

ABSTRACTS

16TH EUROPEAN CONGRESS

OF PHYSICAL AND

REHABILITATION MEDICINE

JUNE 3–6, 2008, BRUGGE, BELGIUM

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WELCOME TO BRUGGE

It is my distinct pleasure to welcome you to the 16th European Congress of Physical and Rehabilitation Medicine, taking place in Brugge/Bruges – Belgium, on June 3–6, 2008.

This 16th edition is organised by the Royal Belgian Society of Physical and Rehabilitation Medicine (RBSPRM) and the European Society of Physical and Rehabilitation Medicine (ESPRM) in collaboration with the European Union of Medical Specialists (UEMS) – Section and Board – and the International Society of Physical and Rehabilitation Medicine (ISPRM).

I am very pleased with the huge contribution of the UEMS Section and Board with topics on training and education, clinical affairs and quality of care.

I am also very proud that the American Academy of Physical Medicine and Rehabilitation (AAPM&R), the French (SOFMER) and Italian Societies on PM&R (SIMFER), and the European School of Marseille have joined us and organise some very interesting sessions during this Congress.

I would like to thank the Federation of European Ergonomic Societies for their cooperation in the pre-congress symposium: ‘Where Ergonomics meet Rehabilitation Medicine’.

I hope that the theme of the Congress ‘From Cell to Society’ will attract you to the different sessions.

Neurological and Locomotor Rehabilitation run through the Congress like a continuous thread.

I would like to invite you to the various practical and theoretical workshops as well.

The organisation made a lot of efforts to create special sessions and workshops for the trainees. I hope they meet each other in the scientific sessions and in the social activities. They are the future of our specialty.

I am pleased to present no less than 929 abstracts in this supplement of the Journal of Rehabilitation Medicine: there are 150 invited lectures, 286 oral presentations and 493 poster presentations. I sincerely thank the members of the Scientific Committee, and Dr. Franco Franchignoni in particular, and the reviewers for their help, support and advice. Thanks to them we can offer you an interesting, balanced Congress.

Enjoy the Congress and the city!

Yours sincerely,

Guy G. Vanderstraeten

Congress President

INVITED LECTURES

11 THE EU STRATEGY FOR PEOPLE WITH DISABILITIES

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Abstract not available.

12 THE LINK BETWEEN ERGONOMISTS AND PHYSICAL MEDICINE – REHABILITATION SPECIALISTS IN A WORKER-CENTERED EUROPEAN PERSPECTIVE

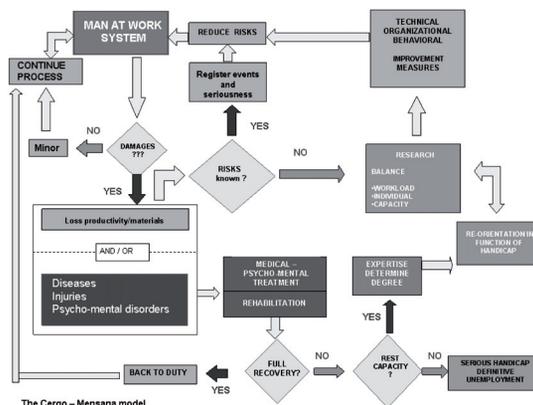
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Our paper is based on the basic principles of prevention at work that are defined in the Council Directive 89/391/EEC on “the introduction of measures to encourage improvements in the safety and health of workers at work”. Concretely, it means that the first target of any European preventive strategy will be to prevent workers from occupational risks at work; this is realised via the elimination of such risks after their screening and their assessment done in a participatory way. If the risks, or certain of them, cannot be totally eliminated, a targeted risk(s) reduction, completed by complementary measures, such as information and training, has to be developed in order to minimize the exposure to such risks (risk should be understood has hazards). This obligation has to be fulfilled by any enterprise/institution in any domain of activity within the European Union (EU27). Unfortunately, if the directive has been transposed in the EU27, its application varies a lot. At the same time, if problems occur, e.g. due to the lack of preventative or strategic visions, the European Trade Unions insist on the onset of two essential compensatory mechanisms: namely, keeping as far as possible the workers at their original job – adapted if needed – and their reintegration at their job – after a rehabilitation period if needed. Keeping an injured worker at his specific job, if achievable (physically, socially, psychologically, etc.) is, for us, the golden standard that shall even integrate the possibilities for the workers to develop (career, well-being, etc.) as before the accident. If this is not possible a constructive alternative – such as an adapted work – shall be found by the involved parties with the specific worker at the centre: he must remain the centre of rotation/decision of anything concerning himself and his future and shall have the opportunity to be supported by his representatives. Usually, this stage is totally realized by multidisciplinary occupational teams (preventionists, ergonomists, occupational physicians / psychologists, personal staff and hierarchy, workers representative). If the accident had major consequences, a rehabilitation period is often necessary before any thinkable return to work. In this latest case, after a longer absenteeism, some other disciplines should integrate the above mentioned multidisciplinary team such as private practitioners and rehabilitation specialists or ‘return to work’ technicians: they will have, jointly with the worker and the traditional occupational team, to assess the job requirements and the work loads (physical, cognitive, sensorial, social and emotional) in relation to the remaining possibilities of the worker at the actual level of rehabilitation. At this stage, the medical staff could even ask colleagues from a physical medicine unit to specifically rehabilitate specific functions in order to make the worker able to face the demand of his former / future job (motor abilities, muscles training, balance, force, velocity, etc.).

13 WHERE ERGONOMICS MEETS REHABILITATION: THE CERGO – MENSANA MODEL

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Up until now Rehabilitation and Ergonomics are living in two different worlds. The rehabilitation is located under the umbrella of the Medical and the curative department and the Ergonomics are more located under the occupational medicines and the preventive area. Although it will be very obvious, looking at the model there is a big grey zone between the preventive and the curative area. In Belgium up until this year there was no communication between the occupational and the curative medical doctor. This implicates that a lot of difficulties arise when the injured – after rehabilitation – employee re-entered the company. When the treatment was successful there is not a big problem, much more different it is when there is no fully recovery and there should be a job re-orientation when re-integrating the work floor. Then it is very important to determine the degree of rest capacity. So the occupational medical doctor can act according the findings coming from the curative department. The main problem is that very often the curative area doesn’t know a lot concerning the work demands of the patient and the occupational medical doctor is often not completely aware of the implications of the rest capacity. The Cergo-Mensana integration model describes the possible meeting points (Grey zones) between the curative and the occupational (preventive- ergonomic) area. These Grey zones are probably the key points for a good success of re-integration of the worker and if necessary of the re-designing of the job to ensure there is no recidivism of the ergonomic – medical related problems.



14 A CLINICAL VIEW OF RISK FACTORS FOR UNEMPLOYMENT IN THOSE WITH DISABILITY

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Introduction: There are different risk factors for decrease in work resumption after long-term sick-leave due to musculoskeletal disease or injury, and factors associated with increased chance to resume work. The aim of this lecture is to give a short overview of the above-mentioned factors. Contents of the Lecture: (i) A short overview of what kinds of risk factor exist for no work resumption after long-term sick-leave due to disease or injury; contents of social law, application of the law, effectiveness of the rehabilitation actors of society and level of their resources, effectiveness of co-operation between rehabilitation actors, eco-

conomic factors, labour market, medical factors, personal factors. How the system works; the more positive factors the greater the chance for work resumption, the more negative risk factors the lesser chance to resume work. Factors that can be influenced. (ii) Examples of important system errors; too few get a rehabilitation measure, too many get a too limited rehabilitation measure, too many get their rehabilitation measure too late, inefficient co-operation between rehabilitation actors, lack of comprehensive view on patients' rehabilitation needs, downsizing specialist-level care gives too long waiting lists for specialist assessments, difficulties with selection of patients for vocational rehabilitation measures, granting disability pension when jobseeker's allowance would have been proper. (iii) Examples of positive factors; effects on employment and sick leave of improved co-operation between rehabilitation actors. Medical factors favouring work resumption. Some obvious factors are documented, such as better work resumption is associated with only one episode of back pain compared to several episodes, only one back surgery compared to several, after rehabilitation lower perceived back pain intensity and less often pain periods compared to higher and more often, back pain without nerve root pain compared to with radiculopathy, solely musculoskeletal pain compared to co-morbidity with depression. (iv) Short overview of medical rehabilitation programmes for patients with chronic pain associated with effects on sick leave or work resumption.

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WORK ORIENTED ASSESSMENT IN LOCOMOTOR DISORDERS FROM THE SWISS PERSPECTIVE

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In the case of the persistent pain and disability due to illness or injury, diagnoses and clinical findings often do not correlate well with physical performance capacity. David Mechanic stated 1959 'Illness and disability vary independently'. An ergonomic assessment based on work-simulation tests such as lifting and carrying, standing, walking, sitting, elevated work, step ladder climbing, hand strength allows a more realistic and reliable judgement of work-related physical performance capacity. Since the 1970s, assessment systems for work-related functional capacity evaluation (FCE) have been developed. At the beginning, psychophysical lifting tests have been used. In psychophysical tests, the client performs a test with increasing load as far as he feels able to do so. In case of poor effort, he performs much less than his physical capacity. On the other hand, also overloading might occur, because the endpoint of the test is not determined by observable ergonomic criteria. Isernhagen introduced the kinesiophysical approach. In kinesiophysical tests, not the test person, but the examiner sets the performance limit of a test, based on standardised ergonomic observation criteria. These criteria imply the observation of muscles recruitment, base of support, posture, control and safety, pace, heart rate, breathing. The comprehensive observation in all the tests also allows well-founded statements on effort and consistency. Kinesiophysical FCE has been further developed and adapted to the needs in Switzerland, and it has become an important standard for medico-legal expertise and work oriented rehabilitation in our country and in other European countries. Effort evaluation is a critical issue in testing, because test results can only be regarded as valid if good effort respectively the absence of symptom magnification behaviour has been confirmed. Effort can partly be observed in a direct way by using the ergonomic observation criteria for the tests. In order to make the effort evaluation more valid, other indirect criteria such as way of pain description, pain

behaviour and consistency should be added. The consequences of observed suboptimal or poor effort for work ability determination and rehabilitation are discussed.

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IMPROVING RETURN TO WORK IN EU – AN EXAMPLE OF WORK-RELATED MUSCULOSKELETAL DISORDERS

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The lack of effective workers protection can result in absenteeism and even early withdrawal from the labour market due to workplace accidents and occupational illnesses. Every year more than 350,000 workers are forced to change jobs following an accident, 300,000 suffer permanent disability to differing degrees and 15,000 are excluded from the labour market for good (1). Of all work-related health problems in Europe musculoskeletal disorders (MSDs) are the most common. Across the EU-27, almost 25% of workers complain of backache and 23% report muscular pain (2). Impairments to the musculoskeletal system cause not only personal suffering and loss in family income, but also constitute high costs for businesses and state economies. Precise figures on overall MSDs costs do not exist. However, estimates show that their impact is huge, for example in some states, 40% of the costs of workers' compensation are caused by MSDs, and up to 1.6% of the gross domestic product (GDP) of the country itself (3). The Agency research report on work-related low back disorders (4) suggested that an integrated management approach including both prevention and rehabilitation of workers with MSDs is the most promising to really tackle the problem effectively. In addition, a new Community strategy 2007–2012 on health and safety at work (5), among other things, encourages the development and implementation of national OSH strategies. In particular, it encourages the Member States to take an action to improve the rehabilitation and reintegration of workers excluded from the workplace for a long period of time because of an accident at work, an occupational illness or a disability. Incorporation of specific measures such as financial assistance, training tailored to individual needs etc. into their national strategies could be beneficial. Taking into account the above, in 2007 the European Campaign ('Lighten the load'(6)) for Safety and Health at Work focused to MSDs. It sought to promote across Europe an integrated management approach to tackle MSDs, embracing both elements - prevention of MSDs and the retention, rehabilitation and reintegration of workers who already suffer from MSDs. A report on return to work (7) was produced to support the Campaign by providing information on the second element. It evaluates the effectiveness of interventions at the workplace and gives an overview of policy initiatives in Europe and at international level regarding the retention, reintegration and rehabilitation of workers with MSDs. In addition, regularly updated relevant good practice information is available on the website (8). A new Agency strategy 2009–2013 is currently being prepared and it takes account of the Community strategy 2007–2012. The proposed six strategic goals for the draft strategy 2009–2013 are: To raise awareness of occupational safety and health risks and their prevention; To identify good practice in occupational safety and health and facilitate its exchange; To anticipate new and emerging risks in order

to facilitate preventive action; To promote Member State co-operation on information sharing and research; To promote networking to make the best use of occupational safety and health resources in Europe and beyond, and To make the EU-OSHA a leading exemplar in social and environmental responsibility.

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SYSTEMS TO AID PEOPLE WITH ILLNESS/ DISABILITIES GET BACK TO WORK IN THE SCANDINAVIAN COUNTRIES – GOOD AND BAD POINTS

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Introduction: There are fundamental similarities in the public systems for vocational rehabilitation in the Scandinavian countries. Rehabilitation actors are the health and medical care services, National Social Insurance Office, employers, County Employment Office, Social Service Office (of the municipality), but there are different national solutions. *Aim:* The aim of the lecture is to comment on these different solutions. Vocational rehabilitation here comprises all types of measures seeking to help the patient/client to return to working life, irrespective of whether they are medical, vocational, insurance, social, or relate to the workplace. *Contents:* There are differences in level of long-term sick leave and disability pension in the Scandinavian countries. Sweden and Norway have high level, Denmark low level while Finland is in between. A bad point of the Swedish system is the imperfect co-operation between the rehabilitation actors. A promising change is a recent reform with new legislation relating to voluntary federations of co-operation between rehabilitation actors. In Norway an interesting point is the attempts to solve the problems with bad co-operation with a merger (‘the NAV-reform’) of three public authorities: Social Insurance Office, Employment Office, Economic support division of Social Service Office. In Denmark the employer is entitled to dismiss an employee for reasons of sickness. If one is ill for more than three months during one year, it is reportedly more the rule than the exception that one loses one’s job. For a permanent partial reduction of work ability the Danish client is offered a so called ‘flex job’ which entitles to flexible working hours allowing him or her to work under favourable conditions, e.g. part-time or whole-time with fewer work tasks for market wages, the employer receiving compensation from the Employment Office/Social Insurance Office. In Finland occupational health services are central rehabilitation actors. Finnish legislation describes the possibility of having a ‘key person’ (case manager) with responsibility for co-ordinating rehabilitation, but without decision-making powers. Finland is the only country where corporate health care is sufficiently developed to be a main actor in rehabilitation.

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COMETE FRANCE: COMMUNICATION, ENVIRONNEMENT, TREMPLIN POUR L’EMPLOI

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The association COMETE FRANCE, which groups twenty eight (28) of the most important establishments of physical medicine and rehabilitation in France, introduces in their health structures a very early step of social and professional inclusion. This initiative consists in anticipating, during the hospitalization, the return to work of handicapped persons, so that they will be effective as rapidly as possible after their release of the clinic. To do this, COMETE FRANCE created, in each of those establishments, an interdisciplinary team (doctors, ergonomists, occupational therapists, psychologists, social workers, etc.) in charge of the preservation of employment and adaptation of jobs and working rhythms. This team is implanted within the structure of care. This anticipation of return to employment gives extremely satisfactory results: persons followed by the COMETE FRANCE teams go back to work twice as often as those who do not benefit of this coverage (Cf. audit 2005 of CREDOC*). Seventy percent (70%) of the persons followed by the COMETE FRANCE teams regain employment, at the latest, 6 months after their release from the establishment of physical medicine and rehabilitation. In 2006, the statistics, on a computing common to the 28 rehabilitation centers participating to the early intervention program, give the following results More than 3,500 welcomed persons and estimated demands (Phase 1): 74% continue the step with Comete France ; More than 3,000 estimated and elaborated projects: 30% pursue the step of insertion with Comete France; About 1,100 action plans operated: – 64% of the people maintained in their employment, – 16% have integrated a training or resumed their studies, – 10% dropped out (medical or personal reasons), – 10 % deferred their project (medical reasons). About 400 persons surveyed one year after their insertion (employment retention, studies resumption or training start): – 71% still employed, – 17% still in training/studies, – 5% without employment (end of contract), – 5% dropped out (medical or personal reasons), – 1% deferred their project (medical reasons). Approximately 300 persons were contacted two years after their insertion (employment retention, studies resumption or training start): – 67% still employed, – 16% still in training/studies, – 6% without employment (end of contract), – 8 % dropped out, – 3% deferred their project. Each year there are 7,500 new handicapped people having either a motor or a neuro-motor deficit, due either en accident or an illness. Most of them, still of working age, could benefit from this early insertion back into work circuit. Their professional life, hindered by their handicap, would enormously be improved by this premature adaptation of their working environment to their handicap.

* CREDOC: Research center for the study and the observation of the living conditions

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VOCATIONAL REHABILITATION IN THE SWISS SOCIAL INSURANCE SYSTEM – SUVA’S SOLUTION

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The Swiss social insurance system has grown historically and is made up of 10 branches of insurance. Accident insurance offers employees protection against occupational accidents and diseases and – as a unique feature worldwide – also against leisure time accidents. Accident insurance is covered by the Swiss National Accident Insurance Fund (Suva) and private insurance companies.

Insurance coverage includes care benefits (medical treatment) and financial benefits (in particular, daily benefits and pensions) but not, however, vocational rehabilitation. This task is the responsibility of Switzerland's disability insurance system. In contrast to most countries in Europe, rehabilitation, reintegration and financial payments are thus not entrusted to the same insurer, which leads to a risk of delays and duplication and creates coordination problems. Attempts to transfer this competence to accident insurance companies have so far been unsuccessful. Suva – Switzerland's largest accident insurance company – therefore goes beyond its statutory remit for economic and ethical reasons. Five years ago, it placed its case management on a new footing. With its New Case Management (NCM) as it is known, it takes into account the fact that five percent of accidents account for 80 percent of the costs. The focus of NCM is squarely on accident victims who, after a serious accident, find themselves in a difficult situation in terms of occupation, family, personal finances and social aspects. Experience has shown that it is not just health impairments but also the personality structure and the occupational and social setting that have a decisive influence on the healing process. These accident victims in difficult situations are helped individually and comprehensively by specially trained case managers with the aim of reintroducing them to the working process. The case managers – insurance specialists with high-level social skills – are supported by case teams, which also include doctors. Initial results are convincing: the number of new disability pensions has been reduced by a quarter of one percent. The cost of disability pensions has even been reduced by one third. As was clearly revealed by the contributions from various countries at the Conference of the 'European Forum of Insurances against Accidents at Work and Occupational Diseases' in June 2007 in Lucerne – a successful back-to-work strategy is based on five principles: the confidence of the person to be rehabilitated, speedy action (danger of chronification), subtle organization of the complex rehabilitation process, a multi-disciplinary approach and proactive financial investment. These core principles apply irrespective of the relevant social security system. They clearly show that accompaniment and care must start at an early stage and preferably from one source if they are to be successful, an approach that is made easier with integrated models.

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VOCATIONAL REHABILITATION IN THE UNITED KINGDOM

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Introduction: In 2000, the British Society of Rehabilitation Medicine (BSRM) brought together rehabilitation professionals, primary care practitioners, occupational health physicians, case managers and representatives of those with disabilities and government – which was concerned at the growing costs of providing benefits. The report published brought together these strands to provide an insight into Vocational Rehabilitation (VR) in the UK (1). **Current Situation:** The UK sees vocational rehabilitation as complex system of interactions relating to policies that are either 'top-down' or bottom-up (2). Top-down approaches reflect government policies which have been introduced with the following objectives: 1) Increase the proportion of the population of working age actually 'in work' from 75% to 80% (3). 2) Decrease expenditure on incapacity benefits (currently about £B12.5 spent on about 2.6 million individuals) through its Pathways to Work Programme (4). 3) Improving both personal and national health and well-being through its Health and Well-being strategy (4; 5) The 'Pathways to Work' programme has targeted those newly receiving incapacity benefits by initiating compulsory interviews; offering 1) financial incentives to return to work (RTW); 2) 'condition management programmes' (with local health providers on the NHS), with the aim of helping customers manage their health condition or disability more effectively. Dame Carol Black, former President of

the Royal College of Physicians, has been appointed Director of a 'Health and Well-being Strategy' in 2006, linking the work of the Departments of Health and Work and Pensions and following up the finding that Work is generally good for your health (6). Bottom-up approaches include a number of case management VR companies now developed in the UK, mostly employed by insurance companies. The Case Management Society of the UK, together with the Vocational Rehabilitation Association represent rehabilitation professionals in this sector and have published standards of professional practice. The BSRM VR Special Interest Group meets twice yearly. Providers of 'bottom-up' rehabilitation have joined with government and business to form the Shadow Rehabilitation Council of the UK. **Conclusion:** In the UK a consensus of views exists between those with disabilities, rehabilitation professionals and the government – a desire to work if possible.

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AGE TRENDS IN THE NEED FOR RECOVERY AFTER WORK

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Aim: The need for recovery after work (NFR) is an early indicator of adverse health effects (1). In earlier research it has been demonstrated that older workers have a higher NFR than younger workers (2). The aim of this study was to explore further the relationship between age and the NFR. **Methods:** 1,855 subjects (80.5% response rate) employed in the public sector participated in a cross-sectional questionnaire study. To describe the relationship between NFR and age the subjects were divided into eight age categories (<25 y, 25–29 y, 30–34 y, 35–39 y, 40–44 y, 45–49 y, 50–54 y, ≥55 y). For comparison of older and younger workers the subjects were divided into two age groups: older (≥45 years; 27.7%) and younger workers (<45 years; 62.3%). The dependent outcome variable was assessed by "The Need for Recovery Scale" questionnaire (0–100 score; high score: >54). Both occupational and non-occupational factors were assessed as well. Univariate and multivariate logistic regression analysis was used to calculate the OR for the presence of a high NFR. To test the difference between the different age groups the chi-square test, the Kruskal-Wallis test and the Mann-Whitney-U test were used appropriately. **Results:** The mean NFR for the whole study population was 38.0 (SD 32.3). There was a specific pattern in the mean NFR score by increasing age: starting relatively high in the youngest group (40.4), decreasing until the age of 34 (31.3), increasing steadily until the age of 54 (46.4) and decreasing from the age of 55 (38.1) ($p < 0.000$). Occupational exposures of the older workers were about similar (or even slightly more favourable) as compared to those of the younger workers. In the group of 45 years or older 42.6% had a high NFR, in the younger group this reached 33.5%, resulting in an univariate OR of 1.47 (95% CI 1.21–1.78), and 1.56 to 1.73 in multivariate logistic regression models. **Discussion:** A specific age trend in the NFR could be identified. The high NFR in the youngest age category could be explained by a lower level of experience in these starting workers. The decrease after

the age of 54 could be due to the healthy worker effect. Although occupational exposures were about similar, workers of 45 years or older had a significantly higher need for recovery than workers younger than 45 years and there were significantly more subjects with a high need for recovery in the group of ageing workers as compared to the group of younger workers, which confirmed our earlier findings.

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KEEPING OLDER PEOPLE AT WORK IN FINLAND – PRACTICES RELATED TO ERGONOMICS AND REHABILITATION

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The great age cohort born in 1945–50 has been the main resource of the current Finnish workforce of 2 400,000 employees. During the past 15 years, rapid ageing of the workforce has been an acute topic, and several strategic and operative actions have launched for promoting health and work ability of older employees. Due to all actions the average retirement age has slowly increased to about 60 years but still quite far from the target level of 63–68 years. The actions have included research and various age programmes carried out by research institutes and ministries. The comprehensive Finnish model for promoting the health, work ability and wellbeing was developed in the Respect for the Ageing program (1990–1996) based on the follow-up study on ageing municipal workers since 1981. The Committee on Ageing completed the National Programme on Ageing Workers in 1998–2002. It was followed by five large national programs in 2003–2007. The encouraging results have provided good practices and tools for developing work organizations and environments to fit workers of all ages, and also individual measures for improving health and work ability. The most effective measures focus on ergonomics of work, organizational atmosphere and supervision, flexible working hours, additional training of occupational competence, opportunities to affect work, possibilities for rehabilitation, physical exercise associated with the control of body weight, and active life style in general. In Finland, occupationally oriented rehabilitation for preventing disability to work and premature retirement has been very active since 1989. However, the rehabilitation is still a quite medically and individually oriented process although no sustainable development can be expected without changes in work contexts. Therefore, the practitioners of ergonomics and rehabilitation should collaborate to produce more tailored flexibility to work contents and conditions based on a worker's individual characteristics, capabilities and life situation. In spite of age management and other positive actions, approximately 900,000 of the current Finnish workforce will exit from the working life in the next 10 years. In 2020, the age of every fourth Finn will be over 65 years, and the maintenance of the Nordic style society of wellbeing and prerequisites for the sustainable development will be a great challenge requiring more qualified, productive and efficient work.

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ERGONOMICS AND REHABILITATION: A UK PERSPECTIVE

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Since 1994, the UK has operated a government-based 'Access to Work' scheme. This is intended to help overcome the problems resulting from disability, although it does not replace the normal

responsibilities of the employer to implement health and safety regulations. It offers practical advice and help in a flexible way that can be tailored to suit the needs of an individual in a particular job. It can help in a number of ways, including adapting an employer's or self-employed person's premises, or equipment to assist a person with a disability to obtain or remain in employment. It is not intended to support the rehabilitation and return to work of those recovering from acute disorders. However, it does assist those with more permanent disability. It makes no distinction between individuals who have sustained their disability as a result of an injury (work-related or otherwise) or those where the disability arises from a congenital, possibly degenerative, disorder. Ergonomics has, for many years, been described as 'fitting the task to the person'. Traditionally, that has involved encouraging the adoption of designs that accommodate a wide proportion of the potential user population, normally regarded as the 90% encompassed by the 5th to 95th percentiles. Conceptually, this ideal relates to any biological distribution although, most usually, it is applied to stature, reach and other anthropometric parameters far more readily than other human attributes (for which the necessary population data might not be readily available). As such, ergonomics might seem diametrically opposed to any idea of bespoke workplaces or 'fitting the task to the individual'. However, the idea of ergonomics as seeking to match the demands of the task to the needs and capabilities of the human population can readily be applied to the individual with disabilities which take them outside the 'normal' design population. An ergonomic approach of establishing the needs, attributes, skills, capabilities and limitations of a working population and seeking to adapt work demands to match those needs applies equally well to a working population of one person. As a formal part of the Access to Work scheme, provision is made for appropriate professionals to carry out workplace assessments. The scheme extends to all forms of disability (e.g. visual or hearing impairment), although IOM ergonomists become involved where the disability is predominantly physical. Case A involved a woman who operated her own small office-based business. She had suffered from a congenital spinal defect since birth but had, until relatively recently, coped with the disabilities this imposed. However, in recent years, further degenerative change, associated with her congenital defect, had made it increasingly difficult for her, culminating in her being unable to continue to work (and, coincidentally, jeopardising the employment of those who worked for her). Case B involved a female lecturer. She had been diagnosed with a degenerative, debilitating condition characterised by severe fatigue and muscle weakness. Again, this had progressed to the point where she was unable to fulfil her lecturing duties. The paper will describe these two cases and outline the recommendations made to help them return to work. There is no provision within the scheme for any follow-up to determine the effectiveness of any recommendations made (although, to date, no complaints have been received that they have not worked or proved impracticable to implement). As far as can be determined, no formal evaluation of the impact and effectiveness of this scheme has been published. At an individual level it clearly offers a procedure through which ergonomic skills, techniques and expertise can be applied to assist those with disabilities obtain, remain in or return to work. How well it is implemented and how effective that implementation is in achieving these aims remains to be determined.

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VOCATIONAL REHABILITATION

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A report will be presented on how, the national public Social & Health Service, in Italy is organized concerning people with occupational and work related diseases. Also attention will be dedicated on the different strategies, regarding assistance and rehabilitation possibilities, achieved by: 1) National Insurance Institute for Accidents at work; 2) The public system for occupational health, safety & ergonomics; 3) The private system for occupational health, safety & ergonomics Besides the above mentioned items also the facts on

how the Italian law and organizations provides possibilities to get disabled people back to work. The pros and cons will be discussed and I will underline the need of the development of ergonomic research. This to improve the design of machinery and work places and to stress the diffusion of the ergonomics principles to correct the existing work places. Important herby is to stress the cooperation with rehabilitation knowledge. Special attention will be paid to occupational and work related musculoskeletal disabilities.

I15

THE TORNEO PROJECT FOR VOCATIONAL REHABILITATION OF PERSONS WITH ACQUIRED BRAIN INJURY

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The Torneo project, an acronym for 'Tratamientos Orientados desde la Rehabilitacion a las Necesidades de Empleo y Ocupacion' was a Horizon project of the E.U. Project members came from Ireland, U.K., Scotland, France and Belgium. Member institutions were working in the field of rehabilitation or vocational training and guidance. The objectives of the project were: – To develop through consortium working an innovative service for people with acquired brain injury as a model of good practice; – To provide individuals with acquired brain injury a structured and professionally monitored programme that will assist them to effectively re-integrate into work and community; – To influence developments in the wider community so that a comprehensive service system can be established for people with acquired brain injury. – To develop a model on a local and transnational basis, by means of mutual exchanges and staff training seminars, to ensure that those delivering the services have the appropriate expertise. –To undertake a formal evaluation of the project to inform future policy. The basic starting point of the Torneo project was to develop procedures to establish a network of cooperation between functional rehabilitation, vocational rehabilitation and the vocational guidance of persons with an acquired brain injury. This common final objective and the composition of the group members had an increasingly effect on the concrete way of working of each of the participants. For the Center for Locomotor and Neurological Rehabilitation of the University Hospital of Ghent, the project resulted in a differentiation of the rehabilitation of brain injured patients into 4 phases, each phase with a specific methodology and expertise. The first phase is directed to ABI-patients who are still minimally responsive, the second phase is built up around patients with p-adl (in) capacities, the third phase focuses on i-adl (in) capacities and finally the fourth phase concerns the vocational reintegration process. We will further explain the specific methodology we use in our vocational rehabilitation phase. Addressing questions as which patients can start the fourth phase, what is the main input of the different therapeutic disciplines, especially of neuropsychology and occupational therapy and which social measures and opportunities can support this process. In describing the methodology we will pay special attention on baseline assessment, work trials within our hospital and in a normal work environment and follow-up procedures. We will discuss also some results of the project that voluntary today has been implemented in our therapeutic approach of individuals with ABI.

I16

GOCI-PROJECT

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GOCI is recognized by the Flemish unemployment agency (VDAB). The main role of the organization is to provide vocational training and career guidance for people with disabilities and mental illness. Most of them are persons with physical problems, persons with autism, persons with psychiatric problems, chronic diseases, hearing or visual disabilities. All of them have normal learning competences.

The only objective is to place the trainees in high level jobs in information technology, administration and Computer Aided Design. Approximately 50 trainees per year are trained on a 2-year training course. GOCI achieves a very high rate of employment placements, approximately 80%, by working closely with employers, who are involved in the selection of trainees, and by providing customized training programmes to suit the need of the employers. A significant part of GOCI's training is organized on-the-job, where the trainee joins the company to experience a real work-environment. GOCI has developed a very successful JOB COACHING scheme to support trainees, during their training and when they move into employment and their new employers, to ensure an optimum match and successful transfer into employment. GOCI uses all kinds of technology in very different areas. They try to be in the front of general developments on the Labor Market, because they want the trainees to be better trained than their non-disabled colleagues! GOCI offers training programs which prepare the trainees for different kind of jobs, especially in the sector of ICT. Trainees can choose one of the following job-profiles: ICT (programming, helpdesk-operator, network administrator, etc); CAD (Computer aided drawing); Administrative work (accountancy, secretary); Call center-operator. GOCI has 20 year experience in cooperation on a European level. At first they were involved in the Helios and the Eurotecte network, in which the main goal was transfer of know-how. These networks were the start of several projects in a variety of European programmes like Horizon, Euroform, Leonardo, Equal, ESF, Interreg. At this moment GOCI is cooperating in projects that involve web-based-learning and access to internet for all. Persons with disabilities are still one of the most disadvantaged groups on the open labour market. We have to take care that new technologies improve the accessibility and inclusion for this target group, and not reduce it!

I17

A SUCCESSFUL VOCATIONAL REHABILITATION SYSTEM FOR THOSE WITH TRAUMATIC BRAIN INJURY

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Introduction: Many people with brain injury in the UK do not receive the specialist support to enable them to return to productive occupation. 'Working Out' is a specialist brain injury vocational rehabilitation programme, funded originally by the Department of Health and the Employment Service. The programme was the South-East Regional Winner of the NHS Nye Bevan Modernisation Award 2000 and is an example of good practice in the National Service Framework for Long-term Conditions (Department of Health, 2005). *Aim:* The Working Out programme was set up to assist people with brain injury who have been unable to return to previous occupation to establish themselves in alternative occupation. *Patients and Methods:* The programme is open to adults with acquired non-progressive brain injury. It comprises four phases: assessment; work preparation; work trials; and supported work placements. Assessment combines interviews, formal testing and observation/ratings of work attitude, performance and behaviour on practical activities. Work preparation integrates brain injury rehabilitation (education programme, cognitive group, personal issues group, occupational/psychological therapy) with graded vocational activities (work preparation group, community vocational activities, individual project work, vocational counselling). Voluntary work trials evaluate alternative occupation and develop work skills and coping strategies. Clients are then supported in establishing themselves in alternative occupation. *Results:* Outcomes for 113 persons seen for vocational rehabilitation are as follows: 64% paid employment/vocational training; 20% permitted work, voluntary work, adult education or housewife duties; 5% further rehabilitation/treatment; 9% disengaged; 2% no activity. Within the R&D project outcomes were well maintained at one and two year follow-up. *Conclusions:* Experience on the Working Out Programme is that a blend of brain injury and vocational rehabilitation, working in partnership with Jobcentre Plus, is effective

in enabling people with brain injury to establish themselves in alternative occupation.

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WHO PRIORITIES FOR DISABILITY AND REHABILITATION

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Abstract not available.

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CURRENT STATE OF THE APPLICATION OF THE ICF IN PHYSICAL MEDICINE AND REHABILITATION

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Rehabilitation medicine can be defined as the medicine of human functioning. Therefore, the ICF as approved by WHO in 2001 is of utmost importance for our specialty. The ICF is the basis for the conceptualisation of the rehabilitation strategy completing the curative, preventive and supportive health strategies. The ICF and the ICF-based conceptualisation of the rehabilitation strategy are again the basis for the conceptualisation of our specialty, the Organisation of human functioning and rehabilitation research in distinct scientific fields and the development of research capacity with respect to academic training programs, interdisciplinary university centres and national/international collaboration networks. The conceptualisation, Organisation and development of human functioning in rehabilitation based on the ICF is the topic of a number of current publications¹. Next to these conceptual developments, there is now a wide range of activities throughout the world of rehabilitation in the development of practice tools and applications of the ICF. First of all, the ICF can serve as reference for the comparison, selection and further development of existing measures of human functioning. The Brief ICF Core Sets are the standards for reporting and planning of studies as well as for clinical encounters. The Comprehensive ICF Core Sets are the standards for multi-disciplinary assessments for example in the context of rehabilitation medicine. Another important development is the operationalization of the ICF qualifiers to directly apply the ICF in practice and research.

Reference:

1. Grimby G, et al. *J Rehab Med* 2007; 39: 277–8.

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FROM ICF CORE SETS TO ICF CORE MEASURES

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Introduction: The implementation of the International Classification of Functioning, Disability and Health (ICF) Core Sets reveals measurement related issues, e.g. with the ICF qualifiers: there are

two approaches to measure a specified ICF-category, a) to use the ICF qualifier as a rating-scale (0–4), or b) to use information obtained with a clinical test or a patient-oriented instrument and to transform this information into the ICF qualifier. Another question is whether it is possible to develop clinical measures with metric properties (1) that provide summary scores across a number of ICF categories. *Aim:* To illustrate a) the construction of interval scales for ICF-categories by integrating items from patient-oriented instruments, and b) to explore whether it is possible to construct clinical measures of functioning by integrating information obtained across categories of ICF. *Patients and Methods:* Two studies using data from a sample of 122 patients with rheumatoid arthritis (RA) and 111 patients with Ankylosing Spondylitis (AS). The patients with RA responded to 19 Items related to the ICF-category b130 Energy and drive functions from 6 different patient-oriented instruments. Rasch analyses were used to examine whether the instrument items constitute a psychometrically sound interval scale. Patients with AS were assessed with regard to 68 ICF categories, these were analyzed to evaluate the fit to the Rasch model. *Results:* Individual ICF-category: Sixteen of 19 items fit the Rasch model according to the X^2 statistic ($X^2_{df=32}=38.25, p=0.21$) and to the Z-fit statistic for items and persons. Project overall score: a clinical measure of functioning for AS was proposed that contained 64 ICF categories. The raw scores obtained by adding the answers to the 64 ICF-categories can be transformed to a Rasch logit scale and to an interval scale ranging from 0–100. *Conclusion:* ICF-category interval scales to operationalize single ICF-categories can be constructed, and a clinical measure of functioning can be constructed based on body functions and structures and activities and participation domains.

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APPLICATION OF THE ICF IN REHABILITATION SERVICE MANAGEMENT IN BELGIUM

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By Belgian government order a study has been performed concerning the organisation and financing of musculoskeletal and neurological rehabilitation. The studied pathologies are stroke, total hip replacement (THR), multiple sclerosis (MS), lower extremity amputation (LEA) and spinal cord injury (SCI). The methodology consists of scientific literature search, completed with grey literature, Belgian data, (inter)national expert opinion, and expert meetings and surveys. First a conceptual definition is developed within the framework of ICF, which in a next phase needs to be made operational by the use of a comprehensive outcome model and of a patient classification system (PCS) which can ideally be used for resource allocation as well as clinical decision making. Current Belgian rehabilitation practice is investigated by a survey and compared to clinical pathways developed in several countries. Also an international study is performed comparing organisation, financing and quality systems of rehabilitation services of The Netherlands, France, Germany, Sweden and the United States. Unfortunately no country disposes of a ready-for-use model for post-acute rehabilitation. Based on the previous data several options for organizational models in the post-acute rehabilitation phase are proposed but the ‘stratified rehabilitation model’ is recommended. This model contains three levels: general rehabilitation services, specific, and highly specific rehabilitation services, organised in a network. For each level several financial models are developed (fee for service, lump sum, or mixed with different weight on the components). However, the implementation of this model requires a systematic assessment of patient’s rehabilitation needs in the acute phase of the disease trajectory, which has to be repeated periodically and can result in a transfer of an individual to another level within the network. The criteria used for patient assignment to the appropriate

service level are: complexity of rehabilitation needs and goals, and incidence and prevalence of consequences of health conditions. For this assessment a PCS is needed, based on the ICF framework. At this point such a PCS is not available yet and further (international) research and effort is mandatory in order to develop such a tool, for instance based on the ICF core sets or ICF linking rules.

Reference:

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I22

ICF-BASED CASE STUDIES IN PERSONS WITH SPINAL CORD INJURY TO ILLUSTRATE THE IMPLEMENTATION OF ICF TOOLS IN MULTI-DISCIPLINARY REHABILITATION MANAGEMENT

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Introduction: The ICF is the universal standard to describe functioning and disability of patients with health conditions. Functioning is at the starting point of rehabilitative strategies which aim to enable people with health conditions experiencing or likely to experience disability to achieve and maintain optimal functioning in interaction with the environment. However, to implement the ICF in clinical practice within a structured rehabilitation management process suitable ICF tools are needed. *Aim:* To develop ICF-based tools to facilitate the implementation of the ICF in the rehabilitation process of persons with health conditions and to illustrate the implementation of those ICF-based tools. *Patients and Methods:* 10 case studies with persons with SCI have been performed, patients from varying demographics and different causes, severity and situations of SCI are studied. ICF tools were developed for the project and used for the presentation of the rehabilitation management. *Results:* An ICF Categorical Profile, an ICF Assessment Sheet, an ICF Intervention Table and an ICF Evaluation Display have been developed and integrated in the so-called Rehab-Cycle, a problem solving approach for the management of patients in rehabilitation. *Conclusion:* The developed ICF tools allow the description of individual functioning status in persons with SCI, facilitates multidisciplinary rehabilitation management and the illustration of changes in the functioning status. However, challenges for further research exist. These are the classification of the 'personal factors', the assignment of appropriate measures to ICF categories, the operationalization of the 'ICF qualifier' and the development of an ICF based electronically documentation system.

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I23

PHYSICAL CAPACITY EVALUATION IN PMR OR IN PATIENTS WITH PAIN AND CHRONIC ILLNESSES

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Patients with chronic pain and illnesses are generally thought to be physically less active and therefore unfit. Hence, physical reconditioning is often included as part of their comprehensive therapeutic program. *Physical Fitness and Quality of Life:* Physical fitness is generally defined as a set of attributes that people have or achieve that relates to the ability to perform physical activity. It is a multi factorial construct that includes several components: Cardiorespiratory endurance (CRE), Muscular strength and endurance, Flexibility (mobility, range of motion), Coordination (motor control), Body composition. A good level of CRE provides individuals with increased cardiovascular, respiratory and locomotor reserves during daily life physical activities. Fitness has also been shown to be a strong determinant of functional independence and quality of life in elderly individuals. Hence, assessing fitness level in patients with chronic pain and illnesses is clearly relevant in the context of rehabilitation of such patients. More precisely, it could help determining how much physical reconditioning should be emphasized during comprehensive rehabilitation of such patients. *Validity of Physical Capacity Evaluations in Patients with Chronic Pain and Illnesses:* Some physical testing procedures, e.g., CRE, mobility and strength testing which is often achieved through maximal testing protocols, are generally not valid for the more disabled patients who tend to avoid feared activities and movements. Pain or simply fear of pain, movement or re-injury may inhibit the subject with the consequence that their true maximal strength, flexibility or CRE may be systematically underestimated through maximal testing procedures. As fitness assessment could usefully be repeated during physical reconditioning, the acceptability of testing should also be considered. CRE and body composition are the only components of fitness that can be evaluated through submaximal testing protocols. Hence, physical fitness assessment in patients with chronic or chronic illnesses should probably be limited to a simple submaximal CRE test combined with anthropometric measurements (weight, height) allowing body mass index (BMI) calculation.

I24

APPLICATION OF THE ICF IN A INTERNATIONAL CLASSIFICATION SYSTEM FOR PHYSICAL THERAPY, OCCUPATIONAL THERAPY AND SPORTS THERAPY INTERVENTIONS IN SCI REHABILITATION

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Introduction: To be able to determine and compare the effectiveness and efficiency of comprehensive SCI rehabilitation programs, it is necessary to describe the contents of these programs in a standardized and unambiguous way. To date, however, no classification system is available for therapeutic interventions in SCI rehabilitation. *Aim:* To present the development of an international classification to document physical therapy, occupational therapy and sports therapy interventions directed at mobility and self-care in SCI rehabilitation. To ensure a cross-cultural perspective, the ICF was used to structure the classification. *Patients and Methods:* 1) Modified Delphi consensus rounds on the definitions, terminology, relevance and completeness of the classification with 30 therapists from 10 Dutch and Flemish SCI centers. 2) Feasibility study with 36 therapists from 3 Dutch SCI centers in which SCI treatment sessions during four weeks were recorded. 3) Inter-rater and intra-rater reliability study

with 15 therapists of 3 Dutch SCI centers classifying videotaped interventions. **Results:** The classification comprises three levels of functioning: functions, basic activities, and complex activities. The three levels comprise 25 categories within which interventions are listed. By applying ICF terminology into detail the majority of the categories and interventions can easily be linked to items in the ICF. 1) Sufficient consensus was obtained on the definitions of the three levels, the terminology used and the completeness of the categories (range, 75% to 100%). 2) A total of 856 treatment sessions were recorded. The system was rated as useful, easy and quick to use. 3) The inter- and intra-rater agreement was good; at the first observation 91.7% of 252 assigned codes were correct and at the second observation 94.4% of the 252 assigned codes were correct. **Conclusion:** The findings support that our classification system is a suitable and reliable tool to record the contents of SCI treatment sessions in different settings and by different therapists.

I25

TRAINING OF WORKING MEMORY

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Executive functions are negatively affected by increased age (2) and updating of working memory has been proposed to be one of the more important executive functions for many everyday activities and are closely related to intelligence (1). This background makes it interesting to investigate age differences in immediate training gains, transfer effects and long term maintenance in young and old healthy adults after five weeks of computerized training of updating working memory. To investigate training related brain activity changes and transfer effects all participants were fMRI scanned and tested in cognitive skills before and after the five week period. Results revealed that both young and old trained improved significantly more than controls for respectively age group in the letter memory criterion task and the results were maintained 18 months after completion of training. Transfer effects were in general quite limited and restricted to young participants were transfer effects were seen in a 3-back updating task. fMRI results revealed training related increases in striatum for young in both the criterion and 3-back task whereas striatal training related increases were only seen in the criterion task for old. The striatal region were a common training related increase was seen for letter memory and 3-back were also activated pre-training for young in these tasks whereas no striatal pre-training activation were found for old. These results indicates that both young and old can increase and maintenance their performance after updating training of working memory and that striatum play a critical role in learning and transfer of updating skills.

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I26

INVOLVEMENT OF transcortical PATHWAYS IN THE TRANSMISSION OF THE HYPERACTIVE STRETCH REFLEX IN PATIENTS WITH SPASTICITY AFTER STROKE

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Many stroke patients suffer from spasticity, characterised by increased resistance to passive muscle stretch and brisk reflexes.

The mechanisms include changed mechanical properties of the muscles and altered excitability of spinal pathways (i.e., hyperactive stretch reflexes). In healthy subjects, transcortical pathways (including primary motor cortex) have been shown to be involved in the transmission of long-latency components of reflex responses in actively contracting muscles. To study whether there is similar transcortical involvement during passive stretch of spastic muscles we performed functional MRI during slow and fast passive stretch of hand flexor muscles in healthy subjects and patients after stroke. Cortical activity patterns differed between groups. In particular, patients had increased velocity-dependent processing of passive muscle stretch. Activity in certain cortical sensory and motor areas was found to correlate with the active contractile response in spastic muscles being passively stretched. The findings suggest that transmission through transcortical pathways may be involved in the increased tone in spastic muscles after stroke.

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LEARNING AND RE-LEARNING OF EXECUTIVE FUNCTIONS

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The label ‘executive functions’ refers to higher-order systems that are necessary for strategic, goal-oriented behavior. There is not complete agreement on a taxonomy of executive functions, but there is growing consensus regarding some key functions such as shifting, inhibition, and updating. In this overview presentation I will present current models of executive functions and discuss results from human brain-imaging studies involving healthy participants that have begun to map the neural basis of specific executive functions. A special focus will be on fronto-striatal circuits, and learning-related changes in these circuits. In the final part of the presentation, evidence for plasticity in the neural systems underlying executive functions will be reviewed.

I28

A NETWORK APPROACH TO RECOVERY

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1) Brain functions are organised in distributed, segregated networks with input and output; 2) Reorganisation due to lesions or intervention mainly takes place within the framework of these nets; 3) The effects of lesions, dysfunction and stimulation or intervention depend on the pre-existing individual network architecture and the site and type of intervention. Modern brain imaging allows the identification of network architecture as well as the effects of rehabilitation on the brain. A new combination of fMRI to detect activation hot spots as network nodes with diffusion tensor based fibre tracking to delineate the connections between the nodes allows the anatomical description of networks in the human brain. A general anatomical framework for interaction between the postrolandic brain regions with the frontal lobe seems to emerge: a dorsal pathway along the superior longitudinal fascicle maps preprocessed sensory, auditory or visuo- spatial information from the temporal or parietal lobe with motor programs in the premotor cortex. This dorsal system is embraced by a ventral network, running through the extreme capsule, which connects to the lateral prefrontal cortex. It is used for top- down control of postrolandic brain regions by the frontal lobe and for the generation of internal, conscious behaviour as in imagery. Applied to the domains of motor, language and attentional control, these networks relate to symptoms as hemiparesis, aphasia and neglect in patients. Understanding of such networks provides a basis for a knowingly intervention: The motor cortex in stroke patients can be stimulated through intense training (e.g.; constraint induced movement therapy) or DC or TMS stimulation with in part long-lasting effects. Network access to the motor system beyond M1

is feasible in patients and has been demonstrated with fMRI: 1) The postcentral cortex can be activated through sensory stimulation and passive movement; 2) The dorsal premotor cortex (Pmd) through imagery of movement; 3) The ventral premotor cortex (Pmv) through watching and imitation in videotherapy. Transhemispheric access to M1 of the infarcted hemisphere poses a special challenge. Network analysis determines a connection of Pmd of one hemisphere to M1 of the other hemisphere via callosal fibres and PmD of the other hemisphere. Accordingly, mirror-training in healthy subjects of the right hand (visualised in a mirror as a “left” hand) leads to improvement of function in the (untrained) left hand, which is correlated to BOLD changes in right PmD. Thus, transhemispheric influence of one M1 is feasible through mirror training of the ipsilateral hand and this change is mediated by premotor cortices.

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NEUROPLASTICITY AND CHRONIC PAIN

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Introduction: Thalamocortical dysrhythmia has been suggested as a pathophysiological explanation for deafferentation pain (1). Sensory deafferentation results in expansion of the adjacent non-deafferented region into the vacated area in the somatosensory cortex. However both these models conceptually generate pain in the edge area of the deafferentation, which does not fit the clinical data. Recently a new form of plasticity, Darwinian plasticity has been proposed, based on neurophysiological and neuroanatomical data, functional imaging, clinical and human electrical brain stimulation data (2). This model suggests that the deafferented area actively goes and looks for novel information in order to survive. If Darwinian plasticity exists, stimulation of the deafferented area should improve pain, if not, stimulation of the deafferented area should worsen it by increasing classical plasticity. **Aim:** The aim is to develop Darwinian neuroplasticity based novel treatments for chronic pain. **Patients and Methods:** Eight patients with intractable neuropathic pain were selected for this study. fMRI scans of the somatosensory cortex were performed while pain was worsened. The allodynia related BOLD signal on the somatosensory cortex served as a target for neuronavigated transcranial magnetic stimulation (TMS). Five of the 8 patients had beneficial effect with TMS and subsequently underwent an implantation of a cortical electrode on the contralateral primary somatosensory cortex. **Results:** All patients with epidural electrical primary somatosensory cortex stimulation improved 66% to 100% (median 90%). Follow up time of the patients ranges from 12 to 36 months. A significant pre vs. post difference on a 95% probability level should be equal to or above 1.87, on a 99% probability level equal to or above 2.46, whilst the highly significant average pain reduction was equal to 8. **Conclusion:** Based on the idea that directly supplying the missing information to the deafferented somatosensory cortex will suppress deafferentation induced Darwinian plasticity, neuronavigation guided implantation of an epidural electrode on the allodynia generated BOLD spot on the contralateral primary somatosensory cortex was performed successfully. Adding Darwinian plasticity to thalamocortical dysrhythmia explains clinical data better than the combination of classical neuroplasticity and thalamocortical dysrhythmia.

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THE FEARFUL BRAIN

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Data will be presented and reviewed on fear-related plasticity in the human brain. Fearful encounters activate the amygdala in several anxiety disorder including specific phobia, social phobia and posttraumatic stress disorder. In specific phobia for example, exposure to feared objects elicits amygdala activity that is associated also with increased activity in visual object recognition areas resulting in motor readiness. Also, fear conditioning in rodents as well as in humans increase amygdala activity suggesting that this could represent an evolutionary conserved etiological mechanism because fear conditioning has been proposed to underlie the acquisition of certain phobias. Some studies indicate that when phobias are treated, a normalization of the original hyperresponsivity in the amygdala occurs. In social phobia this seems to be true both for pharmacological and psychological treatments. This illustrates plasticity in the core fear system in the human brain and suggests that attenuated amygdala activity is a final common pathway for therapeutic interventions.

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ANIMAL ASISTED THERAPY IN PAEDIATRICS

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Animal assisted Therapies are increasingly developing within North Europe and North America. Many these therapies can be used in children. **Dog Assisted Therapies:** The fields in which these therapies are working are multiple. Proper definitions have been developed by Delta Society: Therapy Dogs, Service Dogs for Blind, Service Dogs for Deaf, Medical Alert Dogs, Psychiatric Service Dogs, Animal assisted activity in Hospices, Animal Assisted activity in Hospitals. **Dolphins assisted Therapy:** Mainly for Autistic children, Down Syndrome and Cancer patients. EEG studies have been performed related to human-dolphins interaction. They observed that: Alpha state is induced, and this could be responsible of a strengthening of the immune system. This could explain its efficacy as a complementary treatment in cancer in children. There is a relationship between cerebral waves and increase in endorphins, and this could explain release of pain in neuropathic patients (spinal cord injury) and cancer. **Horse Assisted Therapies:** Hippotherapy in beginning to be used as a tool in the treatment of neurological disorders, mainly through three compounds: hippotherapy; therapeutic riding and riding as sport. Main effects act over spasticity, trunk control, gait dynamics, respiratory dynamics, vestibular system, and central pattern generators in spinal cord. All these effects, acting together with psychological effects, can be very important in Neurological Rehabilitation. **Aims and Goals:** The objective of this study was to value the effectiveness hippotherapy in gross motor function in a group of children with neurological diseases. **Material and Methods:** 15 Children with neurological diseases were included in the study: 11 Cerebral Palsy, 1 Sd West, 1 Sd Of cat Mew. 1 Brain Injury 1 Neurological impairment due to oxygen incubator. All patients were evaluated previous and 6 months after the treatment with hippotherapy following a fixed protocol. They subjected to a complete neurological evaluation and Gross Motor Function Validated Scale was performed pre and post hippotherapy. Due to great variability of clinical symptoms, no control group was used, being each patient its own control group. **Conclusions:** Hippotherapy improves gross motor function in children with neurological diseases after 6 months treatment.

I32

EXOSKELETAL FUNCTIONAL ELECTRICAL STIMULATION: THE NESS L300 AS A MODEL FOR INNOVATIVE TECHNOLOGY**Ring H.***Neurological Rehabilitation Ward 'C', Loewenstein Rehabilitation Center, Raanana, Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv; National Rehabilitation Council, Ministry of Health, Jerusalem, Israel*

Functional electrical stimulation (FES) is an advanced and innovative technology that provides solutions in the realms of rehabilitation efforts to improve paralytic limb functioning. Although the concept is not new, modern technology provides better means to achieve enhanced results in different clinical aspects. Exoskeletal FES systems have been developed for restoring function to both the upper and lower extremities. This presentation is limited to FES application for the lower limb. The NESS L300, an RF controlled Neuroprosthesis may be used as a representative model to demonstrate the ability of specifically designed technology to overcome traditional barriers in the application of functional electrical stimulation in the rehabilitation field. The results of an 8 weeks pilot study including 24 subjects with chronic hemiparesis, demonstrated a significant enhancement of gait speed and a dramatic improvement in the dynamic stability. A significant improvement in community participation and physical functioning was also observed. The objectives of a long-term follow-up study were to assess the effects of the neuroprosthesis on ambulation and function over one year of use. The study included sixteen patients (mean age: 55.7 ± 14.0 years) with chronic hemiparesis (6.3 ± 4.7 years) whose walking was impaired by foot drop. Subjects underwent a baseline gait assessment without the neuroprosthesis and four gait assessments with it: at the initial fitting, after one month, after two months and after one year. At each assessment, walking speed, swing and stride time, gait asymmetry index and stride time variability were determined during a 6 minutes walking test. In order to simulate daily life situations, gait speed was also measured during a 10 m walk over an obstacle course. The social participation domain of the stroke impact scale and the stroke impact scale-16 which assesses physical functioning were measured at baseline and collected again after two months and during the one year follow up evaluation. A repeated measures model was used for each gait parameter to analyze the neuroprosthesis effect with the 5 test-time points. A Hotelling's T^2 test was performed to compare the one year gait results with baseline. The test time effect was significant for all tested variables ($p < 0.05$). Walking speed improved from 0.62 ± 0.22 m/sec to 0.91 ± 0.21 m/sec ($p < 0.001$). When walking over the obstacle course, gait speed improved by 58% (from 0.40 ± 0.15 m/sec to 0.63 ± 0.19 m/sec; $p < 0.001$). An enhancement in gait stability and symmetry was demonstrated in conjunction with the improvements in gait speed. Single leg support (SLS) over the affected limb (swing time of the non affected limb) significantly increased ($p = 0.02$). The gait asymmetry index, a marker of inter-limb coordination, improved by 96% (from 0.51 ± 0.33 to 0.26 ± 0.10 ; $p = 0.006$). Stride time variability, an indicator of gait rhythmicity, decreased from 5.32 ± 3.31 to 3.79 ± 1.64 ($p = 0.01$). Repeated measures analysis was also used for each function questionnaire. Significant improvement over time were found in the social participation score ($p = 0.001$) and the SIS-16 score ($p = 0.007$). An additional study which included 15 patients (mean age: 52.2 ± 3.6 years) with chronic hemiparesis (5.9 ± 1.5 years) who regularly used an Ankle Foot Orthosis (AFO), compared the effects of the neuroprosthesis versus the AFO. There was a four week adaptation period during which participants increased their daily use of the neuroprosthesis; while using the AFO for the rest of the day. Gait was then assessed alternately using the neuroprosthesis and the AFO in a randomized order. A further gait assessment was conducted after using the neuroprosthesis for a further four weeks. After the four week adaptation period, the neuroprosthesis and the AFO affected gait similarly ($p > 0.05$). After eight weeks of walking with the neuroprosthesis, gait was significantly improved relative to the AFO. These studies demonstrate a continuous improvement

of walking abilities, physical function and community participation in patients using the NESS L300 neuroprosthesis. The findings also emphasize the benefits of using the neuroprosthesis in rehabilitation of stroke and TBI survivors when compared to the traditional AFO, supporting the idea that this is a viable treatment option in the rehabilitation of these patients.

I33

PHYSICAL ACTIVITY IN OSTEOPOROSIS MANAGEMENT AND REHABILITATION**Lissens M.A.***Dept. of Health Sciences, KHK, University College Geel; KU Leuven University, Belgium*

It has been shown that physical activity is an important factor influencing peak bone mass, and that a lack of physical activity is a major risk factor to develop osteoporosis (1, 2). This has also its implications in rehabilitation medicine. In primary rehabilitation the aim is prevention of osteoporosis, whereas in secondary rehabilitation treatment of osteoporosis is the main goal. In tertiary rehabilitation emphasis is put on treatment of fractures and complications. An osteoporosis rehabilitation program is designed to meet the needs of the individual patient, depending upon the type and severity of the disease. Active involvement of the patient and family is vital to the success of the program. The goal of rehabilitation is to help the patient to return to the highest level of function and independence possible, while improving the overall quality of life, physically, emotionally, and socially. The focus of rehabilitation is to decrease pain, help prevent fractures, and minimize further bone loss. In order to help reach these goals, osteoporosis rehabilitation programs may include the following: exercise programs and conditioning to increase weight bearing and physical fitness; pain management techniques; nutritional counseling to improve calcium and vitamin D intake and decrease caffeine and alcohol intake; use of assistive devices to improve safety at home; patient and family education, especially prevention of falls. Many skilled professionals are part of the osteoporosis rehabilitation team, including any/all of the following: orthopaedist/orthopaedic surgeon, physiatrist, internist, rehabilitation nurse, dietician, physical therapist, occupational therapist, social worker, psychologist/psychiatrist, recreational therapist, vocational therapist. Physical activity can help osteoporosis patients gain improvement in muscle strength and cardiovascular endurance, and can reduce functional decline. Benefits from regular exercise include improved bone health, both psychological and cognitive benefits, and enhanced quality of life. Adequate intakes of calcium, vitamin D and protein are also an important component of the rehabilitation program. Dietary calcium and vitamin D have been shown to help preserve bone mass and bone strength and should be considered in all elderly patients and in those patients suspected to be vitamin D deficient. Osteoporosis is a disease with psychosocial consequences, and therefore, a psychological assessment is integral to the rehabilitation of any patient with osteoporosis and is an important component of the overall management plan. An effective pain management plan following fractures through a variety of physical, pharmacological and behavioural techniques should be implemented with close monitoring of side effects, such as disorientation or sedation that may lead to falls (3).

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I34

VIBRATION TRAINING IN THE ELDERLY: POTENTIAL STRATEGY TO PREVENT AND /OR REVERSE SARCOPENIA AND OSTEOPOROSIS

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Abstract not available.

I35

BONE AND CONNECTIVE TISSUE METABOLISM IN SCI PATIENTS: A COMPARATIVE STUDY WITH BEDREST UNLOADED SUBJECTS

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Traumatic spinal cord injury is associated with the development of a rapid and severe osteoporosis together with major deleterious changes in other connective tissues, especially muscle and skin. Unloading is also known to be associated with a decreased bone mass and the development of osteopenia together with loss of muscle mass. There are only few reports on the exact metabolic sequence of these events; therefore we developed a prospective study aimed at comparing the levels of various biochemical markers of bone and connective tissue metabolism and body composition in 24 patients with acute traumatic spinal cord injury (SCI) followed for 6 months from onset, 24 SCI patients involved in a one year duration open trial with pamidronate and 8 healthy subjects submitted to a 6 week anti-orthostatic bed rest. The results of biochemical markers did show tremendous differences between SCI and bed rest populations, both in magnitude and in kinetics. In the bed rest subjects, bone metabolism as well as connective tissue metabolism did only slightly vary during the follow-up period. No changes were observed in both bone mineral content (BMC) or density (BMD) and fat mass (TFM), whereas there was a significant reduction in lower limbs (LL) lean mass (TLM) by the end of the bed rest period which did totally recover after 3 weeks of reambulation. In the SCI patients, bone and connective tissue metabolism showed early and dramatic changes with major uncoupling between bone formation and resorption ($R \gg F$). A similar trend was observed for type III collagen markers ($R \gg F$). SCI patients did show a significant decrease in LL BMC and BMD, a decrease in LL TLM (ns) and a significant increase in the UL. LL TBF was increased (ns) and did not change in the UL. SCI patients treated with pamidronate had decreased levels of bone catabolic markers and a significant reduction in bone density loss one year after onset. A comparison of the levels of markers was performed between the bed rest subjects at the end of the immobilization period and in SCI patients at month 2 after onset. Except for PICP levels, all markers did show highly significant differences. These results do confirm that SCI does have an early and dramatic impact on both bone and connective tissue metabolism whereas bed rest does not. In addition, they provide a strong support for an early therapeutic intervention in SCI patients combining active rehabilitation procedures with bisphosphonates drug therapy. This work should help orienting future therapeutic trials with drugs and/or procedures intended to correct for the musculoskeletal deleterious effects of paralysis. The author will in addition review the current knowledge on this matter.

I36

EVIDENCE-BASED REHABILITATION OF PERONS WITH LONGSTANDING PAIN

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Abstract not available.

I37

EVIDENCE-BASED REHABILITATION IN THE AREA OF BRAIN INJURY

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Few would now dispute the need to gather robust evidence to inform best clinical practice. Questions remain however on how this should be done, what sort of evidence should be taken into account, and how it should be assimilated. The Cochrane Library is widely cited as a source of robust systematic reviews and research syntheses which draw together the evidence available from randomised controlled clinical trials (RCTs) tested further by meta-analysis. Although there is a reasonably strong evidence base for the effectiveness of brain injury rehabilitation using this methodology, it is increasingly recognised that RCTs cannot be applied to address all the questions that need to be answered. Other methods have been developed for assimilating published literature to include a broader range of 'evidence' – encompassing other research designs, qualitative studies and different techniques which allow the evaluation of individual experience in addition to controlled experimental data. One such method is the research typology that was developed for the UK National Service Framework (NSF) for Long Term Neurological Conditions. The typology focuses on the quality of research, and the appropriateness of research design to answer the question in hand, as opposed to restricting evidence to any one type of design. It also places value on the experience of individuals and their family who live out their lives with a long term condition. Importantly the quality assessment is simple, so that it may be applied by the clinician seeking to gather evidence within the context of clinical practice. However, there is also an emerging view from Horn, de Jong and colleagues in the USA that it is not 'evidence-based practice' we need now, but 'practice-based evidence' in rehabilitation. They argue that the real proof of effectiveness comes from systematic collection of prospective data (the 'clinical practice improvement' (PBE-CPI) approach) which provides information about what works for which patients in real-life clinical practice. This, they contend, is the science of innovation and discovery – as opposed to confirmation and validation. In this talk I will briefly review the evidence-base for rehabilitation in acquired brain injury (of any cause), and discuss the different information that derives from these three sources to demonstrate that brain injury rehabilitation is not only effective but highly cost-efficient. In particular, I will review evidence emerging from the UK for the cost-efficiency of longer stay rehabilitation programmes for profoundly disabled patients.

I38

EVIDENCE-BASED REHABILITATION TRANSFERRED INTO CLINIC

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EBM is the integration of best research evidence with clinical expertise and patient values. An important criticism of EBM is that it fails to account for the individual social and biological variation or for patients' values, perspectives and choices. However, with the increasing number of providers and expenditures on the one hand, and restricted resources on the other, health authorities may no longer support non-evidence based interventions. Therefore, translation and implementation of existing evidence into clinical practice, more specifically in rehabilitation medicine, is an important challenge for the next years. Existing evidence concerning diagnostic methods or treatment strategies in rehabilitation has mostly been developed monodisciplinary (e.g. physical therapy) and thus is fragmented, which hampers transfer into the multi-disciplinary clinic. Also, existing evidence does not (yet) take into account all (biopsychosocial) domains of the International Classification of Functioning, Disability and Health (ICF), the

widely accepted conceptual framework in Physical Medicine and Rehabilitation (PMR). To study the efficacy of treatment strategies, adequate measurement tools are mandatory but there are fewer valid measures available for cognitive and psychosocial outcomes than for medical and physical outcomes, and the existing tools often struggle with floor or ceiling effects. Due to the variable case-mix and heterogeneity in patient population, translation of the evidence into individually tailored rehabilitation programmes is necessary and needs to be based on the clinician's judgment and clinical decision making. The PMR specialist, as a clinical coach of the multidisciplinary rehabilitation team should integrate EBM in daily practice and coordinate rehabilitation research within the different disciplines and ICF domains. As funding of rehabilitation research is problematic, joint international effort is advised and valid outcome measures, within the common language of ICF are to be defined. Using these measures, patients' outcomes should be gathered for study in larger databases. The ESPRM website states: 'The most important step that has to be made to improve the level and amount of research in PRM is to organize a platform for communication for all participants in research activities in Europe.' The aim of this presentation is to contribute to this objective.

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PATHOPHYSIOLOGY OF SPASTIC PARESIS

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Spastic paresis follows chronic disruption of the central execution of volitional command. Patients with spastic paresis are subjected over time to three insults, of which the last two are avoidable: (1) the neural insult itself, which causes paresis, i.e., reduced voluntary motor unit recruitment; (2) the relative immobilization of the paretic body part, commonly imposed by the care environment, which causes adaptive shortening of the soft tissue (including muscle) left in shortened position; and (3) the chronic disuse of the paretic body part, self-imposed in most patients. A vicious cycle of paresis-disuse-paresis emerges as disuse causes plastic rearrangements in the higher centers, which further reduce the capacity of voluntary motor unit recruitment. In the acute stages, paresis and soft tissue contracture represent the first two mechanisms of motor impairment. In subacute and chronic stages, stretch-sensitive (spastic) muscle overactivity emerges as a third mechanism of impairment. We review the definition and the pathophysiology of the various forms of spastic overactivity. A vicious cycle of contracture-spasticity-contracture emerges as muscle contracture causes excessive responsiveness to stretch, which in turn aggravates contracture. None of the three mechanisms of impairment (paresis, contracture, spastic overactivity) is symmetrically distributed between agonists and antagonists, which generates torque imbalance around joints and limb deformities. Thus, each may be best treated focally on a muscle-by-muscle basis. Motor training of the less overactive muscles should disrupt the cycle of paresis-disuse-paresis, while concomitant use of stretch and focal weakening in their more overactive and shortened antagonists should disrupt the cycle of contracture-spasticity-contracture.

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CLINICAL ASSESSMENT FOR SENSIBLE TREATMENT OF SPASTICITY

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Spasticity is here considered as the different kinds of muscle overactivities observed after most of the brain or spinal cord injuries. It includes exaggerated muscle stretch reflex, abnormal permanent muscle contraction (spastic dystonia), abnormal co-contractions of the antagonist muscles or synergistic contractions. Spasticity focuses the interest of the functional examination after stroke or injury be-

cause it is the only neurological symptom which could be changed by a treatment, general or focal. But, unfortunately, spasticity is only one of the neurological disorders leading to disability. Most of the time, the main disorder is the motor impairment, often associated with loss of sensibility and sometimes neuropsychological troubles. The first goal of the assessment of spasticity before treatment must be to define the real role of spasticity in the functional disability among other neurological, and sometimes orthopaedic, disorders. Then, it is possible to relate the patient to one of the four following groups: no spasticity; slight but not disabling spasticity; marked and probably disabling spasticity but associated with other neurological or orthopaedic disabling trouble; spasticity is the only or obviously the main cause of disability. Answering to the question of the real place of spasticity in the disabilities is the only way to the choice of the good treatment and to a reasonable chance of success. The second main issue for the clinical examination is to define the real goal of the treatment: to improve such function, to reduce pain, to make easier nursing, toilet or dressing for example. This must be done by the mean of a rigorous examination including close interrogation of the patient. No treatment of an expected disabling spasticity should be started before establishing its reasonable and personalized goals. This is important for the patient, the physiatrist and their confident relation.

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INSTRUMENTED ASSESSMENT

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Abstract not available.

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CONSERVATIVE TREATMENTS FOR ADULTS WITH SPASTICITY = ORAL DRUGS

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Spasticity is a common disabling feature after a central nervous system (CNS) lesion. A variety of drugs exist to treat this symptom. They can be categorised according to mode of administration: oral (baclofen, dantrolene, tizanidine, diazepam or gabapentin), focal (botulinum toxin, alcohol or phenol) or intrathecal (ITB). Here we will focus on oral treatment. Current evidence of effectiveness of oral treatments is limited. Most trials are of small size, short duration and poor methodology. Few randomised controlled studies have been carried out. Several studies suggest that baclofen, tizanidine, diazepam and gabapentin are all effective in reducing clinically evaluated spasticity. There is no evidence to suggest any difference in effectiveness between them. Results of trials of dantrolene are discordant. Diazepam and dantrolene seem to induce more side effects than baclofen or tizanidine. There is no evidence that oral treatments lead to an improvement in functional ability. Their place along side focal and general treatments (such as ITB) in spasticity management is yet to be defined. Moreover, many of these treatments are inhibitors of CNS receptors. They have to be used with caution in patients with CNS lesions because some of them may inhibit neuroplasticity. The benefit-risk ratio has to be evaluated for each patient and if the benefits are not obvious, the possibility of stopping treatment should be discussed.

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PHYSICAL MANAGEMENT OF SPASTICITY

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For therapists treating patients presenting with increased tone following CVA it is vital to determine whether their presentation is due to spasticity alone, or the combination of spasticity and biomechanical changes in muscle resulting in hypertonia. This diagnosis will determine the correct treatment approaches. There are many evidence based interventions which can be used to reduce spasticity, alter the biomechanical changes to muscle, and facilitate function. Stretching and positioning programmes are crucial to maintain and alter muscle length; however, there are still several different thoughts on the length of time a muscle requires to be stretched to effect change (1). Serial casting is another commonly used technique but, whether to use this with or without botulinum toxin is still being debated (2). The importance of correct seating for patients is recognised within the rehabilitation setting but provision of appropriate wheelchairs and static chairs and correct use within the Community setting remains a challenge. Strengthening programmes once taboo within the Physiotherapy community are now being shown to be advantageous without increasing spasticity and may in fact improve function more than therapies targeted at reducing spasticity (3). The use of orthotics to maintain, stabilise or improve a joint position continues to be common practice while hand splinting still suffers from non compliance from patients and limited evidence of efficacy (4). The introduction of lycra splinting is much more patient friendly and has been supported in clinical trials but its use is minimised due to cost. Electrical stimulation may also have a role to play in spasticity/hypertonia management to improve the effect of botulinum and or facilitate function in the opposing muscle (5). Finally, ensuring the continuation of physical management programmes for patients with hypertonia living in the community remains the biggest challenge for the Health and Social care services.

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THE VALUE OF NERVE BLOCKADE AND SEDATION TO DETECT CONTRACTURE IN ADULTS WITH SPASTICITY

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The diagnostic nerve block (DNB) consists in injecting a local anesthetic close to a nerve in order to temporarily suppress the

spasticity of the muscle(s) innervated by the selected nerve. The nerve is located thanks to a disposable needle for conduction anesthesia coupled to an EMG apparatus and a 1ml dose of anesthetic is injected (1). DNB is indicated in case of focal spasticity. It is easy to do, low cost, well tolerated and safe (1, 2). DNB allows us to determine the respective responsibility of the muscles spasticity and of the musculo-tendinous shortening in the patient deformity. It also helps to determine the antagonistic muscles strength, to predict the expected functional improvement of a spasticity treatment and to enhance the therapeutic decision process. DNB is mandatory before surgery (especially neurotomy and tendon lengthening) and may help to determine the muscles to inject with botulinum toxin. The DNB can be made at the level of the musculo-cutaneous nerve (flexed elbow), of the median and ulnar nerve (spastic hand), of the obturator nerve (adducted hip) and, most frequently, of the tibial nerve (spastic equinovarus foot). The localization of the motor nerve branches of the tibial nerve has been determined by means of CT-scanner and cadavers studies allowing to perform selective motor nerve branch block without sensory disturbances interfering with gait (2, 3). Electrophysiological studies demonstrate that spasticity reduction is correlated to a decrease in Hmax/Mmax ratio which indicates a preferential susceptibility of muscle spindle afferents to local anesthetics (1, 4). Further studies are necessary to compare the improvement obtained after DNB and spasticity treatments. Sedation is indicated in case of diffuse spasticity complicated by contracture related to musculo-tendinous shortening and/or heterotopic ossification. Sedation performed by means of a short general anaesthesia allows us to determine contracture without spasticity. Thus, it gives no information about muscle strength and function.

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TREATMENT OF FOCAL SPASTICITY: CHEMODENERVATION

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The management of the focal problems of spasticity management is now changing following the introduction of clinical guidance, such as those from the Royal College of Physicians of London in 20011 and the European Consensus Group in 20032. Both are currently being updated and highlight the importance of spasticity management within the context of a defined rehabilitation programme. Both also agree that chemodeneration with botulinum toxin or phenol should be supported by physical measures. Botulinum toxin is now considered to be the first line pharmacological therapy in post-stroke patient management. It is effective in management and cost effectiveness now needs to be demonstrated, if it is to be funded routinely in health care. A cost-effectiveness study is now underway and the aim of this will be to identify the clinical outcomes, cost-utility and cost-effectiveness of treatments for focal spasticity following stroke. Experts in focal spasticity management were brought together to develop the new guidance document, which covers the following principles: The need for

multi-professional assessment prior to treatment; A uniform assessment process – spasticity also changes over time and requires further assessment every time further treatment is considered; A formal goal setting process; The actual treatment process; and A range of system of measures to reflect relevant clinical outcomes. This presentation will, therefore, mainly discuss the update of the European guidance document, which will shortly be published. It will also address the assessment and measurement processes and why spasticity should be treated. It will be illustrated by case histories and will utilise the experience of the audience in developing spasticity services.

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I46

ITB FOR SPASTICITY AFTER STROKE

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Abstract not available.

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THE MERITS OF ORTHOPAEDIC SURGERY IN TREATING SPASTICITY

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The relative merits of surgery and physical therapy in the management of children with spastic paralysis have been fiercely argued for the last 50 years. In the early part of this century ill-advised and indiscriminate surgery on nerves and tendons without proper analysis of the paralysis, deformity, and function in the affected limb often did as much harm as good. As a consequence there was a reaction towards reliance on physiotherapy alone. This view has been changed to a need for restoring muscle balance. There is not only a need for lengthening of overactive muscles (tendons) that, but also a treatment for functional weakness of the opponent muscles. When the cases are selected with care, the appropriate orthopaedic measures are skilfully performed, and when the patients are adequately supervised afterwards the benefits of surgery are greater than those provided by any other treatment. But one should realise that Orthopaedic surgery does not treat spasticity. The goals of surgery may include increasing range of motion, improving access for hygiene, improving tolerability of braces, or reducing pain. The most common orthopaedic procedure is a contracture release. In this procedure, the tendon of a contracted muscle is cut either partially or clean through. Common targets are contractures involving muscles of the ankles, knees, hips, shoulders, elbows, and wrists. New insights nourished by clinical gait analysis (kinetics) have created a surgery moving away from classic tendon lengthening, but created a more valuable role for muscle lengthening by aponeurectomy and intramuscular lengthening. This to avoid further weakness. A tendon transfer moves the attachment point of a spastic muscle. Ankle balancing procedures are among the most effective interventions. Osteotomy can be used to correct a deformity that does respond to other corrective procedures. In an osteotomy, a small wedge is removed from a bone to allow it to be repositioned or reshaped. Osteotomy procedures are most commonly used to correct hip displacements and foot deformities. It also provides muscle balancing. Arthrodesis is a fusing together of bones that normally move independently. This fusion limits the ability of spastic muscle to pull the joint into an abnormal position.

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THE BOTULOSCOPE: A COHORT STUDY ABOUT TREATMENT OF POST-STROKE UPPER LIMB SPASTICITY BY BOTULINUM TOXIN

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The 'botuloscope' is a French observatory of botulinum toxin uses in treatment of post-stroke upper limb spasticity. The aim of it is to built guidelines for botulinum toxin uses. The botuloscope is a pragmatic open study. 11 centers were involved in the work for 2 years. Included patients choose 5 goals of treatment with their practician in a list of 12 functional or nursing objectives. Muscles and doses injected were chosen by the practician in accordance with the objectives of treatment. Joint amplitudes, Ashworth scores, motricity index, frenchay arm test, independency scores were assessed at 1, 3 and 6 month after injections. Patients were engaged to give their subjective opinion on accomplishment of the treatment goals with a visual analogic scale. The Quality of life was assessed by the RNLI before and one year after the inclusion. 396 patients were included (mean age 54 years). Wrist and finger flexors muscles were the most often injected one. 21% of patients described minor complications. Joint amplitudes (+5 to 15°, $p < 0.01$) and Ashworth score (-1, $p < 0.01$) were significantly modified 1 and 3 month after injections. Motricity index, Frenchay arm test and independency remained unchanged. The median of satisfaction were over 5 for the main goals of treatment: reduce uncomfortable posture (61% of patients), facilitate dressing (57% of patients), facilitate palm hand nursing (51% of patients), increase functional use (48 % of patients). The RNLI was significantly decrease (-2, $p < 0.001$) over a year of treatment corresponding to an increase of quality of life. The results of the French botulinum toxin observatory are very consistent with those of previous studies for joint and spasticity gains. They also emphasize the satisfaction of patients and the repercussions on quality of life when goals of treatments are well designed.

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THE ITALIAN PROJECT FOR A NATIONAL REHABILITATION STROKE REGISTER: BASIC ASSESSMENT OF STROKE PATIENTS (PMIC)

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The need for a National Register to collect homogeneous data on clinical and functional parameters expressed by stroke patients from the event up to the development of stable disability has been repeatedly requested by clinicians and researchers. Such homogeneous recorded information could lead to and support reliable prognostic studies and the planning of correct health strategies. Thus, a specific Task-Force, by appointment of by the Italian Society of PM&R (SIMFER) and S. Lucia Foundation (a scientific institute dedicated to research and in-patient rehabilitation), produced an assessment instrument easy to use, inexpensive, and designed for an efficient administration, named 'Protocollo di Minima per l'Ictus (pmic)'. The main objective of the protocol is to offer to every Physiatrist in Italy a minimum data set with a standardized stroke assessment tool for acute, post-acute and community-living stroke patients, easy to use. The secondary objectives are: To evaluate rehabilitation pathways, from the emergency room to a community living setting; To record prognostic and clinical outcome factors.; To develop a common National Data-base as a first step towards a National Rehabilitation Stroke Register; The pmic should follow each patient in all phases of his/her rehabilitative program: acute phase, rehabilitative hospital stay and extensive territorial phase (after hospital discharge). Lastly, a 1-year follow-up evaluation is recommended. Thus, pmic includes

3 distinct specific forms: 1) stone for the acute phase, another for in-patient intensive rehabilitation and third one for the territorial phase. The pmic will hopefully help Italian Physiatrists to promote data exchange between centres, allowing observational studies to be carried out on large samples and providing insight into the short and, most of all, long term outcome after stroke in the Italian community. It is important to remember that pmic has been conceived as a simple and quick tool, and not as an exhaustive method of evaluation.

*PMIC National Project Steering Committee: Agosti M (Parma), Gimigliano R. (Napoli - President of Italian Society of PM&R-SIMFER), Giustini A (Volterra), Iocco M (Catanzaro), Lenti G (Piacenza), Massucci M (Perugia), Pace P. (Ancona), Zampolini M (Foligno).

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DEVELOPMENT OF A STROKE REHABILITATION MINIMUM DATA SET

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Although Clinical Practice Guidelines for stroke patients recommend a standardized assessment (through specific scales) of neurological impairment, mobility, mental state, language, independence in ADL and Quality of Life, a common assessment procedure among Physiatrists in Italy is still lacking. From end 2004 to early 2006 our Project Group examined the literature most important variables for stroke rehabilitation assessment and outcome. We reached a consensus identifying a 'minimum' core set of data, appropriate for the different possible settings along the continuum of rehabilitation care, ensuring that sufficient information is collected without overly increasing participants' workload. We developed a minimum data set, that we defined as 'basic assessment protocol'. We aimed to create a valid, accurate, easy to do and time saving instrument. However this tool is not expected to represent all the options for stroke rehabilitation assessment. After identifying the domains to be quantified, our Project Group selected the specific data elements (demographic and socio-economic elements, impairment and disability measures, clinical and process indicators) to be included in the data collection tool. The outcomes variables have been selected in order to be valid, reliable, responsive, interpretable, with appropriate psychometric characteristics. Our approach was to prefer simpler and more synthetic scales to more exhaustive, but less easily recordable ones. This 'basic assessment protocol', has been peer submitted in early 2006, to allow modifications and adjustments in fields such as burden of data collection, potential areas for missing data, completeness or lack of data elements. This project was triggered by the common need of a standardized evaluation procedure manageable in every-day practice and in every setting. The Italian Physiatrist community showed a broad interest, and many colleagues are now using it, in different clinical settings and different sites. Planning, design, data elements and data sources of this project can be considered in line with good registry practices (Gliklich RE, Dreyer NA, AHRQ Publication No. 07–April 2007). Nevertheless, further resources and work are needed in order to expand this project in a proper patient outcome registry.

*PMIC National Project Steering Committee: Agosti M (Parma), Gimigliano R. (Napoli - President of Italian Society of PM&R-SIMFER), Giustini A (Volterra), Iocco M (Catanzaro), Lenti G (Piacenza), Massucci M (Perugia), Pace P. (Ancona), Zampolini M (Foligno).

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CLINICAL AND FUNCTIONAL MONITORING

Zampolini M. on behalf of the pmic national project steering committee*

Clinical and functional assessment has been used to look at the outcome of stroke. In rehabilitation, in accordance with the recent International classification of Functioning (ICF), a comprehensive set of measures should include Impairment, Activity Limitation and

Participation Restriction. This framework is used in 4 phases with specific forms to be filled in for different settings: 1) acute phase (at least one evaluation); 2) patient rehabilitation phase (admission and discharge); 3) community rehabilitation, one evaluation for each access; 4) follow-up after one year with the community rehabilitation evaluation form. In the acute phase we included general data of the patient and some clinical data: the Oxford classification of stroke types in the case of ischemic form and a localization description in hemorrhagic form. To assess disability before the stroke we use the Rankin Scale. For impairment we use the Canadian Neurological Scale, the Ashworth Scale, Trunk Control Test, Mini Mental State examination. We also included the type of rehabilitation carried out and the destination upon discharge. In the rehabilitation phase we add the Barthel Index, Motricity index, Nine hole peg test and a visuo-analogic scale for depression. The data collected for community rehabilitation are very similar to those for an in-rehabilitation setting, we include the Walking Handicap Scale to assess the walking capabilities. The time requested to fill the form is limited to a few minutes so as not to interfere with normal clinical activity. This study has the following objectives: 1) Evaluation of the clinical pathway as a whole from the acute phase to dwelling in the community. There are few studies of follow-up after stroke rehabilitation. 2) Identification of prognostic factors and outcome. 3) Creation of a National rehabilitation measuring system to monitor the clinical and epidemiological aspects.

*PMIC National Project Steering Committee: Agosti M (Parma), Gimigliano R. (Napoli - President of Italian Society of PM&R-SIMFER), Giustini A (Volterra), Iocco M (Catanzaro), Lenti G (Piacenza), Massucci M (Perugia), Pace P. (Ancona), Zampolini M (Foligno).

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BASIC ASSESSMENT OF STROKE PATIENTS IN ITALY: PRELIMINARY REPORT OF ACUTE PHASES EXPERIENCE IN EMILIA ROMAGNA PMIC GROUP

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Introduction: Stroke is classified as the most disabling chronic disease in Western Countries. Its consequences include not only activity limitations and participation restrictions but also a detrimental effect on well-being and quality of life. **Aim:** To evaluate the effectiveness of a timely rehabilitative intervention during the acute phase, to appraise the most appropriate pathways from acute area to rehabilitation setting, to demonstrate the presence of any local differences in the pathways amongst hospitals in our region; to record prognostic and clinical outcome factors. **Methods:** This longitudinal observational study was carried out in some hospital of our region in 2007. All patients admitted either to Stroke Unit or to a General Medical Ward with a stroke from CVA were included. The data recorder was carried out from national pmic evaluation protocol and these included: demographic and socio-economic element (i.e. sex, age, etc.), date of stroke, first rehabilitative evaluation, discharge, destination at discharge. As outcome measure the following clinical indicators were used: Canadian Neurological Scale, Trunk Control Test, Barthel Index and Rankin Scale. **Preliminary Results:** Amongst the 441 patients enrolled in the study, 46.5% were females (mean age: 70), whereas the remaining 53.5% males had mean age of 62. 88.1% of patients had had an ischaemic stroke, whereas the remaining 11.9% had suffered from an haemorrhagic one. The mortality rate during the acute phase was 3.6%. On admission, 46.7% of patients had urinary incontinence and all but one were catheterised. All patients had a good trunk control (TCT median score: 66/100), whereas the level of disability was comparatively low (Barthel Index median score 25/100). LOS in Stroke Unit was about two weeks. On discharge from the acute care setting 35% of patients needed admission to a rehabilitation unit. Physiotherapist's first assessment took place within 48 h from acute event, whereas physiatrist's evaluation took place within seven days from admission. **Conclusions:** These results confirm the usefulness

of this protocol about to demonstrate critical process in stroke care. Further analyses are needed to confirm these preliminary data also from other hospitals and to show the presence of any eventual differences in care pathways between local organization.

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EVALUATION OF STROKE REHABILITATION ACROSS EUROPE – LESSONS LEARNED FROM THE CERISE PROJECT

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Background: Outcome after first stroke varies significantly across Europe. This study was designed to compare recovery after stroke between four European rehabilitation centers. Associations are made with how the centers organised their services. **Methods:** In total, 532 consecutive stroke patients were recruited. Assessments took place on admission and at 2, 4, and 6 months after stroke with the Barthel Index (BI), Rivermead Motor Assessment of Gross Function (RMA-GF) and Nottingham Extended Activities of Daily Living (NEADL). The use of time of patients and staff was documented using time mapping and diaries, respectively. Recovery patterns were analysed using random effects ordinal logistic models adjusting for case-mix and multiple testing. Logistic generalized estimating equation models and negative binomial regression models were used to compare the data on time use between the centres. **Results:** Patients in the UK centre were more likely to stay in lower RMA-GF – and NEADL classes compared with patients in the German center and Swiss centre, respectively. UK patients were less likely to stay in lower BI classes compared with the patients in the German centre. Patients in the UK centre spent on average 1 hour per day in therapy. This was significantly less compared to the amount of therapy time in the other centres. Occupational therapists (OT) and physiotherapists spent between 32.9% and 66.1% of their time in therapeutic activities, with the OT's in the UK centre spending a significantly lower proportion of their time in therapeutic activities compared with their peers from the other centres. In the Belgian centre, three times less time was spent on patient related co-ordination activities (e.g., administration, ward rounds) compared to the UK and Swiss centres. **Conclusions:** Gross motor and functional recovery were better in the German and Swiss centres compared with the UK centre, respectively. Personal self-care recovery was better in the UK compared with the German centre. German and Swiss patients received more therapy per day. This was not the result of more staff but may be related to a more efficient use of human resources. This study indicates potential for improving rehabilitation outcomes in the UK and Belgian centres.

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ASSESSMENT OF STROKE OUTCOME IN SWEDEN BASED ON ICF

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Sweden has one large database (riks-stroke.org) which covers all hospitals in Sweden, which all have stroke units. Entries are made at discharge from the stroke units and also at 3 months follow-up. The register covers almost 80% of all stroke cases in Sweden each year. The rehabilitation physicians also has a register since many years, which aims at in-patients receiving comprehensive rehabilitation. The entries here are dominated by stroke cases as well, around 60% of the entries per year. This register is now web-based with immediate feedback at entry. The first one year follow-up have just started. The two registers cover different areas

of the ICF. A presentation of the two registers, differences and similarities will be given.

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ASSESSMENT OF STROKE OUTCOME IN TURKEY: CURRENT CONCEPTS & PRACTICAL IMPLICATIONS

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For good clinical practice, clinicians should measure the effectiveness of their interventions with standardized instruments, whenever possible. The measurement of outcome is fundamental for effective evaluation in clinical management of stroke patients. Neurological outcome research has predominantly focused on the effects of treatment, management, and on predictive indicators. A reliable measure of deficits after a stroke is important, not only to serve as a baseline for the evaluation of therapeutic measures, but also for rehabilitation and health care planning. Successful management of any disabling disease, including stroke, will benefit from the use of a classification system to judge the impact of treatment. However, in this moment, worldwide comparable data about functioning and disability are simply not available. Data on disability are not consistently gathered because it is defined either in terms of performance levels in social activities or in medical or rehabilitative terms depending on the profession of the researcher. This lack of homogeneity reflects the lack of a common model of disability, which prevents countries from taking common initiatives in clinical and rehabilitation practice, so as in the fields of disability policies, employment, health and social interventions. Some current limitations can be listed as the lack of consensus on the selection of measures to present the needs and values of stakeholders in stroke rehabilitation, including patients and their caregivers, practitioners, and health care decision makers. The ICF model of functioning and disability is a necessary cultural and scientific background called as the 'universality of disability'. In this presentation we aim to discuss current situation in Turkey and bring some suggestions regarding a set of criteria to guide the selection of outcome measures for stroke patients.

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THE MEASURE OF LATENT VARIABLES IN REHABILITATION MEDICINE

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In rehabilitation medicine, most of the variables are "latent" or in other words not directly observable variables. Some examples are stress, anxiety, quality of life or manual ability. To assess such variables, questionnaires are frequently used without systematically verifying the fundamental psychometric qualities such as validity, reliability, reproducibility, linearity and unidimensionality. The two last qualities, linearity and unidimensionality, are often not displayed in existing scales used in rehabilitation medicine. For this reason, the researches in our lab are focused on development of new scales using a statistic and probabilistic model, the Rasch model. This model allows to verify unidimensionality and to transform total ordinal scores obtained on questionnaires into linear measures. Developed scales could assess manual ability in chronic stroke patients, in cerebral palsy children, in patients with rheumatoid arthritis and in patients with neuromuscular disorders, activity limitations in patients with neuromuscular disorders, locomotion in chronic stroke patients and in cerebral palsy children, and satisfaction in participation in chronic stroke patients. All these scales could be found on www.rehab-scales.org, a website with downloadable instructions and scoring sheets and allowing on-line analysis by transforming total raw scores into linear measures.

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THE ACTIVITY LIMITATIONS IN PATIENTS WITH NEUROMUSCULAR DISORDERS

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A scale assessing activity limitations in patients with neuromuscular disorders (NMD), ACTIVLIM, was developed and validated using the Rasch model. The final version of ACTIVLIM includes 22 items or daily activities involving the use of the upper and/or the lower limbs. These 22 items define a unidimensional and linear measure of activity limitations and show a continuous progression in their difficulty. Furthermore, ACTIVLIM is reproducible over time and sensitive to change. Relationships between activity limitations and motor impairments (muscle strength, grip strength and gait speed) were also investigated. The relationships were not so straightforward indicating that activity limitations and impairments are two different dimensions of patients' functioning and that they should be independently assessed. Finally, as ACTIVLIM is a self-reported questionnaire, patients' responses were compared to the observation of the 22 ACTIVLIM daily activities performed by the patients but assessed by external examiners. The results showed a good agreement between both measures indicating that the use of a self-report questionnaire is a valid method for assessing activity limitations in patients with NMD.

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TREATMENT OF PLANTAR FASCIITIS WITH EXTRACORPORAL HIGH ENERGY SHOCK WAVE THERAPY: OUR EXPERIENCE WITH 48 PATIENTS

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Introduction: Plantar fasciitis is a common cause of heel pain. The conservative treatment consists of several therapies including ESWT; however there are few data that support the efficacy of these therapies. **Aim:** To test the hypothesis that high-energy extracorporeal shockwaves therapy (ESWT) solely is an effective treatment for plantar fasciitis in our patient population, contributing to improve quality of life. **Patients and Methods:** 48 subjects (14 men, 34 women; age range, between 3rd and 8th decades of life) with a diagnosis of plantar fasciitis longer than 6 months, who are submitted before to other forms of conservative management of plantar fasciitis with no success, and who are not submitted to other forms of treatment during our study. We performed 3 sessions, with a 2-week interval between each, of ESWT to the calcaneal area of greater pain. We assessed pain, walking time without pain, and also for difficulty in buying shoes before the first session and 3 months after the last session. **Results:** We found a major therapeutic effect with statistical significance, when comparing the measurements of T1 and T2 for the pain scale and walking time without pain, and also for difficulty in buying shoes. **Conclusions:** ESWT is safe and a good option for the treatment of plantar fasciitis and should be considered prior to other options such as corticoid infiltration, when available.

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END-GROWTH FINAL RESULTS OF AN EFFECTIVE CONSERVATIVE TREATMENT: A CASE SERIES

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Introduction: Few papers reported final results of conservative treatment. **Aim:** To review our final results between September 2003 and December 2006. **Study design:** Case series **Patients:** We had 58 patients (males 17%), 22.6±10.6° Cobb, 13.4±2.4 years (17.9±2.6 at the end). All patients who finished their treatment in the Centre of Vigevano of our Institute have been reviewed. **Methods:** Treatment groups considered: exercises (E: 14.0°±4.6), bracing+exercises (BE: 25.7°±8.6°), cast+exercises (CE: 39.8°±8.2°). Starting Cobb degrees groups: 11–20° (A: 25), 21–30° (B: 18), 31–40° (C: 7), over 40° (D: 8). **Results:** Total sample: -4.3°±7.1°, E -3.4°±5.4°, BE -4.5°±7.9°, CE -6.1°±7.7° (all *p*<0.001). Patients worsened-improved have been: total 9–49%, E 4–33%, BE 11–48%, CE 14–40%. According to Cobb degrees at start, all groups improved (A: -1.6°±6.5°; B: -7.1°±7.2°; C: -3.8°±6.6°; D: -6.0°±6.5°): only A was not statistically significant. Patients over 30° at the end have been 15.5%, over 40° 3.4%. We had referrals to surgery only before starting treatment. **Conclusion:** Effective conservative treatment can avoid surgery in most patients if performed correctly and started with right timing.

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EXERCISES FOR SCOLIOSIS TODAY: EVIDENCE AND SCHOOLS

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We are convinced in Europe of the utility of physical exercise for idiopathic scoliosis. We have statistical proof of effectiveness of physical exercise: The group of scoliosis with physical exercise is less progressive (1.5°/year) than the group without physical exercise; When these exercises are optimized like SEAS, the results are statistically better than non specific exercises. Since the foundational meeting of SOSORT which took place in 2004 in Barcelona we tried to reach a consensus. The responses to the questionnaires show that, in principle, specialists in scoliosis physiotherapy do not disagree and that several features can be regarded currently as standard features in the rehabilitation of scoliosis patients. The features include from the most consensual exercise to the least: Respiratory exercises with improvement of costal mobility, intercostal muscles strengthening, work in expiration, Autocorrection in 3D, and restoration of the sagittal alignment, Equilibrium, Para vertebral muscular strengthening, Increase of Range of Motion, Neuro motorial control, Side shift for a thoraco-lumbar curve, Stabilization, Muscular endurance, Coordination, Ergonomy and general motors capacities. Some schools are insisting on some technical points. For the Lyon school we have some principles: No complex material. All the exercises have to be repeated at home, No sportive counter indication. The sport practiced by the child must be continued by adapting if necessary the sportive gesture (avoid the deep quick inspiration, and the flexion of the trunk forward) and by completing if necessary the sportive activity thanks to physiotherapy. The exercises are symmetric in the frontal plane. No chapel and miracle exercise. Choosing the best technical way for every child, at every age, and every therapeutic sequence. No revolution, therefore but an evolution in the exercises which are repeated few minutes a day at home.

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BRACING FOR SCIOLIOSIS TODAY: EVIDENCE AND SCHOOLS**Rigo M.***Instituto Elena Salvá, Barcelona, Spain*

Abstract not available.

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THE ACTION PLAN OF THE PHYSICAL AND REHABILITATION MEDICINE (PRM) SECTION AND BOARD OF THE EUROPEAN UNION OF MEDICAL SPECIALISTS (UNION EUROPÉENNE DES MÉDECINS SPÉCIALISTES, UEMS) 2008–2010**Delarque A.¹, Michail X.²**¹President of the UEMS PRM Section; ²President of the UEMS PRM Board

PRM Section and Board main aim is to improve the quality of life of disabled persons in the EU. The efficacy of PRM Section and Board activities to reach this goal will depend, on the one hand, on internal factors such as the increased number of countries involved within the Section and Board activities, on its working organization and on the other hand, on external factors such as disabled persons demography and needs, health and social care management of disabled persons in Europe, education and research in the field of disabilities at a European level. PRM Section and Board have to be aware of these factors to set up their Action Plan 2008–2010, with the three committees, in the fields of Education for the Board, of Quality of Care for the Clinical Affairs Committee and in the PRM Field of Competence for the Professional Practice Committee. Action Plan for Education: a world action plan for initial education in PRM (WAPIE PRM) has been proposed. The three main targets are to teach PRM activities to undergraduate medical trainees in all medical schools, to diffuse recent knowledge to PRM trainees, to involve all the PRM trainees in research activities. Action Plan for Quality of Care: a European Accreditation for the Quality of PRM programs will be decided on in 2008. This accreditation program is based on ethics and EBM. Action Plan for the Field of Competence of PRM: the specificities of PRM in diagnostic, evaluation and treatment procedures; the role of PRM from acute care to community-based rehabilitation will be defined during the following years.

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WORLD ACTION PLAN FOR INITIAL EDUCATION IN PRM 'PRM WAPIE'**Viton J.M., Franchignoni F., Michail X., Vanderstraeten G., Delarque A.***Université de la Méditerranée, Faculté de Médecine, Assistance Publique Hôpitaux de Marseille, Dept. of PRM, Marseille, France*

Introduction: Initial education of PRM trainees is a crucial issue for the future of the specialty. Some weaknesses can be observed in this field in Europe: Undergraduate trainees do not have teaching programmes on disabled persons and on the role of PRM in all European Medical Schools. Access to the last evidence based advances in PRM is not always easy for European PRM trainees. Involvement in research is unusual for PRM trainees in Europe. Information on management is lacking. *Aim:* Hence, there is a need for an action plan: to have teaching programmes for undergraduate trainees in all medical schools on disabled persons and the role of PRM. To bring PRM trainees knowledge on guidelines and evidence based medicine. To involve all PRM trainees in research activities. to inform on management. *Method:* In each country, PRM

specialists along with disabled persons associations can advocate the creation of teaching programmes on disability to undergraduate medical trainees. Educational tools should be available. In each PRM National and European Congress PRM trainees should benefit from reduced fees and special sessions dedicated to them and in each PRM Journal, and website educational articles should be available with free access. Summer schools should be further developed with reduced fees. In each PRM teaching programme, training in research (methodology, scientific communication, etc.) should be organised. In each PRM teaching programme, management techniques should be taught. *Results:* Starting from this year the ECPMR Congress offers reduced fees for PRM trainees and organizes specific educational sessions and the Journal of Rehabilitation Medicine will publish educational articles. The Summer schools created in the past years will go on.

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EDUCATION AND TRAINING IN THE FIELD OF PHYSICAL AND REHABILITATION MEDICINE IN BULGARIA**Ilieva E.M.***Dept. of Physical and Rehabilitation Medicine, Medical University, Plovdiv, Bulgaria*

The aim of the study is to make an analysis of the challenges of education and training in the field of Physical and Rehabilitation Medicine in Bulgaria. The author presents the undergraduate teaching programmes in PRM in the different Medical Universities in Bulgaria as a part of the basic medical education: length of training, topics, theoretical and practical minimum. The percentage of the physicians, specialists in PRM among the other medical doctors in Bulgaria is discussed, as well as the way to start a postgraduate teaching programme; the duration, the contents and the clinical rotations during postgraduate PRM training; the sites that are authorized by the government to perform it; the certification process. The changes that are taking place concerning PRM training after Bulgaria has become a member of the European Union are followed. The education of the other professionals working in the PRM facilities is mentioned. The author discusses the problems concerning initiation to research and the continuous medical education.

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TEACHING AND TRAINING PROGRAMS IN PHYSICAL AND REHABILITATION MEDICINE (PRM) IN GREECE**Michail X.¹, Stathi K.²**¹Professor of Rehabilitation Medicine ATEI-Athens, President of the Hellenic Society of PRM, ²Greek delegate for the European Board of PRM

Undergraduate Teaching Programs (UTP) in PRM are not included in all Greek Universities. Only one medical school offers an elective lesson in PRM (10–15 h) organised in modules, taught by the professors from each relevant specialty (e.g. the lecture on pulmonary rehabilitation module is given by the professor in respiratory medicine, etc). In certain medical schools a few lectures on PRM are included in the teaching curriculum of some specialties like orthopaedics and neurosurgery. Education of rehabilitation professionals (physiotherapists, occupational and speech therapists) does not include a lesson dedicated in Disability and Rehabilitation, except of the physiotherapy course at Higher Technological Institute of Athens (TEI-A) where a lesson on Rehabilitation Medicine, covering all the field of physical disability, is taught during the 6th semester. Postgraduate education in PRM specialty takes place only in the capital of Greece, Athens, in four hospital based departments of PRM, and in the two PRM services of the

National Centre for physically disabled people, in a total of 180 beds. The organization of training is supervised by the Ministry of Health with a total of about 6 new trainees per year. There is a waiting list of almost five years for a young doctor willing to start training in PRM, which is not very different than most of medical specialties in Greece. The duration of training is five years, consisted of 3 semesters (internal medicine, orthopaedics and neurology) followed by 3.5 years in a PRM service, during which period there is a possibility of a semester of training in another European country. The number of trainees does not exceed a total of 30–32 and they are paid by the Ministry of Health for all the period of their training. The up-to-date number of specialists is about 165, despite the fact that training in PRM has started on 1974. At the end of the five years of training in PRM, trainees have to successfully pass an oral exam so as to be granted the license to work as specialists in PRM. In most of PRM training departments, trainees are involved in clinical research, whilst very few follow PhD Studies and research in a Medical school under the supervision of a professor in a relevant specialty. Educational courses and seminars are organized by or under the auspices of PRM Society for trainees as well as for CME/CPD purposes, mainly free of charge. During the annual Congress of PRM Society in Greece, reduced fees are offered to PRM trainees and paramedical students.

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PRM EDUCATION IN PORTUGAL

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Introduction: A survey about PRM education and teaching in Portugal was done both in undergraduate and the postgraduate. *Aim:* To characterize how the teaching of PRM is structured in the several Portuguese Universities. *Methods:* Direct contact with those in charge for the teaching and education in the several Portuguese Universities. *Results:* The situation is not uniform, differing from University to University. *Conclusions:* Necessity to reinforce the PRM education by requiring it compulsory in the undergraduate teaching and by increasing its schedule where it is already compulsory.

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COOPERATION IN THE FIELD OF PHYSICAL MEDICINE AND REHABILITATION WITH BOSNIA-HERZEGOVINA – INDIVIDUALS OR INSTITUTIONS?

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In 1996, Bosnia Herzegovina faced major difficulties: An increase of the number of people with disabilities, due to war casualties, a destruction of most of the PM&R facilities, a complete reorganisation of academic and health institutions in BiH. *Objective:* Description of an array of different cooperations in the field of PM&R between 1996 and 2008. *Results:* Four different types of cooperations and programs have been implemented. Upgrading the level of competencies of Bosnian PM&R teams, and implementing new techniques. Urodynamic expertise is now available in Tuzla and Sarajevo. Short training periods in France, and training sessions in Bosnia have been supported by the French foreign office; Facilitating Bosnian participation in international meetings, and international participation in Bosnian meetings. A Bosnian society of PM&R has been set up. Bosnian colleagues have participated regularly since 1998 to the meetings of the French society of PM&R with financial support from the SOFMER; Upgrading initial training in PM&R for Bosnian medical students. This project was implemented within the tempus framework and supported by the European union. It consisted between 2001 and

2004 in 12 seminars covering most of the field of PM&R and was organized in cooperation by the universities of Angers/Newcastle/Banja-Luka/Sarajevo and Tuzla. Coordination of these different levels has been provide by a French NGO (Médecine France Bosnie-Herzégovine) and local support has been provided by the French cultural centre André Malraux in Sarajevo. *Discussion:* Cooperation relies on motivation of individuals, financial support of different actors (health institutions, NGOs, Governments, European Union), implication of institutions. Coordination of the different interventions and long term planning are crucial. The main difficulty remains the sustainability of these actions in a political context which remains difficult.

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TEACHING AND TRAINING PROGRAMMES IN PHYSICAL AND REHABILITATION MEDICINE (PRM) IN SPAIN

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Undergraduate Teaching Programmes (UTP) in PRM are not included in all Spanish Universities, and the physiatrist is not always in charge of their lecture. Other medical specialties (i.e. Radiology) sometimes teach Rehabilitation, as this discipline is included also in their teaching programs. Overall, UTP (usually 6–10 h of lesson, where available) are very variable: e.g., in Complutense University (Madrid) and in Canarias PRM programmes are compulsory, whereas in Santiago de Compostela and Autonoma de Madrid they are optional and elsewhere they don't exist. Where PRM is taught, students have usually both theoretical and practical lessons, including stays in a PRM unit. In Hospital Clínico de Madrid (linked with Complutense), all teaching is done by PRM doctors. Postgraduate Teaching and Training Programmes (PTTP) in Spain begin after a National Exam and in PRM they last 4 years. Usually, the 1st year is organized in different clinical units (e.g., Orthopaedics: 6 months; Neurology: 6 months; Radiology: 1 month; Internal Medicine: 6 months; etc.). The following 3 years, the trainees stay in a PRM Department, but they are allowed to visit 'external' facilities (also abroad) for 2 months per year. The 'Hospital Nacional de Paraplégicos' in Toledo represents an almost universal stage. During these 'external' visits, the trainee receive a reduced salary. During the 4 years the trainees are on duty about 4 days per month: most trainees in trauma units, some in internal medicine, very few in PRM departments. During this period, courses for the theoretical programme are organized at local level, but there are some official courses that are mainly taught by PRM doctors. Textbooks are mainly translations of foreign books, but now some Spanish textbooks begin to be included. International PRM Journals are not broadly read. Some Universities are starting to include lessons in Evidence-Based Medicine and Research. The Congress of the National PRM Society have only a 'small' fee reduction for trainees. An important recent advance is the creation of APUMEFYR (National Association of University Professors in PRM; President: dr. Santos del Riego), to promote PRM within the frame of undergraduate and postgraduate teaching, and to defend our speciality when it is required, from other disciplines (e.g. Physiotherapy).

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HIGHER EDUCATION PROVIDED BY ITALIAN UNIVERSITY FOR MEDICAL DOCTORS AND REHABILITATION PROFESSIONALS

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Education of physiatrists and other rehabilitation professionals takes place in many Italian Universities and the number of students

for each academic year is decided, in agreement with the Health Ministry, according to rehabilitation needs. The course of study of Italian medical school lasts 6 years. During the first 3 years students are engaged in pre-clinical courses. The remaining 3 years are comprised of rotations at different hospital departments, but also in a number of clinical (or not) theoretical courses, included Physical and Rehabilitation Medicine. The School of Medical Specialization in Physical and Rehabilitation Medicine lasts 5 years. In Italy, there are 31 School of Medical Specialization in Physical and Rehabilitation Medicine for a total number of 142 students with an educational contracts paid with funds provided by National government, plus a 10% of students paid with funds provided by local administration or by Private Institutions, plus another 20 students, already working for the National Health System (these numbers refer to Academic Year 2007/2008). Theoretical courses concern all disabling diseases (motor, cognitive, visceral), with the formulation of rehabilitative projects and programs. Besides studying, residents have to attend Operative Units of Rehabilitation Medicine in order to learn all the specialty procedures. Physical therapists and other rehabilitation professionals training consist of a 3 years of tertiary education. There are 39 universities with 3 years academic courses related to rehabilitation, for a total number of 5386 students admitted (Academic Year 2007/2008), and half of them are physical therapists. There is also a specialistic course in Sciences of Health and Rehabilitation Professionals lasting 2 additional years dealing with management and coordination activities, teaching, educational and research skills. In Italy, there are 13 specialistic courses in Sciences of Health and Rehabilitation Professionals for a total number of 382 students (Academic Year 2007/2008). Moreover Universities can activate Master of I and II level reserved respectively to graduated in a 3-year academic course and in specialistic degree. There is also the doctorate of research, that is the highest Italian academic degree, the formal equivalent of a PhD.

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INITIAL EDUCATION IN PRM IN FRANCE

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Initial education in PRM in France includes under and post graduate education. During the undergraduate medical education, all medical students in France attend a mandatory teaching programme on disabled persons and PRM. The lecturers are academic physiatrists. Rotations in a PRM department are available. The 4-year long postgraduate PRM teaching and training programmes are headed by academic physiatrists. Out of the 4 years, two years minimum in accredited academic PRM departments are mandatory. The other rotations must include: neurology, rheumatology or pediatrics. The courses for the theoretical programme are organized at a local level, a regional level and at a national level (www.cofemer.fr). An academic physiatrist, head of the French association of academic physiatrists is responsible for the PRM programmes at a national level. The website of the French association of academic physiatrists (Cofemer) includes educational documents and references of textbooks, handouts or specific educational websites. A final examination is taken to become a PRM specialist. Initiation to research starts during the undergraduate education with a teaching programme on evidence based medicine and a teaching programme for analysing articles published in scientific journals. Teaching programme on how to perform research in PRM are not mandatory but are available (MASTER, during national events such as the National Congress SOFMER or at the local level). Teaching programme on techniques of scientific oral and written communication are not mandatory but are organised at a local level. Free access is given to the National Congress SOFMER to the PRM trainees. Specific sessions for trainees are organized during the national congress both by the SOFMER and the French association of academic physiatrists. Trainees may have free access to scientific journals through the

University libraries. Information on mobility programmes in higher education is given to the students during their under and post graduate education.

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REQUIREMENTS FOR SPORTS MEDICINE TRAINING IN EUROPE: CONCLUSIONS OF THE UEMS MULTIDISCIPLINARY JOINT COMMITTEE ON SPORTS MEDICINE

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Sports Medicine (SM) is not recognised as a separate specialty in Europe, nor by the UEMS. Nevertheless, its significance today is recognised worldwide. For this reason the Council of UEMS has decided on October 2005 in Munich to create a Multidisciplinary Joint Committee (MJC), to deal with the competences and the sphere of SM activities. The MJC on SM which is open to all the UEMS Sections wishing to participate, as well as to the European Federation of Sports Medicine Associations (EFSMA), started its operation on February 2006. The first interest was to define the training requirements for SM. The UEMS Council validated the defined requirements at its meeting in Bratislava on October 2007. This presentation aims to explain the several training requirements having to do with: the general rules on monitoring, accreditation and quality of postgraduate training, the general aspects of training in SM and its minimum curriculum, the definition of SM, the scope of SM, the basic educational requirements to enrol in training programmes, the criteria of accreditation for institutions offering SM training and the criteria for SM trainers.

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PHYSICAL AND REHABILITATION MEDICINE MEETS SPORTS MEDICINE

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Concerned with the evolution of sports medicine since 1972, I saw the increasing importance of physical medicine. First in the prevention and treatment of lesions, but also, later on, in multidisciplinary rehabilitation programs and in the specific approach of women's football. Physical medicine takes an important part in the development of intense prevention programs, actually developed. Finally, physical medicine plays a coordinating role between the different medical specialities, in direct relation with sport: traumatology, physiology, pharmacology, nutrition and diet.

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THE PRINCIPLES OF OSTEOARTHRITIC KNEE BRACING – DYNAMIC BRACING TO ELIMINATE PAIN

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The use of osteoarthritic braces to relieve pain in patients with unicompartmental osteoarthritis (OA) has come into popular use in the last decade. How these braces fit into the current range of treatment options for knee OA is discussed along with their limitations. The technique of testing the effect of OA braces by downloading data from a video fluoroscope while patients are walking on a treadmill is presented. 78% of the patients experienced condylar separation at heel strike. 92% experienced significant pain relief. In a German test by TÜV, OA braces were instrumented with strain gauges. Force levels were measured while walking and stair climbing. The force levels correlated to

pain reduction. In yet another study of patients with moderate to severe OA, daily walking time tripled while pain levels dropped 68% after only three weeks of brace wear. Anecdotal information concerning the use of OA bracing in conjunction with hyaluronic acid (HA) products suggests that OA braces greatly increase the efficacy of the HA injections. Clinical use of specific nutritional supplements designed to aid the body in the manufacture of its own glucosamine has also shown good anecdotal results. This anecdotal information suggests areas in which future studies might be done. OA bracing can be a good conservative method of prolonging the need for total knees by a few years. This gives middle aged patients time for implant technology to improve while they get a little older thus increasing the chances that a knee implant will last the remainder of their life time.

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LOWER EXTREMITY AMPUTATIONS: AN UPDATE IN MANAGEMENT AND NEW PROSTHETICS

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Introduction: Amputation is a common problem worldwide. Prevalence of amputation varies country-wise, however there is no up-to-date published information available about the worldwide incidence. There are 350,000 amputees living in the United States of America and 135,000 new amputations occur each year with incidence of lower limb amputation being more than the upper limb. 18–20 lower limb amputations per 100,000 of population are performed every year in the Netherlands. The causes of amputation vary depending on morbidity patterns, ageing of population, poor infrastructure, war/civil conflicts, terrorism and natural calamities. Vascular disorders, which are related with ageing, are the major contributors to lower limb amputations in western nations. Diabetes and vascular problems are on steep rise in some developing countries as well. 15–20% of the diabetic people have foot problems and 30% have peripheral vascular disease. Also, pedal ulcers are precursors of 70–90% of diabetic amputations; therefore the population undergoing amputation is likely to increase in the near future (1). Whatever the cause, amputation brings a dramatic change in the life situation of the individual in almost all aspects of daily living and functioning. Impairment due to limitations in body function and structure as a result of amputation affects the activity level, thereby influencing the participation of the individual in the society. Quality of life of amputees gets affected directly (the fact of disability) and indirectly (decrease in social participation and its consequences). Of course, contextual factors (environmental and personal), like poor and unsafe living conditions, war, personal factors, like coping strategy, availability of social support, etc. affect Quality of Life, as may be derived from the ICF framework. **Update in Management:** In 1992, a report of the International Society for Prosthetics and Orthotics (ISPO) was published. The theme was an international consensus conference on amputation surgery and prosthetics of the lower extremity (2). In 2001 an update was published (3). With my colleague Harmen van de Linde (Nijmegen) and Hans Rietman (Enschede) we received a grant (on behalf of The Dutch Society for Rehabilitation Medical Doctors/ VRA; 2008) and we will start this year with a multidisciplinary Dutch consensus conference about amputation surgery and rehabilitation. In ISPO international, van de Linde and I received a grant to start an international consensus conference on prescription of first prosthesis and the rehabilitation process based on a study called Proguide (4). The goal of this clinical project was to establish a national consensus on the prescription of different prosthetic components in patients with leg amputations at various levels. Based on a literature review, on nation-wide observations of clinical practice and on the collection of expert opinions, clinical guidelines for lower limb prosthetics (Proguide) is developed. In the field of the outcome measures there is still a lack of good tools which are not only reliable and valid in English but also in other

European languages. **Update in New Prosthetics:** There are only a very few 'new' developments in the field of prosthetics of the lower extremity. Most changes come as a part of the natural evolution of prior advances that are continually challenged by an ever demanding user population and increasingly skilled and educated prosthetic professionals (5). The osseo-integration (direct bone anchoring of amputation prosthesis) which will be discussed in this same symposium (see later in abstracts) is such an example of evolution. Other developments are different liners made of different materials and self-adapting intelligent knee-prostheses. In the lecture the usability of virtual reality and robotics in the training with prostheses will be ticked off (6). Prices of the new prostheses are increasing but are patients benefiting from this? These new developments in this evolutionary process of the prosthesis allow the amputee the possibility of fulfilling their desired lifestyle.

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UPPER EXTREMITY AMPUTATIONS: AN UPDATE IN MANAGEMENT AND NEW PROSTHETICS

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Management: Rehabilitation of subjects after an upper limb amputation has to start immediately after the injury or in the cases of congenital deficiencies in the first month after birth. It has to be done by specialised team including medical, psychosocial and vocational rehabilitation. Such management shortens rehabilitation time, decrease number of treatments and improves rehabilitation outcome. There are only few studies based on the level of amputation and rehabilitation outcome (1). **Prosthetics:** Rehabilitation also includes fitting with appropriate prostheses. An ideal prosthesis should replace all functions of the amputated hand. The main problems that prosthesis ought to solve are motor, sensor and cosmetic. State of the art in upper extremity prosthetics will be presented through active movement of thumb and fingers as well as prosthetic elbow and shoulder joint. Recent advances in the sensory feedback control will also be demonstrated. New surgical reinnervation techniques (2) improve the control of myoelectric prosthesis. A cosmetic aspect is crucial in many cultures. The best solution is silicone cosmetic prosthesis or custom-made silicone gloves. In Slovenia we developed technology that allows us to make silicon prosthesis which is a mirror copy of the other hand or finger (3). **Outcome Measurement:** One has to objectively demonstrate the results of rehabilitation and the value of expensive new prosthetic components. There are some outcome measures developed for children with demonstrated psychometric properties and also one for adults (4).

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OSSEOINTEGRATED AMPUTATION PROSTHESES – A PROMISING TREATMENT FOR INDIVIDUALS WITH LIMB LOSS

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The number of problems related to suspension and comfort of socket prostheses has led to a desire to attach amputation prostheses directly to the residual skeleton. Since 1990 such treatment has been performed in Gothenburg, Sweden using the method of osseointegration. The concept of osseointegration was first described by Professor Per-Ingvar Brånemark and it has been in successful clinical use for dental applications for more than 40 years. For individuals with amputations the treatment includes two-surgery sessions and prosthetic rehabilitation. At the first surgery a titanium implant (fixture) is inserted in the residual bone and left unloaded for about six months. At the second surgery a titanium rod (abutment) is inserted into the distal end of the fixture and is then penetrating the skin. Prosthetic suspension is obtained by connecting the osseointegrated prosthesis (OI-prosthesis) to the abutment with a specific attachment device. For patients with transfemoral or transhumeral amputations the total treatment period is about 12 months. For patients with transradial and thumb amputations the treatment period is shorter. Today a total of about 120 patients have received the treatment in Sweden. In 1999 a prospective clinical investigation was started on patients treated with a transfemoral OI-prosthesis. The study is ongoing and includes a total of 55 implants on 51 patients, with 4 treated bilaterally. A primary report from the study includes the first 18 consecutive patients that have passed 2-years follow-up. Seventeen of the 18 patients (8 male/10 female, mean age 45 years, amputation cause; 12 trauma, 5 tumour, 1 arterial embolus, mean time since amputation 15 years) used the OI-prosthesis at follow-up. One patient could not use the prosthesis due to pain and subsequent loosening of the implant. The results showed statistically significantly improved general health related quality of life (HRQL), measured by SF-36, and condition-specific HRQL showing increased prosthetic use, improved prosthetic mobility and less problems as compared to the preoperative situation. Thus, OI-prostheses represent a very promising development in the rehabilitation of individuals with limb loss.

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EVIDENCE-BASED CONCEPTS IN BACK PAIN MANAGEMENT

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Evaluation and management of back pain requires comprehensive knowledge in the areas of epidemiology, anatomy, biomechanics, and pathophysiology of the disease process. This knowledge combined with a thorough history, physical examination, and diagnostic evaluation will allow the clinician to reach a clinical diagnosis that includes the suspected pain generator and the functional deficits. The rehabilitation program for back pain is divided in three separate phases with each one having specific goals. The acute phase has the goals of reducing the patient's symptoms and protecting injured tissues; the recovery phase has the goals of allowing tissue healing as

well as achieving normal strength and flexibility; and the functional phase has the goals of correcting abnormal biomechanics as well as returning the patient to normal function and preventing long-term disability. Components of the rehabilitation program that have been shown to be effective in the acute treatment of back pain include a short period of bed rest, low-level physical activity, patient education, and medications. In the recovery phase, flexion and extension exercises, stabilization training, and core strengthening programs have been shown to be clinically successful. Treatment strategies that have been effective in the functional phase include quota-based strengthening exercises and interdisciplinary rehabilitation in patients that fail other treatment options. Although back pain is a very common clinical symptom, there is a lack of well-controlled, randomized clinical trials and scientific validation of treatment strategies for the different clinical subsets of back pain.

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PAIN MANAGEMENT, SPORTS MEDICINE AND SPINE CARE: EDUCATIONAL TRAINING PROGRAMS IN THE UNITED STATES

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Summary: A multitude of factors have contributed to the significant increase in demand for clinical care for acute and chronic disability resulting from spinal and peripheral sources of pain in the United States, including the aging of the population, the increase in physical demands required by specific components of the population for work and leisure activities, an increasing awareness and desire by the patient population to receive health care attention for these conditions, advances in pharmacologic, rehabilitative technologic interventions for these conditions, and the economics of the U.S. healthcare system. This increased clinical demand has been paralleled by an increased need for medical education and training. This presentation will focus on the current system of formal and informal training programs established to provide initial post-graduate and practitioner life long education in pain management and spine care for trainees and practitioners of PM&R in the United States. *Objectives:* Upon completion of this presentation, participants will be able to: 1) outline the informal and formal systems of training in pain management, sports medicine and spine care education for residents, fellows and practitioners in PM&R, 2) justify the current accreditation status of post-residency PM&R fellowship training in pain management, sports medicine, and spine care, 3) discuss the relationship of post-graduate training experience in pain management and spine care to job procurement, clinical privileges and quality of care, and 4) review the available systems of life long learning for PM&R practitioners in the areas of pain management, sports medicine and spine care, including the AAPM&R learning platform *Acadame*.

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THE IMPORTANCE OF CORE STRENGTHENING IN BACK PAIN MANAGEMENT AND PREVENTION

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Core strength training has become a popular mode of treatment for patients with back related injuries and pain. The core muscles are felt to be responsible for the maintenance of stability of the spine and the pelvis and help in the generation and transfer of energy from the large to small body parts during many sports activities. This presentation will address what is meant by core muscles, why strengthening of those muscles may play an important role in stabilizing the spine during various activities of daily living and vocational and avocational pursuits, what literature supports its use and what are some practical ways to build core strength.

First, a description of what muscles make up the “core” will be discussed. Specifically, muscle of the core including the multifidi, the transverse abdominus, the rectus abdominus, the long spinal extensors, the diaphragm, the pelvic floor muscles and selected hip and pelvis muscles will be discussed and their specific roles in spinal stability. Second, the role of these particular muscles in providing stability to the lumbar spine will be outlined along with recent research documenting their importance in this role. Third, literature will be reviewed as to the clinical usefulness of core strengthening and what role, if any, it plays in the treatment of patients with low back pain. Finally, a proposed practical application of strengthening core muscles will be addressed with emphasis on functionally training muscles to do the specific activity that they are called upon to perform. Specific examples of functional core strength training will be discussed. To gain a good understanding about the theories and practical applications of strength training, limitations in the current knowledge to date will be addressed also.

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INTERVENTIONAL PROCEDURES FOR LUMBAR PAIN SYNDROMES: EVIDENCE-BASE AND CLINICAL PRACTICE

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In the United States, the use of interventional spinal procedures as a component of the nonsurgical management of axial low back and radicular pain is steadily increasing. These procedures include epidural steroid injections, zygapophysial joint (z-joint) injections, sacroiliac (SI) joint injections and intradiscal electrothermaplasty (IDET). Various permutations of each procedure are also on the rise including z-joint and SI radiofrequency neurotomy. Unfortunately, the rapid growth in popularity of these spinal procedures has generally not been matched by advances in evidence-based support. This dichotomy has led to trends toward lowered reimbursement for the contextual use of some of these procedures. The objectives of this presentation are to: 1) present available data on the historical use and current trends for epidural steroid injections; 2) review the evidence base for the use of epidural steroid injections, z-joint injections and IDET for either axial low back pain or lumbar radicular pain; 3) discuss various clinical scenarios highlighting the typical implementation of these procedures; 4) differentiate important technical factors in performing some of these procedures; 5) project the future viability of lumbar spinal injections.

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REHABILITATION HOSPITAL ADMISSIONS: PAYER VERSUS PROFESSIONAL STANDARDS

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Introduction: In the US, Medicare is a government program that pays most of the health care costs of patients over age 65. It administers its payments to health care providers, including rehabilitation hospitals, through government designated organizations called Fiscal Intermediaries (FIs). There are ten FIs that provide payments in different geographic areas. Rehabilitation hospitals report that FIs frequently deny admissions by citing they do not meet their admission standards. Rehabilitation professionals believe the standards used by FIs are different from those of standard practice, and vary significantly among different FIs. **Aim:** The aim of this study was to determine how the admission standards of the 10 FIs compared to those

distributed by the American Academy of Physical Medicine and Rehabilitation (AAPM&R) and to each other. **Methods:** The investigators compared the individual admission standards of the ten FIs to the similar standards of the AAPM&R and to those of the other FIs. **Results:** An analysis of the standards of the 10 FIs and the AAPM&R showed significant similarity among most of the individual standards. However, 5 of the 10 FIs had at least one standard that differed significantly from the comparable AAPM&R standard. The AAPM&R standards state explicitly that determining the appropriateness of admissions should not be based on the presence of specific diagnoses. Five of the FIs had standards that preclude approving admissions because of the presence of identified diagnoses. **Conclusions:** There is general agreement on most of the standards that should be considered when admitting patients to rehabilitation hospitals or units. However, half of the FIs had standards that would preclude admissions based upon diagnoses rather than functional rehabilitation needs. The variation of standards among the FIs is likely to result in regional differences in access to inpatient rehabilitation services.

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ROLE OF STRONG OPIOIDS IN CHRONIC LOW BACK PAIN

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Chronic low back pain can have different aetiologies. Problems of the disc, facet joints, spinal canal, vertebrae with their surrounding tissues as ligaments and muscles can all provoke and maintain chronic low back pain. It is important to find and understand the primary origin of the pain. So, we can look for an appropriate treatment. Mostly, a conservative therapy will be started. A multidisciplinary approach with a team of experts is very useful in this difficult population group. Indeed this patients suffer for a long term and are a burden for the society and health insurances. The most ideal multidisciplinary team consist of: a physician in physiotherapy and rehabilitation, a pain specialist (anaesthesiologist), psychologist, social worker and physiotherapist. Putting forward a clear diagnosis associated with a patient convenient rehabilitation program are the most important goals of the team. Sometimes drugs and interventional therapy need to be associated at the program. Considering the WHO ladder system, strong opioids are only the third step in medication treatment. In the past century (the nineties) IASP, WHO and EFIC tried to tackle the myth of opiophobia. Indeed, at that time, physicians had noticed good results using strong opioids in the treatment of cancer patients. So, strong opioids were also used in the treatment of chronic non malignant pain. As chronic low back pain is a pain condition where invasive procedures are mostly obsolete, physicians used more and more opioids to relieve the pain. Many short term studies revealed good pain relieving effects and the side effects weaned off or could be managed. However, in the 21 century, physicians and jurisdiction started to look for more evidence using strong opioids in a chronic treatment. As time passed, more and more side effects in long term treatment were noticed and fear for addiction increased. The lack of randomised placebo controlled studies over a long term period showing no strong evidence for the long term use of strong opioids were another argument to doubt the indication of strong opioids. Fortunately, scientific groups made some recommendations as the Amsterdam Recommendations which are good guideline before starting such treatment. Finally, we can state that the debate about pro's and cons in the use of strong opioids for chronic non-malignant pain conditions has never been so intense.

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FUNDAMENTALS OF HUMAN GAIT**Prahlow N.***Indiana University, Dept. of Physical and Rehabilitation Medicine, Indianapolis, USA*

Abstract not available.

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ABNORMAL GAIT**Viton J.M., Bensoussan L., de Bovis V., Collado H., Delarque A.***Dept. of PRM, University Hospital Marseille, CHU La Timone, Marseille, France*

Our knowledge of normal gait has improved considerably during the last few years mainly thanks to the use of the latest movement analysis tools. Optoelectronic systems, surface electromyography (EMG) methods and force plates have made it possible to describe in detail some of the characteristics of normal gait. This knowledge has led to a better understanding of gait abnormalities. To analyse abnormal gait in patients, it is necessary to have information about the lesions and their development, to be able to assess the impairments and disabilities involved and to understand the compensatory strategies developed by the patients. The aim is always to choose the right treatment for the patient in terms of the drugs, prosthetics and orthotics, physical therapy and functional surgery prescribed in order to obtain a functional improvement, which means improving the gait and locomotor abilities/performances. It is therefore necessary to understand the effects of any treatment on the compensatory processes, otherwise correcting an impairment may actually decrease the patient's ability to walk. During normal gait in adults, each lower limb has to meet several requirements. During the swing phase the limb has to be shortened and moved forward. During the stance phase, the lower limb has 3 functions, support, propulsion and absorption, the most important of which is support/the support function. Gait abnormalities can have several origins such as central or peripheral nervous lesions as well as musculoskeletal impairments. These problems result in compensatory strategies facilitating locomotion. For instance, a lesion of the 5th lumbar nerve root may cause paresis of the ankle flexor muscles; the lack of ankle flexion during the swing phase results in foot drag and in many cases, in falls. The compensatory mechanism often developed, which is called steppage, consists in increasing the hip flexion, and hence the foot clearance, thus preventing foot drag. Several gait abnormalities resulting from specific lesions will be described here along with the corresponding compensatory strategies. Data showing the need for increased attention in subjects with gait disabilities will also be presented. It is necessary to know the exact features of normal gait to be able to analyse abnormal gait in terms of the impairments and compensatory strategies involved. The final goal of the treatment is to improve the patients' ability to walk.

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ELECTROMYOGRAPHY IN GAIT ABNORMALITY**Buschbacher R.B.***Indiana University Dept. of Physical Medicine and Rehabilitation, Indianapolis, IN, USA*

This presentation is to familiarize the participant with the techniques of electromyography including the usual techniques of the study. In addition, clinical settings in which electromyography can be useful will be discussed. The purpose of this presentation will be to inform the participant of the clinical uses of electromyography in a variety of patient diagnosis. Various peripheral nerve techniques will be described and the ways in which the test can be used to help make a diagnosis will be covered. This will be an

introduction to electromyography with emphasis on the clinical uses of electromyography and how such testing can be useful in gait abnormalities.

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CORRELATIONS BETWEEN SPEED IMPAIRMENT AND STRENGTH REDUCTION IN AMBULATORY PATIENTS WITH MULTIPLE SCLEROSIS**Thoumie P.***Hôpital Rothschild, Assistance Publique Hôpitaux de Paris, Paris, France*

Introduction: A prospective analysis of gait and strength parameters was performed in 100 patients diagnosed with MS and pyramidal involvement to assess the correlation between strength and gait impairments. *Methods:* The patients were divided into two groups based on their ability to walk in daily life (non-assisted or cane-assisted gait) and into four clinical subgroups depending on associated involvements such as sensory loss or cerebellar ataxia. Twenty healthy subjects were studied as a control group. Gait parameters were evaluated with a Locometre and muscle strength with an isokinetic dynamometer. *Results:* The average velocity and strength of the hamstring and quadriceps were strongly correlated and reduced in the MS group in comparison with the control, and in the cane-assisted group compared with the non-assisted group. Gait velocity tended to be more correlated to hamstring strength in the non-assisted group with a determination coefficient (r^2 reaching a value of 0.44 in the sensory subgroup. *Discussion:* These findings provide evidence that a correlation between strength reduction and gait impairment is obvious whichever clinical form in patients with MS but may change depending on the disability level and the clinical form. This could be taken in account in the individual assessment of further rehabilitation programs.

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ARM FUNCTION AFTER STROKE: WHAT STRATEGY?**Pélissier J.Y., Oujamaa L., Froger J.***Dept. of Physical Medicine and Rehabilitation, Academic Hospital Caremeau, Nîmes, France*

A focal vascular brain lesion of cortical arm area leads to a functional brain reorganization inside the bilateral sensory and motor cortical areas in order to promote a skilled hand function. This evolution needs three conditions: 1) An expansion of hand representation towards regions formerly occupied by representation of the elbow and shoulder. 2) A total reorganization of cortical areas involved in arm movement (primary sensorimotor cortex -SM1, premotor cortex-PMC, and contralesional or ipsilesional supplementary motor area -SMA). 3) The intact adjacent cortex and the undamaged cortex play a part but the brain insult induces a transient hyperexcitability of the unaffected motor cortex which may abort motor recovery. Is rehabilitative training able to shape an efficient reorganization? Most modifications observed occurred within 3 months after stroke. Different techniques are used acting on the neuromuscular effector with task oriented and repetitive exercises, on perception to enhance or change sensory inputs and on cortical neuronal excitability. Value of an early intensive rehabilitation has not to be demonstrated; some techniques have been proposed including constraint-induced therapy or functional electrical stimulation or bilateral movement training; they have demonstrated their efficacy but each of them has its own indications. Association of EMG-Stim training by electromyography-triggered functional stimulation of the arm and bilateral movement or constraint-induced therapy are now studied; some techniques of computerized arm training have been proposed but their results do not lead us to conclude definitively. On perception, some proposals including virtual reality have been made. Repetitive Transcranial Magnetic Stimulation (rTMS) aims at changing cortical

excitability, with low-frequency on the intact hemisphere (1Hz) and/or high-frequency on the affected hemisphere (5Hz); it is to date an experimental technique but the first results are encouraging. Rehabilitation of the affected upper limb of the hemiplegic patient is crossing a very challenging period which will change dramatically our knowledge and our techniques of care in order to improve arm function.

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HEMINEGLECT IN STROKE PATIENTS

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A large proportion of right-hemisphere stroke patients exhibit unilateral neglect, a neurological condition characterised by deficits for perceiving, attending, representing, and/or performing actions within their left-sided space. Unilateral neglect is responsible for many debilitating effects on everyday life, for poor functional recovery, and for decreased ability to benefit from treatment. Prism adaptation (PA) to a right lateral displacement of the visual field (induced by a simple target-pointing task with base-left wedge prisms) is known to directionally bias visuo-motor and sensory-motor correspondences and has recently been found to improve various symptoms of neglect. For example, performance on classical pen-and-pencil visuo-motor tests could be improved for at least two hours after adaptation. Effects of PA have also been described for non-motor and non-visual tasks, such as for somatosensory extinction, for deficits in mental imagery of geographic maps and in number bisection, and even for visuo-constructive disorders. These cognitive effects are shown to result from indirect bottom-up effects of the deeper, adaptive realignment component of the reaction to prisms. Lesion studies and functional imaging data point to a cerebello-cortical network in which each structure plays a specific role, though not necessarily one that is crucial for adaptation. The variety of cognitive effects induced by PA suggests that this treatment acts not only specifically on the ipsilesional bias characteristic of unilateral neglect, but also rehabilitates more generally the visuo-spatial functions attributed to the right cerebral hemisphere. One could speculate that PA permits an enlargement of the visual-motor mapping of space, on both the left and right sides. These results further support the idea that PA may activate brain functions related not only to multisensory integration, but to higher spatial representations as well, and hence may produce a generalization at a functional level. PA therefore appears as a powerful new therapeutic tool for spatial cognition disorders, which produces central effects via a bottom-up activation process.

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ASSESSMENT OF BALANCE AND MOBILITY

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In clinical settings, assessment of balance and mobility can help in determining both the individual's risk of falling and the most suitable preventive and therapeutic measures to cope with postural instability. The domain of 'balance' embraces at least three sub-domains: stability during quiet stance; postural reactions to external disturbances; and anticipatory postural adjustments to perturbations caused by self-paced movements (e.g. lifting an object). The main measurement approaches for balance and mobility assessment are as follows: 1) clinical tests; 2) multi-item ordinal scales; 3) static and dynamic posturography; 4) balance systems; 5) objective assessment of long-term mobility. 1) Clinical tests

have been designed to: a) investigate maintenance of the standing position with a narrowed base of support (sharpened Romberg in tandem standing), or with a reduced weight-bearing area (one-legged stance-test); b) assess the capacity to perform voluntary movements potentially challenging balance, such as Functional Reach; c) measure the time taken to complete manoeuvres including complex sequences of functional movements (e.g. 'Get up and Go' test). 2) Multi-item ordinal scales are useful tools for exploring simple real-life performances. Two balance scales have emerged in the rehabilitation field: the Tinetti scale (TS) and the Berg Balance scale (BBS). The TS encompasses both balance and gait evaluation while the BBS evaluates only balance performances. The balance items of the TS are scored on a 0-2 point scale (from 0='impossible to perform' to 2='normal'). The gait items are simply scored as 0-1, depending on the abnormal or normal finding. The BBS is the most widely used and validated instrument: it includes 14 items scored on a 0-4 scale, a higher score indicating a better performance. For gait and mobility, the Dynamic Gait Index recently demonstrated sound psychometric properties. Moreover, fear of falling (SAFFE, Fear of Falling Measure), balance confidence (Fall Efficacy Scale, Activities-specific Balance Confidence Scale) and participation in real-life activities need also to be analysed for a comprehensive clinical assessment of patients with balance disorders. 3) Static posturography is based on estimation of the oscillations of the body centre of pressure in the horizontal plane, recorded during quiet stance through dynamometric platforms. Dynamic posturography analyses reactions to external perturbations, and the organization of sensory systems. 4) Balance systems (such as Balance Master) offer quantitative assessment of sensory and motor control of balance (also during performance of daily living tasks) and function-based training of patients with balance and mobility problems. 5) Finally, in ambulatory monitoring of long-term motor activity the signals coming from 4 uniaxial accelerometers are stored on a solid state recorder and then processed by a classification algorithm, which provides an estimate of the subject's motor free-living activity, identifying postures (lying, sitting and standing) and a number of major movements (walking slow, fast or regular, running, cycling, climbing and descending stairs) and their duration.

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RETROPULSION IN PARKINSON DISEASE IS CAUSED BY AN ABNORMAL SENSE OF VERTICALITY

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Objective: To investigate verticality perception as a possible cause of postural instability in Parkinson's disease (PD). **Method:** The postural vertical (PV), i.e. the body orientation for which a subject feels upright in darkness, was measured in both pitch and roll planes using the wheel paradigm in 17 PD patients (mean age 71.4 years, 7 women) and 37 controls (mean age 72.6 years, 15 women). Their postural behaviour was assessed using the degree of retropulsion (unexpected pull test) and static posturography. **Results:** The main finding was a backward PV tilt in PD ($-4.7^{\circ} \pm 1.9^{\circ}$ for patients vs $-1.1^{\circ} \pm 1.4^{\circ}$ for controls; $p < 10^{-3}$). This backward PV tilt was strongly related to the degree of retropulsion (PV = -3.3° , -6.7° , -6.2° for pull test scores = 0, 1, and 2, respectively; $p < 10^{-3}$), but not with disease duration. A backward shift of the centre of pressure was also found in PD patients, who were more unstable than controls. The PV of PD patients was normal in the roll plane. **Conclusion:** This study reveals the existence of an abnormal verticality perception in PD, occurring early, related to retropulsion with a possible causal role. Because PV relies on the integration of somesthetic graviception, this finding suggests involvement of the basal ganglia in the processing of somesthetic gravicep-

tion, and that this process is altered in PD. This could have some clinical implications, especially for early rehabilitation.

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LOCOMOTOR CAPACITY AND PERFORMANCE: RELEVANCE AND LIMITATION OF MICROPROCESSOR PROSTHESIS IN TRANSFEMORAL AMPUTEE

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Introduction: The plus-value of microprocessor controlled knee is demonstrated in lab conditions. Despite the satisfaction of C-Leg users, the amputees are not more active with C-Leg (1). **Aim:** To compare the walking characteristics of active transfemoral amputee by C-Leg versus Conventional knee, both in semi-natural controlled conditions and in daily life conditions. **Patients and Methods:** Randomized crossover design; Microprocessor controlled C-Leg knee versus non microprocessor conventional knee; 8 adults, post-traumatic transfemoral amputee, daily user of well fitted prosthesis, active in professional or vocational daily activities; Semi-natural conditions: asphalt normal and fast walking, grass, slope up and down, stairs up and down Natural conditions: 12 h monitoring during a weekday; Outcome measures: Prosthetic Profile Amputee Locomotor Capacity Index, Houghton scale, Quebec User Evaluation of Satisfaction with assistive Technology; Accelerometry monitoring Vitaport: step rate, walking speed, heart rate response, Physiological Cost Index, duration of activities. **Results:** High level with both prosthesis for PPA-LCI and Houghton scale; – Semi-natural conditions: significant improvement with C-Leg for QUEST, PPA-LCI (uneven ground, stairs), Walking Speed and Physiological Cost Index (fast walking, grass, slope and stairs down); Natural conditions: no difference (C-Leg versus Conventional) in locomotor performance during daily life monitoring. **Conclusion:** First, microprocessor controlled knee improve locomotor capacities and metabolic efficiency just in exigent conditions. Patient needs must be precisely analysed before microprocessor medical prescription. Second, these results exhibit the dissociation between capacity (semi-natural conditions) and performance (natural conditions) (2). The hypothesis of an avoiding behaviour in front of exigency is discussed.

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A BIOMECHANICAL ASSESSMENT OF TWO BABY CARRIER POSITIONS

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In Europe, the use of sling-type or backpack-type baby carriers is now widespread. Various designs are available for carrying a baby in front, on the back or laterally at the hip. **Objective:** To assess an adult's alterations in posture and gait when carrying a baby in a front carrier (FC) or hip carrier (HC). **Material and Methods:** 9 couples (i.e. 18 parents) agreed to participate with their babies. The study included static posturography on a platform and 3D gait analysis with a VICON 370 system. Each test began with a recording without the carrier and was followed by recordings with the baby in a carrier. The order of use of the baby carriers was randomized. **Results:** 10 parents preferred to carry their baby on the right side and 8 carried their baby on the left side, independently

of their handedness or the position of the centre of force (COF) on the platform. Static posturography revealed an increase in the amplitude of the COF displacement when using a baby carrier, whatever the model. Standing with the baby in a HC yielded a larger area of COF displacement than when standing without the baby ($p < 0.001$). The three conditions did not differ in terms of the mean position of the COF. For gait analysis, we had to replace the baby by a ballasted baby dummy, since the children were always playing with the markers. We did not find any difference between the three conditions in terms of the temporal-spatial parameters: velocity, cadence, % double support time, % single support time, step length and stride length. When the baby was carried on the hip, the bi-acromial line was significantly more oblique and the shoulder opposite the carrying side was always lower. Backward tilt was greater with the FC. Both baby carrier positions led to a significant decrease in girdle rotation. **Discussion and Conclusion:** the use of a baby carrier has only a moderate impact on postural equilibrium and gait. We did not find any evidence to suggest that one baby carrier position is more ergonomic than another.

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FROM MENTAL REPRESENTATION OF ACTION TO MOTOR REHABILITATION

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Functional imaging techniques and modern theoretical modeling have provided a new insight on the relationships between motor production, motor imagery and visuomotor perception. New rehabilitation techniques can emerge from these results, based on the immersive and interactive properties of Virtual Reality (VR) systems. From very simple immersive systems, like the « mirror box » used in amputees, to more complex systems, this seminar will review the development of these new techniques and their clinical applications in stroke and chronic pain.

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EARLY REHABILITATION OF PEOPLE WITH NEUROLOGICAL CONDITIONS – DEFINITION AND OUTCOMES

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Early specialist medical rehabilitation for people with neurological conditions delivers a programme of specialist medical rehabilitation for patients during an acute hospital admission and has been developed in response to the need for hospitals to reduce inpatient stays in acute beds. It is under the clinical responsibility of a specialist in PRM. The point of entry is defined as when “the priority of care has moved from the definitive acute treatment to one of rehabilitation” and it is at this time that the specialist in PRM takes the lead for clinical care. In reality, once definitive care or resuscitation has taken place, a patient's inpatient stay in hospital is primarily for rehabilitation and dedicating facilities, including beds, for this purpose will bear fruit to meet healthcare priorities. Below are some examples of how it may be delivered. *i)* Transfer of patients to PRM beds in the acute hospital; *ii)* Establishment of peripatetic teams under the responsibility of a specialist in PRM, while the patient remains in the referring specialist's bed; *iii)* Daily visits to the acute wards by specialists in a stand-alone rehabilitation facility; *iv)* Establishment of PRM centres to take patients in the very short term. The following patients would be suitable: a) Those requiring 24 h nursing and medical supervision for their rehabilitative needs. b) Those who have the capacity for, require and will benefit from rehabilitation, i.e. patients, in whom the evidence shows that active intervention improves function, life satisfaction or prevents deterioration. c) Those with severe dis-

abilities whose needs can only be met by a multi-professional team practising inter-disciplinary rehabilitation. d) Those with complex needs, i.e. requiring more than two professionals working in a team. e) Those with severe disabilities who require assessment and appropriate equipment and whose families require education for caring purposes. The White Book on PRM in Europe sets out the competencies of PRM specialists and services and this presentation will describe an evidence based care pathway and the results of a study in which the outcomes of brain-injured patients were improved by PRM interventions in the intensive care unit.

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ACUTE REHABILITATION AFTER TRAUMA – CONCEPTS AND OUTCOMES

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The outcome of rehabilitation depends on the earliest onset of rehabilitation. This has been proven not only in stroke rehabilitation initiated early in the stroke unit in combination with the acute treatment modalities. It seems to be the case as well concerning polytrauma, brain injury although there is still a lack of evidence based data. Rehabilitation interventions along the continuum of care may decrease mortality, improve the follow-up quality of life and decrease follow-up costs. The lecture describes early posttraumatic rehabilitation as it is practiced in the Center of Rehabilitation Medicine in Hamburg, which is part of an acute hospital-setting specialized in the treatment of spinal cord injuries, brain injuries, burns and polytraumas. We found significant better functional outcomes and a higher rate of 'back-to-work' score.

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REHABILITATION TEAMS IN ACUTE HOSPITALS – ADVANTAGES AND LIMITATIONS OF THE MOBILE TEAM APPROACH

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Introduction: Immediate rehabilitation in acute hospitals can be provided by mobile interdisciplinary teams as well as separate post acute rehabilitation units. Whereas much clinical interest has been centred on the development of separate rehabilitation units, little is known about the practicability and clinical relevance of mobile rehabilitation teams. Here we report the results of a retrospective analysis of this approach in a large university hospital with a main focus on transplantation surgery. **Methods:** Within an observation period of 24 months 541 (0.6%) of all hospitalized patients were referred to the mobile team. 201 of them (37%) were admitted to rehabilitation (female 37%, male 63%, mean age 47+20.4 years). 134 patients (24.8%) failed to meet the admission criteria (i.e. at least 3 therapies of different professions needed; ability of at least minimal cooperation during therapy; expected stationary stay >7 days). Additional reasons for refusal were: insufficient medical stability $n=42$ (7.8%); no need for rehabilitation $n=4$ (0.7%); admittance to an acute rehabilitation unit $n=11$ (2%); limited personal capacities $n=149$ (27.5%). The majority of patients were treated in the departments of general surgery (23%), cardiac and thoracic surgery (20%), internal medicine (21%), neurology and neurosurgery (15%). 71% of all patients were treated on intensive care units, 29% on general wards. The average duration of acute rehabilitation was 21.7±20.3 (range 1–136 days). Mean Barthel index at onset of rehabilitation was 9.6±11.9 with an improvement at the end of therapy of 29.4±32.3 points. 67.6% of all patients contributed to this increase, whereas in 32.4% no improvement or even deterioration occurred. 26 (12.9%) patients died during inpatient treatment. **Discussion:** These data confirm the practicability of and need for

mobile rehabilitation programs in large acute hospitals. Their advantage is the immediate delivery of rehabilitation services even in critical stages of a disease when there is need for acute care in the diverse specialities. Principle limitations of this approach are aggravated working loads for therapists and high demands on an optimal clinical coordination. In conclusion, mobile rehabilitation and acute rehabilitation units are not excluding but complementary rehabilitation approaches in acute hospitals.

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PAYMENT SYSTEMS FOR REHABILITATION IN ACUTE SETTINGS IN EUROPE

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Introduction: Payment system for physical therapy and rehabilitation in European countries is very diverse and complex. The amount of treatment provided through state health system depends on the sum of money that government allocates for rehabilitation out of funds for health care. Though needs and possibilities for rehabilitation are increasing, extension of program paid by health care funds is very difficult. **Aim:** The aim of the article is to obtain information on payment system for rehabilitation programs in acute health programs for the future possibility of uniform system establishing. **Methods:** Analysis of payment system for rehabilitation in acute settings was done on the basis of obtainable data from various articles and information given by specialists of physical and rehabilitation medicine from European countries. **Results:** In most individual member states the hospitals consume majority of the health care resources. Consequently governments are examining how hospitals should be financed, trying to reduce acute health provision costs. Rehabilitation in acute settings is a part of acute hospital health care and as such as well under the restrictions. Financing of acute settings in European countries went through changes and experts are still searching for the transparent way of funding. In last 10 years hospital financing reform was implemented in most European countries, including changing from a global budgeting approach to Diagnosis Related Groups (DRG) based financing of hospitals. Prospective payment systems based on patient classification systems like DRG appear to be an useful model of financing acute health care. Rehabilitation in acute hospitals is paid within the framework of DRG system. It is very difficult to get more precise information on how much exactly from this amount of payment is allocated for rehabilitation program and rehabilitation teams. **Conclusion:** Payment system for acute rehabilitation in Europe is diverse. A suggestion for an uniform way of financing physical therapy and rehabilitation programs in acute settings in EU should be prepared by UEMS section for PRM.

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REHABILITATION IN THE POST-ACUTE PHASES

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Rehabilitation from the acute hospital to community integration covers the whole spectrum of rehabilitation. The medical part is the most heavy in the acute phase and is continued all along the 'rehabilitation chain'. In the post-acute phase the training to gain function is more vital in order to obtain participation in society and in the end of the rehabilitation period social and vocational contributions dominate. A 'rehabilitation chain' for patients with spinal cord injury (SCI) in Stockholm, Sweden is presented. It is divided into three parts. The first being the acute medical treatment and the medical rehabilitation at the acute hospital. The second being localized at a clinic outside the hospital concentrated on

relearning and increasing function for example walking or handling a wheel-chair. In the last part of this period the patient begins to spend more time out in the society and at home. The rehabilitation continues in the last part at an out-patient clinic with the aim of integrating the patient in the society. This out-patient clinic has the whole responsibility for the patient and is fully integrated in the community. The social and vocational rehabilitation starts already in the acute phase but is more in focus in the second and dominates in the last part of the chain. The medical rehabilitation dominates in the first part but is less in focus during the last two parts of the rehabilitation chain. Although the different units are their own clinics, the rehabilitation chain is kept in one piece. This means that when a patient is in the first part of the chain the other units are informed and begin their work, which minimizes the time of transition between the units and ensures a continuity of the rehabilitation. A disadvantage with this construction may be the last part of the chain where the unit has increasing demand of resources due to a growing number of patients.

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REHABILITATION IN CHRONIC CONDITIONS

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In Germany and other central European countries a system for the rehabilitation of patients with chronic conditions is well established. The system is based on complex in-patient rehabilitation measures with a standard-duration of three weeks. The rehabilitation is performed in condition-specific rehabilitation departments mostly led by a physician in the specific field (orthopaedics, rheumatology, neurology, cardiology, oncology, psychosomatics and others). These departments traditionally are mostly located in health resorts. In larger cities day-clinics with similar programs were established too recently. The rehabilitation programs include a wide range of interventions, e.g. medical treatments, physiotherapy, occupational therapy, other physical modalities, psychotherapy, nutritional therapy, health education and others. For special indications other special interventions are included too. In employed persons rehabilitation is paid by the German pension insurance and aim at return to work mainly. In most other cases the health insurance is responsible and the aim is an improvement of functioning. Main indication are musculoskeletal disorders (males: 43%, females: 41%), psychosomatic disorders (males: 14%, females: 17%), cancer (males: 11%, females: 18%) and cardiovascular disorders (males 13%, females: 5%). Long-term studies show that symptoms in most indications are reduced after end of treatment and that the effects last up to 6 or even 12 months. Functioning and quality of live improved and number of days on sick leave is reduced. Health education during rehabilitation has been shown to be effective too. In order to stabilize the effects specific programs for long-term out-patient interventions.

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COMMUNITY-BASED REHABILITATION – CONCEPTS AND OUTCOMES

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Introduction: Usually, and preferentially, Physical Medicine and Rehabilitation activity is organized in an inpatient medical unit in a public hospital or a private medical center. It is also preferentially considered and developed as a second care, after the post-acute medical interventions for disease, trauma, surgery or reanimation for example. If we take into account some observations and concepts about care organization and needs as: 1) the general evolution of care (particularly in surgery with ambulatory techniques for example); 2) the technical evolutions in PM&R particularly with

functional analysis and functional therapies (as botulinic toxin for example); 3) a more important expectations of others practitioners for PM&R interventions in regard to deficiencies, impairments and handicap; 4) the expectations of patients and their associations with attention about the information to patients and the choices of care procedures; 5) the chronic evolution of disease and their consequences on impairment, disability handicap and participation; PM&R must be more developed in community and particularly must develop ambulatory care modality with the preservation of a multi-disciplinary intervention. *Objectives:* Firstly determine the factors which contribute to the necessity that PM&R takes a place in the medical services for community with outpatient units, ambulatory and at home procedures. Secondly describe some organizations and procedures necessary in a territory with the relations between PM&R inpatient hospital or medical center unit and private medical practitioners and others professionals, medical and social institutions for disabled subjects, patients associations. Thirdly, analyze this organization with other models in Europe. *Methods:* Analyze from our activity and experience in the Ambulatory MP&R care Unit and Mobil Unit from CHU de Saint-Etienne and other models in France. Analyze of literature about ambulatory and community organization of PM&R in Europe. *Results:* We report our organization and activity in the PM&R Ambulatory Care Unit of the institution which group: medical consultations, clinical and functional explorations, outpatient rehabilitation unit and mobile care unit and some experiences reports in France and in Europe. We analyze the interests for the patients, the medical community, all the community (persons and institutions in relation with handicap) in an urban territory. We analyze also some financial and administrative difficulties to promote and develop this model of organization. *Discussion and Conclusion:* The PM&R interventions at acute, post-acute and chronic stage of the disease give the collaborations more efficient with others medical specialists. The importance of PM&R care during the life of patient affected by a chronic disease or a handicap, the adaptation to the handicap all the life to promote participation of the person and probably more important benefices of PM&R interventions in the personal environment of the patient in ecological conditions than only in medical center need to organize community rehabilitation. This is also conditioned by economic conditions, psychological changes PM&R professionals to accept to work more in this “mobile” conditions than it is usually.

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PMR SPECIALISTS IN PRIVATE PRACTICE – CAN THEY PERFORM MULTIDISCIPLINARY REHABILITATION

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Private practice in PRM is certainly not uniform and can range from an isolated activity of manual medicine to organizations derived from the example of institutional rehabilitation centres. In 2002, the French Union of PRM (SYFMER) (1), in cooperation with the National Health Insurance (Caisse Nationale d'Assurance Maladie), issued a modular concept of PRM private facilities. Around a core set, dealing with reception, security and information management, separate modules were described in relation to musculoskeletal assessment, nervous system assessment, neurologic and locomotor rehabilitation, pelvic assessment and rehabilitation, cardiovascular and respiratory assessment, orthotics and prosthetics, vocational rehabilitation. Then, in 2003, a national survey was carried out over the 600 French PRM private doctors. Out of them, 33% responded after a single mailing. Their responses were consistent with a first audit, achieved in 1996. 25% worked without any technical platform. 50% had a specialized practice, using one or two modules as defined above. 25% had a versatile activity. PRM premises and equipment are very diverse according to the orientation of each specialist, but also to synergies, which are

often established with neighbouring radiologists, physiotherapists and other complementary disciplines. 55% perform locomotor investigations (X-ray, ultrasound, isokinetic dynamometry, posture analysis, etc.). 55% perform locomotor rehabilitation, either themselves (41%) and/or in cooperation with physiotherapists. 29% perform pelvic assessment and/or rehabilitation. 27% perform neurophysiologic investigations (EMG). The current trend is to insert PRM practice either into multidisciplinary outpatient facilities or into a private hospital, which offers the same kind of equipment and competencies as a public hospital. This leads to a daily dialog with other specialities, especially with orthopaedic surgeons and to organize multidisciplinary procedures of care in PRM. Self rehabilitation takes an increasing part in this kind of procedure and this enhances the educational role of the PRM doctor. Cooperation with community based physiotherapists is important too, since not all patients can be rehabilitated locally. For instance, when we launched a rehabilitation procedure after ACL surgery (2), several educational meetings were organized and 250 physiotherapists out of 500 attended those sessions. There is no private occupational therapist in France, but it is possible to cooperate with those who are employed by associations of patients and some other organizations. The same kind of possibility exists with social workers. Most often, this multidisciplinary approach is informal, but some rehabilitation networks have gained official recognition, for instance "Handicap Lourd Aquitaine (HLA 33)", which is funded by the Regional Health Insurance (3).

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I102

FROM PHYSICAL MEDICINE TO INTERDISCIPLINARY REHABILITATION – AN ICF PERSPECTIVE IN PRM PAIN MANAGEMENT

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Traditionally, physical medicine modalities have constituted the main methods for PRM physicians when encountering patients in chronic musculoskeletal pain. Recently, our understanding has increased considerably, both with respect to their biological mechanisms and effectiveness. By introducing cognitive-behavioural psychology into pain management, the rehabilitation of persons with chronic pain has been greatly facilitated. From an ICF perspective, physical medicine modalities as well as behavioural cognitive therapy can be integrated into an interdisciplinary rehabilitation process. However, often a vast number of treatment modalities are tried in a haphazard order and with at best uncertain success. As in all other areas of medical practise, treatment should start with diagnosis, which in turn makes an assessment protocol and taxonomy necessary. Traditionally, the classification of pain has been based on localisation. With this approach, neither the specific mechanisms by which the injury or other causative factor produces pain, nor the cognitive or behavioural aspects of the pain condition are included as integral parts of the assessment. Often a traditional pathology of the pain condition cannot be defined. In 1994, I suggested that pain conditions due to disturbances of function in the nervous system should be denoted 'dysfunctional pain'. These conditions may be misinterpreted as 'psychosomatic' but are analogous to e.g. epilepsy. Most clinicians work very hard to prevent the transmission of nociceptive stimuli from reaching the conscious level. However, the awareness of pain immediately gives rise to an interpretative process where previous experience and environmental cues as well as affective aspects play important roles, critical to whether the pain becomes disabling or not. Using the international classification of functioning, disability and health (ICF), longstanding pain should be seen as a significant deviation from normal nociceptive transmission and thereby a severe sensory

impairment. This implementation enables us to use the ICF classification to describe pain-related activity limitations and participation restrictions in a particular context, explaining the complex picture of the sensory/interpretative/behavioural clinical presentation of longstanding pain. Indications for pain management can be logically derived from the ICF approach, focussing pain management on those persons who are distinctly limited or restricted by their pain.

I103

HIGH-ORDER NOCICEPTIVE PROCESSING ANOMALIES IN CHRONIC PAIN SYNDROMES

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There is evidence to suggest that chronic wide spread pain syndromes (e.g. fibromyalgia) may result from abnormal processing of somatosensory information within the central nervous system (CNS) characterized by sensitization of the nociceptive system and possibly by alteration of the modulatory inhibitory pathways. Most studies rely mainly on psychophysical methods showing a decreased threshold and steeper stimulus-response functions in perception of nociceptive stimuli in these patients as compared to age and gender matched control groups. But neurobiological (e.g. neuropeptides in cerebrospinal fluid), electrophysiological (e.g. RIII nociceptive reflex, laser evoked potentials) and neuroimaging findings (e.g. fMRI) are also indicative of a CNS sensitization of nociceptive pathways. However, these findings may also be interpreted from the perspective of a dysfunctional perceptual-attentional interpretation of the pain experience. Indeed, recent studies using similar investigational methods suggested that these patients present with 'hypervigilance' to nociceptive and nociceptive-related information at the expense of other sensory modalities. This hypervigilance conduct fibromyalgia patients to bias their focus of attention toward nociceptive information and their over-interpretation may lead to a perceptual amplification of pain-related sensations. It has been proposed that hypervigilance to pain results in an automatic and goal-independent capture of attention by nociceptive events (Crombez G, Van et al. Hypervigilance to pain: an experimental and clinical analysis. *Pain* 2005; 116: 4–7). If we assume this to be true, one may expect that in fibromyalgia patients (1) the decrease in pain threshold should be the result of a lowering of the decision criterion rather than an increase in sensory discrimination (using the sensory decision theory paradigm), (2) the involuntary orienting response evoked by nociceptive stimuli should be facilitated and greatly amplified (even when pain is not relevant to current cognitive goals) and (3) the processing of nociceptive stimuli should interfere more severely when engaging in or maintaining selective attention to other sensory modalities or ongoing cognitive tasks. Experimental and clinical evidence regarding the hypervigilance hypothesis shall be reviewed and discussed.

I104

COMPLEX REGIONAL PAIN SYNDROME CRPS: PAIN MANAGEMENT AND FUNCTIONAL RESTORATION

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This topic is widely discussed and diagnosed. It is vital to understand the pathophysiology of CRPS if one is to understand its evaluation and treatment. This presentation will address in detail with multiple possible theories addressed. The educational objectives of this presentation are that on the completion of this presentation, the participants will be able to: 1) Understand the recent research in the area of CRPS. 2) Understand how recent research is changing clinical practice of CRPS. 3) Understand

the current etiology of CRPS. 4) Understand the current concepts of evaluation and treatment of CRPS. The evaluation and its classification has recently been updated. A more comprehensive and specific classification will be presented based on recent research for utilization in the clinical and research diagnosis of CRPS. The treatment of CRPS is in evolution with new proposed treatments which have questionable effectiveness and cost efficacy. This program will address the evidence basis studies on treatment especially based on the proposed pathophysiology of CRPS. New treatments will be explored and critiqued.

I105

SCIENTIFIC EVIDENCE OF THE REHABILITATION TREATMENT OF THE FIBROMYALGIA

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Fibromyalgia is defined as a functional somatic syndrome, where the patient suffers of chronic pain due to disturbances in pain perception pathways, probably following changes in chemical neurotransmitters. It attends with ample somatic manifestations that are usually associated with psychiatric disturbances. It is the most frequent cause of generalized chronic pain in middle age women. Demographic studies show an incidence of almost 5.6% in general practice consultations and 12 to 20% in rheumatology consultations. Pathogenic is unknown, but present data suggest pain pathways sensibilization and damaged central pain processing. Heterogeneous clinical approach and unclear knowledge of its pathogenic mechanisms leads to lack of treatment and the absence of establish protocols of performance. *Objective:* The objective of this study is to demonstrate effectiveness of the non pharmacological treatment in fibromyalgia. *Method:* We have used different sources of search: Scientific Pub Med-MEDLINE, Pedro, Cochrane Library and magazines. *Results:* Effectiveness of the treatment has been classified in strong, moderate, weak and without evidence, being the aerobic exercise, the education of the patient and the cognitive behavioural therapy the therapeutic modalities more recommended.

I106

LARYNGEAL ELECTROMYOGRAPHY: NOT EASY TO PERFORM BUT USEFUL

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Although laryngeal electromyography (LEMG) was introduced in 1944, relatively few professionals trained in EMG have practical experience. LEMG is a valuable adjunct in the study of vocal fold dysfunction (VFD). VFD may result from neural injury or from mechanical fixation of the cricoarytenoid joint. In clinical practice, laryngoscopy rarely differentiates between these underlying causes of VFD; laryngeal electromyography (LEMG) may be a more objective technique for assessing the etiology (1). LEMG techniques utilize primarily needle recordings of activities from the thyroarytenoid muscle (TA; recurrent laryngeal nerve) and the cricothyroid muscle (CT; superior laryngeal nerve). LEMG can be performed percutaneously with a bipolar concentric needle in the awake patient. Electrical activity is studied at rest and during voluntary motor activity by phonation. Specific EMG patterns (fibrillation potentials, positive sharp waves, polyphasic motor potentials, ...) can be observed in neuropathic and myopathic disorders involving the vocal fold and larynx. LEMG is also valuable in predicting recovery from neural injury. As demonstrated in a previous study (2), when performed more than 6 weeks after the onset of symptoms, pathological LEMG results are significantly correlated with a bad recovery. Denervation activity at rest correlates better with VFD evolution (86%) than motor unit recruitment

(71%). On the other hand, a normal LEMG is poorly correlated with a good recovery. So, the LEMG shows a better positive than negative predictive value; this observation is not surprising because when the LEMG is normal, mechanical fixation is suspected, the evolution of which is independent of the LEMG results. Furthermore, in the treatment of laryngeal dystonias LEMG seems to be preferable to direct visualization (endoscopy) for guidance of botulinum toxin injections (3).

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I107

PROSTHETIC REHABILITATION IN GERIATRICS

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Introduction: The most common causes for amputation in elderly are peripheral vascular disease, diabetes mellitus, trauma, infections and tumors. Arteriosclerosis is found in about 5% of population older than 50 years and in 5% of these cases ultimately leads to amputation. The incidence of diabetes mellitus is 2–5% of which 40–45% patients undergo amputation of one or both lower extremities on different levels. *Aim:* To analyze the specifications of the prosthetic rehabilitation in geriatric population with a goal of achieving the best possible level of functionality and a better quality of life. The main problems in prosthetics are decreased elasticity of skin and the amount of soft tissue, decreased neural conductivity, decreased muscular strength and contraction velocity, decreased reactivity of blood vessels and local tissue trophics, arthrotic changes of joints and localized or generalized osteoporosis. *Results:* The program of prosthetic rehabilitation involves the same stages as in younger amputees, but is guided by cardio-pulmonar status, status of the valid extremity, status of the locomotor system and psychosocial status. The specificity of the program is in its dynamics, minimal starting requirements which are increased later, the phases that last longer, larger tolerance concerning deviations in walk, reactions to psycho-social reintegration problems and lower level of functional ability. The prescribing of prosthesis is done by a team. Due to the necessity for as lighter as possible prosthesis, light bearing is used, as well as endoskeletal systems with a break in the knee, soft foot and modified suspension. *Conclusion:* The program of prosthetic rehabilitation of geriatric patients has numerous specifications whose goal is to manage a successful prosthetics in spite of larger health and psychophysical problems which are common in this group of patients compared to younger amputees.

I108

COGNITIVE AND NEUROBEHAVIORAL IMPAIRMENTS IN ROAD-CRASH INJURED PATIENTS WITH AND WITHOUT TBI: AN EVALUATION OF THE ESPARR COHORT ONE YEAR AFTER THE ACCIDENT

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Introduction: In ESPARR's study, we followed up a road accident victim's cohort in order to assess the medical, social and family

consequences of a road accident on the victims and their family. All the members of this cohort were included while they were given care of in the Rhone department's hospitals. **Objectives:** This study aims to describe the cognitive and neurobehavioral impairments that road accident victims can suffer from, according to the gravity of the reported head injury. **Method:** The ESPARR Cohort study included (road crash) injured subjects while they were taken care of in the Rhone area's hospitals, between October 1, 2004 and December 31, 2005. The neuropsychological assessment realised one year after the accident concerned specific people: first, they had to be 15 years old or more at the time of their accident. Secondly they had to be considered as severely wounded (M.AIS 3+) or have at least an AIS 2 head lesion score (corresponding to a TBI with loss of consciousness). Assessment scales and questionnaires were administered by neuropsychologists. We chose the Revised Neurobehavioral Rating Scale (NRS-R), which was validated in French by Vanier, Mazaux et al. **Results:** 281 of 401 subjects (71%) accepted the follow-up one year after the accident: 115 people had a M-AIS \geq 3 without TBI, 46 a serious TBI, and 120 a moderate TBI. The mean age is 36.6 years (\pm 16.7). The three groups are similar in terms of socioeconomic categories or familial status. Three subjects out of 4 are men. As expected, subjects with serious TBI suffered significantly more frequently from attention and memory impairments, anxiety, difficulties in oral expression, mental fatigability, difficulties in mental flexibility, lability of mood and emotional withdrawal. Moderate TBI were slightly more numerous to present mental fatigability and decreased motivation but this was not significant. On the other hand, more severe injured people without TBI had a blunted affect but the difference with moderate TBI was not significant. **Conclusions:** The results of the study confirm the cognitive and neurobehavioral impact of severe traumatic brain injury one year after the accident. We did not find statistical differences between moderate TBI and serious injured people without TBI.

I109

TOPOGRAPHICAL DISORIENTATION IN PATIENTS WITH TRAUMATIC BRAIN INJURY: PERFORMANCE IN REAL COMPARED TO VIRTUAL ENVIRONMENT

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Background: Topographical disorientation (TD) is frequently observed after traumatic brain injury (TBI), and it is an important source of disability in daily living. In healthy subjects, topographical memory (TM) is a complex cognitive process which allows for finding again his or her way, and for situating oneself within a familiar environment. From this process, individuals build mental egocentric and allocentric representations of their environment (cognitive map theory), and an impairment of these representations might play a role in TD observed after TBI. According to many authors, TD cannot be assessed accurately by classical paper-and-pencil tests. Despite assessments in real life large scale environment are developing, no standardized assessment of TM impairment in real life environment is yet available for TBI persons. **Objective:** To assess if using an immersive virtual environment (VE), modelling an environment which reproduced reality, might allow developing a new, valid and reliable assessment tool for TM impairment in TBI patients. **Material and Methods:** 17 TBI patients and 6 matched controls were asked for making a walk in the streets surrounding the hospital with the examiner, then for reproducing three times the

itinerary from memory (real environment). In a second phase, 15 other TBI patients and 5 controls were asked for making the same trip on a computer, in a virtual reproduction of the streets. **Results:** Using ANOVA, we found a significant difference between the performances (group effect, $p < 0.01$) of control subjects in comparison with TBI patients, in both type of environment, but there was no significant difference of performance between real and virtual environment (Environment effect, $p > 0.05$). **Discussion:** Our results go in the sense of data in literature about brain-injured patient behaviour in VE. Assessment of TM impairment in TBI patients is difficult because of the impossibility to do it in real life, because of variability and unpredictability of environmental conditions. Safety is another restraint. But the results of this study suggest that these impediments may be overcome by using VE tasks, and provide evidence to the ecological validity of virtual environment and its interest in assessing DT.

I110

THE EFFECT OF AGE ON EXECUTIVE FUNCTIONING AFTER ACQUIRED BRAIN INJURY IN ADULTS

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Introduction: Executive functioning deficits have often been described in normal aging. They are also known to be a frequent sequel of traumatic brain injury, where patients may exhibit severe long-standing impairments in instrumental activities of daily living. One could therefore expect that cerebral lesions affecting executive functioning would result in more severe impairments in older patients. We previously developed an ecological assessment of executive functions, consisting of a cooking task, requiring multi-tasking abilities and known to be sensitive to a dysexecutive syndrome (Chevignard et al. 2000). **Aim:** The aim of this study was to analyze the effect of age on the cognitive and ecological assessments of executive functions in a group of patients with acquired brain injury (ABI) resulting in a dysexecutive syndrome. We hypothesized that older patients would have poorer performances on the cognitive and ecological tests of executive functioning, when compared to younger patients. **Methods:** 45 patients with ABI resulting in frontal lesions and a dysexecutive syndrome participated in this study. Patients underwent a comprehensive battery of cognitive tests assessing executive functioning, as well as the cooking task. We also studied a group of 12 control subjects who performed the cooking task. **Results:** No effect of age was found on performance in the cooking task in the control group. Although the ABI group was relatively young (mean age: 40.3 years (SD=12.5), ranging from 17 to 63), results indicated a significant deleterious effect of age on the cognitive tests of executive functioning in the ABI group. We also highlighted a significant worsening of patients' performance in the cooking task with age, and this effect was found on several variables of task analysis: the number of errors, task duration and occurrence of dangerous behaviors. **Conclusion:** Our study demonstrates the deleterious effect of aging on cognitive and ecological assessment of executive functioning after ABI. The strength of this study is that it deviated from the traditional age considered in studies of elderly populations and focused on younger patients. It is therefore important to consider the implication that this may have on a patient's rehabilitation program and post-injury discharge.

I111

HOW TO EXPLORE THEORY OF MIND AFTER SEVERE BRAIN INJURY?

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Introduction: Impairments of social behaviour after severe TBI are strongly related to poor social outcome. Current studies report dissociation between social behavioural impairments and relative preserved performances in traditional tasks that investigate cognitive abilities. Theory of mind (ToM) refers to the ability to make inferences about other's mental states (beliefs, intentions and desires) and use them to understand and predict other's behaviour. However, the relationship between ToM abilities and executive functioning remains controversial. **Aim:** We tested a group of patients with severe TBI on a series of four verbal and non verbal ToM tasks, and on non mental inference tasks of indirect speech act and empathy and tests for executive functions. We hypothesised 1) that subjects with TBI perform more poorly than control subjects on all ToM tasks, 2) a dissociation in interaction between ToM abilities and other cognitive functions/inference tasks suggesting modular organisation. **Patients and Method:** 15 patients who suffered a severe TBI (13 male, 2 female) ranging in age from 19–58 years ($M=37.2$, $SD=12.3$) were recruited. Control group (NC) consisted of 15 subjects who had no brain damage and neurological or psychiatric history with similar educational and vocational level. Baseline neuropsychological assessment consisted of WAIS-III, executive tests (Trail Making Test (TMT) A and B, Stroop Color Word Test, Verbal Fluency) and memory tests (California Verbal Learning Test (CVLT), working memory span). Four different tests involving ToM: two verbal tasks (Faux-pas Recognition Test and false-belief task), and two non verbal tasks (character intention task and the Reading the Mind in the Eye Test) were performed. Non verbal inference mental tasks used were (indirect speech act) from Montreal Evaluation of Communication Protocol (MEC) and Davis' interpersonal reactivity index (IRI). **Results:** TBI patients and controls differed in faux-pas-related questions ($U=46.5$, $p<0.01$), character intention task ($U=51$, $p<0.01$), and Reading the mind in the eye test ($U=35$, $p<0.01$). TBI did not show difference in faux-pas-related questions on the control stories and in understanding faux-pas stories and control stories as in Character intention task. Understanding of second order belief stories) was lower in TBI than in control subjects ($U=47$, $p<0.01$). Regarding non verbal inference test, TBI showed lower results in MEC protocol, but as well in indirect speech act ($U=44$, $p<0.01$) than in direct speech act ($U=11$, $p<0.001$). No difference was found in Davis' interpersonal reactivity index (IRI). **Discussion:** Subjects with TBI perform more poorly than control subjects on all ToM tasks, except first-order belief task. The failure of TBI in verbal as non verbal tasks and preservation of executive performance in some subjects suggest that ToM involve a unique modular function. ToM has a particular stereotyped developmental sequence which also argues for hypothesis. Normal performance in IRI pattern suggests that TBI subjects demonstrate appropriate empathic understanding even when ToM abilities deteriorate. **Conclusion:** We show that ToM deficit is probably distinct from other cognitive difficulties like empathy and pragmatic communication skills, even if we cannot tell whether the difficulty is specific to the domain of mental states, or, whether it reflects a more general problem with some kinds of inferences and deductions. The finding of a specific ToM impairment in TBI would provide further evidence for the modular nature of ToM. It would also have important implications for the rehabilitation of social difficulties.

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I112

FATIGUE, SLEEPINESS IN PATIENTS WITH TRAUMATIC BRAIN INJURY

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Background: Almost one in every two patients, suffering from traumatic brain injury (TBI), report chronic fatigue. A previous study showed that sleepiness could account for fatigue in TBI patients. **Objective:** In this new study, we looked at the relationship between both objective and subjective sleepiness, fatigue and drug treatment in TBI patients. In a TBI subgroup vs. matched controls, we focused on the relationship between fatigue or sleepiness and driving performance. **Methods:** Nocturnal polysomnography, 5×40 min maintenance of wakefulness test (MWT) trials, Epworth Sleepiness Scale (ESS) and a Fatigue Severity Scale (FSS), were collected in 36 TBI patients (28 males, mean age [\pm SD] = 33±11 years). Twenty-two patients (16 males, mean age [\pm SD] = 37±12 years) out of the TBI and 19 controls (16 males, mean age [\pm SD] = 31±10 years) performed an hour simulated driving session to estimate their mean standard deviation from the centre of the road (SDS). Out of the 36 TBI patients, 7 patients took psychotropic treatment but none of them performed the driving session. **Results:** In TBI patients, FSS, ESS and MWT latency means [\pm SD] were, respectively, 19±7.8±4 and 35±7 min. In control subject, FSS, ESS and MWT latency means [\pm SD] were, respectively: 11±2.5±3 and 37±5 min. TBI patients under treatment did not differ in term of sleepiness or fatigue from drug free patients. TBI patients reported more subjective fatigue (Mann-Whitney U, FSS: $Z=-4$, $p<0.001$) and subjective sleepiness (ESS: $Z=-1.68$, $p=0.093$) than controls. Their driving performance was also significantly worse than controls (SDS: $Z=-3.7$, $p<0.001$). In TBI patients, fatigue scores related with driving impaired (Rho de Spearman. $r=0.455$, $p<0.05$) and with objective sleepiness (MWT: $r=-0.423$, $p<0.05$). **Discussion and Conclusion:** TBI patients complain of subjective fatigue and sleepiness but present normal scores at the MWT. Interestingly, subpathological level of sleepiness at the MWT correlates in TBI patients with fatigue when it does not in control subjects; and fatigue is associated with poor driving performance. Treating TBI patients, with alerting drugs even if MWT scores are subnormal, could improve fatigue.

I113

REHABILITATION OF THE CENTRAL EXECUTIVE OF WORKING MEMORY AFTER SEVERE TRAUMATIC BRAIN INJURY: TWO SINGLE-CASE STUDIES

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Background/Objective: A deficit of the central executive of working memory is a frequent finding in patients with severe traumatic brain injury (TBI). The objective of the present study was to assess the efficacy and the specificity of a rehabilitation programme of the central executive after severe TBI. **Method:** An experimental single-case multiple-baseline-across-behaviour design was used, in two chronic severe TBI patients suffering from an isolated central executive deficit. Outcome was assessed by a clinician not

informed of the experimental trial, with specific working memory tests (Spans, Brown Peterson, n-back), non specific cognitive tasks requiring working memory (dual-task, arithmetic solving problem), ecological questionnaires to assess generalisation to everyday life, and non-target tasks not requiring working memory, to assess specificity of effect. *Results*: Performance was stable on two baseline sessions before therapy. For both patients, a statistically significant improvement was found for target measures, mainly for central executive tasks, and for ecological questionnaires. In opposition, no change was found on non-target measures. *Discussion*: Improvement was not seemingly related to spontaneous recovery, nor to re-test effects. This study suggests that specific cognitive training may improve the central executive of working memory in patients with chronic severe TBI.

I114

TAKING CARE OF A TRAUMATIC BRAIN INJURY VICTIM AFTER A ROAD ACCIDENT: HOW TO ASSESS THE LONG-TERM EFFECT ON THE FAMILY?

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Introduction: ESPARR is a prospective cohort study of road accident victims, allowing us to study the consequences of road accidents on the victims and their family. After such an event, victims and their family experience a major change, which is often permanent. *Objectives*: This work presents the methodology and the tools which will be used to assess the repercussion of road accidents on the family of the seriously injured people. *Method*: By a collaboration with the UNAFTC's families, we are able to highlight their expectation, their needs and what would be necessary to assess, such as the burden that represented the caring of their injured parent, changes in their life projects, the anxiety and the fear, and how they are affected 'today' by all they went through after their accident. An auto-questionnaire, intended to the family circle, is chosen because it reflects the different levels of complaint the different family expressed. It includes a family burden measure scale (the short version of the Zarit scale), a quality of life scale (the Glzman scale) and a visual analogical scale of the level of felt burden (load). This auto-questionnaire will be sent at each sought member of the family, by postal service. On a second hand, a psychologist will carry out a phone interview allowing any family member to express freely his feelings. These data will be analysed and crossed with the questionnaire's results. The 66 victim's family (in which 59 had a traumatic brain injury) of the ESPARR cohort will be contacted, up to 4 members per family more than 14 years old, after we obtained the victim's agreement. *Expected Results*: We expect to contact 264 close relatives of the victims, in which 236 traumatic brain injury victim's family. The observation and the analyses of the family's behaviour, and the highlighting of how the family can disorganise and reorganise itself to deal with a 'dependant' person will help obtaining quantitative data, which will be useful to establish caring action plans. We will be able to validate the short Zarit scale in a population of road accident's victims caregiver.

I115

FITNESS TO DRIVE AFTER SUFFERING HEAD INJURY IS AN ESSENTIAL ISSUE

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Background: Driving is considered by most patients as an essential everyday life activity, and returning to driving seems to be impor-

tant for recovering independence and becoming 'normal' again. There is also a clear link between safe driving and returning to work. We know that TBI induces residual cognitive deficits even in the long term, especially regarding attention, memory, learning, problem solving and reasoning. These most common deficits are amplified by visual, sensory and motor difficulties. We also know that behaviour problems are the most frequent after-effects of TBI. Lack of flexibility, disinhibition, impulsivity and anosognosia are core issues problems for driving. If assessment of these residual capacities and incapacities are of course important, we must also take into account that driving puts the driver in an unpredictable environment under time pressure. There is currently a limited knowledge base to guide our assessment strategies. We believe that neither a medical nor a neuropsychological approach are able to assess driving and give a definite answer as to what is 'safe' driving. *Objective*: To propose a collaborative policy to integrate a multi dimensional approach between medical, neuropsychological and ecological driving assessment data in advising patients and the administration about fitness to drive. *Method*: We built up a special program for driving assessment for TBI patients. This program runs on with a special staff composed of a medical doctor, a neuropsychologist, a physiotherapist and an instructor, divided in two judge groups. The technique of the two groups we used consisted in assessing two different areas on the one hand a medico psychological test and on the other hand, working separately, a real on-road driving test. *Results*: Comparing the results of these two different approaches allowed our team to define a profile of the potential driver and to distinguish different categories: fit to drive, unable to drive, driving allowed after training. We are now able to present the first thirty cases assessed in Mulhouse.

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SEVERE TBI AND RETURN TO COMMUNITY IN FRANCE

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The return to Community is not easy after severe TBI. It depends on the physical as behavioural sequelae and on familial and social resources. The goals of rehabilitation for TBI have been defined in France by several legal texts (Circulaires 1996, 1997, 2002, 2004, law 2005). The « departmental house for handicapped people » plays an important part to propose adapted ways and means to realise self project and to compensate for handicap. The use of FIM and GOS allows to define some levels of handicap so as daily autonomy, accessibility at home, return to work, abilities in civil as social life, for friends and cultural activities. They are an index of gravity of the trauma as a guidelines to realize, in the best conditions, the reintegration of TBI. GOS2 Motor abilities as communication are very poor. The patient is highly dependent, all care have to be realized by an outsider. We speak about «vegetative coma» or «minimally responsive». It is not easy to find a place for such people : sometimes at home, either in nursing home, some will die in general hospital. From 2002 the ministry points out this catastrophic problem and put up money for create special places. GOS3 Partially independent, patient needs of human presence. Some remain at home if behaviour allows visited by specialized people (SAMSAH), some are admitted in day center (CAJ) for occupational activities, or in a special unit with some help for daily activities but also a lot of various animations (MAS, FAM). Some can work again in very special conditions (ESAT). GOS4 for most of them an evaluation of abilities has to be realized by UEROS to define the ability to work. Some can to come back to work in adapted factories, different status are possible (ESAT, EA). Return to previous work or in normal activity needs a supervision to avoid incidents. GOS5 is very rare situation with come back to the previous life. The behavioral impairment and anosognosia make necessary a follow-up and a supervision. All situations will be developed.

I117

CARE PATHWAYS FOR PEOPLE FOLLOWING ACQUIRED BRAIN INJURY**Ward A.B.***North Staffordshire Rehabilitation Centre, University Hospital of North Staffordshire, Stoke on Trent, UK*

Medical rehabilitation interventions and the success of rehabilitation depend on the quality of the patient presenting to treatment, the motivation and attitude of the patient, the skills of the treating team and the availability of appropriate facilities to implement a rehabilitation strategy. The patient's own attributes are again dependent on his or her pre-morbid state, the severity of the injury and the delivery of rapid and appropriate intensive care and resuscitation to prevent secondary brain injuries and other complications. The ability to prognosticate survival and independence at six months is now possible and prognostic modelling in traumatic brain injury is now possible (1). Although the CRASH Trial collaborators (1) and IMPACT database (2) have both designed systems of care in the acute phase following injury to the brain and made assumptions about prognostication of independence at six months, little success has been achieved in acquiring a care pathway for brain injury rehabilitation. The CRASH study is based on a collective clinical experience beyond that achievable by any individual clinician and these estimates are potentially useful to support clinical decision making as well as for education. The White Book on PRM in Europe (3) is also potentially useful for setting the clinical context for care pathways and this presentation will describe the evidence necessary for developing a care pathway and the results of a study in which the outcomes of brain injured patients were improved by PRM interventions in the acute phase.

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I118

WHAT QUALITY OF LIFE AFTER TRAUMATIC BRAIN INJURY? QOLIBRI, A DISEASE-SPECIFIC QUALITY OF LIFE TOOL**Truelle J.L., von Steinbuechel N., von Wild K., Hoefler S., Lichetzke T. and the Qolibri group***Dept. of Neurorehabilitation, University Hospital, Garches, France*

Objective: There is no disease-specific Health-related Quality of Life (HRQOL) tool dedicated to assess people after Traumatic Brain Injury (TBI) yet. QOLIBRI was developed by an international research group. **Material and Method:** 1568 TBI patients from 10 countries and 8 languages filled-out a preliminary version of the QOLIBRI taking into account specificities, sequelae and well-being of persons after TBI. Therefore, the QOLIBRI was developed through 3 successive versions and consecutive statistical analyses in order to obtain a psychometrically valid and self-reported questionnaire. **Results:** The QOLIBRI final version, filled-out in 15 minutes, consists of two parts. The first part assesses satisfaction level with HRQOL and is composed of 6 overall items and 29 items assigned to 4 subscales: thinking, feelings and emotion, autonomy in daily life and social aspects. The second part is devoted to "bothered" questions and composed of 12 items in 2 subscales: negative feelings and restrictions. The 6 subscales meet standard psychometric criteria. In addition, 2 items assess more medical aspects. The questionnaire was validated in Dutch, English, Finnish, French, German and Italian. **Conclusion:** TBI patients may now be assessed, beyond objective measures including handicap and recovery, with a new subjective measure assessing the TBI patient's own opinion on his/her HRQOL, applicable

across different populations and cultures. Validations in China Mainland, Hong-Kong, Taiwan, Egypt, Japan, Poland, Norway, Malaya, Spain, Portugal and Brazil are on the way.

I119

COMPREHENSIVE REHABILITATION OF SPORTS INJURIES**Christodoulou N.***Limassol Centre of Physical and Rehabilitation Medicine, European University, Cyprus*

The lecture presents the basic principles of sports injuries rehabilitation, the stages of a tissue injury and the techniques used in rehabilitation of such problems. Since rehabilitation begins at the time of injury and continues even after the athlete's return to competition, the focus is on what is done at the field-side at the time of injury, in the rehabilitation departments and during the athlete's return to the field for training and competition. To design a rehabilitation plan which would maximize the restorative events, it is important to know the pathophysiology of the tissue-injuries and the three stages of their healing process: the inflammatory stage, the fibroblastic-repair stage, and the maturation-remodelling stage. Knowledge of the several physical modalities used during the acute, sub-acute and functional phase of rehabilitation is important as well. Improvement of neuromuscular control, correction of maladaptive behaviours, sport-specific and multi-plane activity, functional retraining, balance & proprioception re-education and athletic psychological approach are essential parts of the whole rehabilitation program. Examples for mobility exercises, strength exercises and stretching exercises are presented for several muscle groups and the relevant joints.

I120

SPORTS IN THE ELDERLY**Hasçelik Z.***Dept. of Physical Medicine & Rehabilitation, Hacettepe University Medical School, Ankara, Turkey*

Age-related changes in many organ systems are well known, for due reason appropriate exercise program even in apparently healthy elderly as well as in groups with different health conditions require certain considerations. In this session we'll try to deal many aspects of the sports programs specifically designed for aging group in both gender. Exercise can be carried out at any age and there is hardly any contraindication against exercise and training but certainly much effort should be paid for certain methods, types and intensities of exercise. Elderly people with chronic diseases usually need an individual program which considers their age, state of health, working capacity or fitness level, tolerance for loads, personal familiarities against certain types of sports activities and personal capability plus opportunities with environmental factors. The principle of 'primum nil nocere' with other safety rules should be considered. Some fundamental organic phenomena occur in the aging body by way of cellular biological changes followed by tissue and organ systems resulting: the decrease in reserve capacity of various functions, decline of adaptability to changes in external-internal environment and decrease in resistance against infections, malignancy development etc. These are relevant, in general, to a decrease in number of cells, intracellular changes, new structure of collagen tissue. Those may be generally contributed to slow deterioration process in the body as well as approaches to perception of aging mentally. Specialists dealing with exercise sciences deals all this processes from one aspect of the follow-up survey of aging ex-athlete and sports programs for elderly. Ex-athlete has a general tendency to slow down in time in terms of intensity, frequency volume and type of activity whereas aging body without experienced regular exercise resists to exercise recommendations. Certain chronic diseases get the situation more complicated in terms of compliance. Reactions

to exercise in groups with chronic disease are biphasic. This is also a matter of public concern and of health policy. Exercise should take place in many treatment regimens of many diseases as well as preventive management, this supported by many data in recent years which also helps to decrease the public health expenses. As being rehab professionals we should remember another profit from exercise that is to encourage social integration of elderly. Although we may extend the list of advantages, there are many risks of new problems potentially called by activity as exposure to trauma, possibility to deepen the health problems by excessive loading due to lack of certain level of supervision or control of individual both short and long term response to exercise. This is the other face of moon if you are engaged with this area. However we have many recommendations statements American College of Cardiology (ACC) and American Heart Association's 2007 summary is one of the informative and safe example. Following sentences are enlightening us as a result of a panel study with strength levels of evidence. 1) To promote and maintain good health, older adults over 65 should maintain a physically active lifestyle. I(A) 2) Should perform moderate-intensity aerobic (endurance) physical activity for a minimum of 30 min on five days each week or vigorous intensity aerobic activity for a minimum of 20 min on three days each week. I(A) 3) Combinations of moderate and vigorous intensity activity can be performed to meet this recommendation. IIA(B) 4) At least twice a week older adults should perform muscle strengthening activities using the major muscle groups of the body that maintains or increase muscular strength and endurance. IIA(A); 8–10 exercises should be performed on at least two nonconsecutive days per week. The intensity level should be moderate to high at a resistance and 10–15 repetitions for each exercise. 5) Older persons who wish to further improve their personal fitness, reduce their risk for chronic diseases and disabilities, or prevent unhealthy weight gain will likely benefit by exceeding the minimum recommended amount of physical activity. I(A) 6) To maintain the flexibility necessary for regular physical activity and daily life, older adults should perform flexibility exercises on at least two days each week for at least 10 minutes each day. IIB(B) 7) To reduce risk of injury from falls, balance and coordination exercises are helpful. IIA(A). 8) Older adults with one or two medical conditions for which physical activity is therapeutic should perform activity in a manner that effectively and safely treats the condition(s). IIA(A) 9) A plan for obtaining sufficient physical activity that address each recommended type of activity is necessary. IIA (C). For chronic conditions a simple therapeutic plan that integrates prevention and treatment requires a gradual (or stepwise) approach to increase physical activity over time is needed. Older adults should also be encouraged to self-monitor their physical activity level on a regular basis and to reevaluate plans as their abilities improve.

I121

AGEING MUSCLES: BACKGROUND, IMPLICATIONS AND RECOMMENDATIONS

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Ageing is associated with a loss of muscle mass and function and this is commonly referred to as 'sarcopenia'. The age-related changes within this syndrome are consistently reported as independent risk factors for frailty, loss of independence, falls, morbidities (obesity, diabetes, hyperlipidemia, hypertension,...) and even mortality in older adults. With respect to the high prevalence of this deteriorating condition in relation to the demographic expansion of the elderly population in the near future, the absolute number of 'sarcopenic' elderly is expected to increase dramatically. As a consequence this phenomenon implies a direct and indirect growing burden on healthcare (fundings) and can thus be interpreted as a major challenge for medicine and allied healthcare. For this moment there exists no effective and safe therapy that can prevent or restore the changes in the ageing muscles, their function and the concomitant conditions. One of the most explicit and substantiated care strategies

that delivers important support for prevention and treatment nowadays therefore still seems to consist out of an appropriate exercise regimen by means of muscle training (strengthening, resistance exercises,...). Notwithstanding the potential beneficial effects of such program, one has to admit that the ageing adult will still lose muscle and functional output. It is however generally accepted that such muscle training not only improves quality as well as quantity, but it also reduces all kinds of (risks on) difficulties in daily living and enhances physical and mental health in a substantial way. Nevertheless, clinical assessment of muscle function in the ageing population and eventual subsequent prescription of exercises is often surpassed in daily practice. All rehabilitation specialists should therefore gain the appropriate insights in this phenomenon, its consequences, the potential assessment procedures and eventual training programs, especially with respect to age-related modalities (program, frequency, intensity, volume, equipment,...). In this way the current scientific knowledge can become an asset in the daily clinical practice of an ageing society and thereby contribute to the health of the ageing adult and social security provisions.

I122

IMPLICATIONS OF AGEING FROM THE PERSPECTIVE OF EXERCISE PHYSIOLOGY

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An improvement in life expectancy is leading to an increase in the total number of older people worldwide. The trend of an ageing population is expected to bring challenges for society. Although people are living longer, the ability of living independently is often limited, due to a reduction in functional capacity (e.g. strength, endurance, flexibility). Moreover, quality of life is sometimes drastically reduced because many are faced with the reality of a chronic disease and disability. Ageing reduces steadily most important functions in the human organs. Although brain capability seems to be less affected by ageing (5%), cardiac, renal and pulmonary functions decrease by 25–55% at the age of 80 years. The reductions in maximum oxygen uptake and muscle strength are the most notable and maybe the most debilitating effects of ageing. A vicious circle starts with cardiovascular impairment, muscle wasting and loss of functional capacity with increasing age, leading to a rapid decline in physical activity. It is difficult to distinguish the effects of ageing and those of decreased physical activity on functional capacity. One suggests that 50% of the decline in functional capacity, associated with ageing, is actually due to disuse rather than aging. Most chronic diseases are considered age-related, since they clinically manifest themselves to a greater degree later in life. From a genetic point of view, physical inactivity is physiological abnormal and a strong association exists between the increase in physical inactivity and the increase in chronic diseases. In this context, we speculate that physical inactivity in the current ageing population surpass a threshold of biological significance, so that clinical conditions (e.g. chronic diseases) occur. Several studies have demonstrated that the human body retains its ability to adapt to exercise well into old age. Evidence exists that exercise can profoundly influence functional capacity and serves as a primary prevention strategy against chronic diseases in the older individuals. Therefore, as more individuals live longer, it is the imperative to determine the extent, the effects and the mechanisms by which physical activity and exercise can improve functional capacity, independence, health and quality of life.

I123

ASSESSMENT OF STRENGTH & STRUCTURE: ISOKINETIC TESTING & SONOGRAPHY

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Regardless of age, evaluation of muscle strength is paramount in every type of sports play. Although physical examination gives

an idea about the general strength, quantification might be necessary in certain cases. Especially for professional players suffering various injuries, either before or after the rehabilitation process, physicians need to rely on some muscle strength limits in order to decide safely whether/when the person may carry on that very specific sportive activity. In this aspect, isokinetic systems that provide quantification of strength play important role in the clinical practice. Further, the capability of these dynamometers to assess proprioception signifies their extra importance in the elder population where falls by far remain as the major cause of morbidity and mortality. On the other hand, sonographic imaging has gained an intriguing concern in the field of musculoskeletal medicine in the last two decades. This has become true especially after clinicians had started to perform US evaluation themselves. Moreover, the probe of sonography has become the stethoscope of the musculoskeletal physicians. Sonography is convenient as well as inexpensive, noninvasive, repeatable and does not require any exposure to radiation. Besides, its capability to provide dynamic imaging and comparison, has established its exquisite place in the diagnostic algorithm of musculoskeletal disorders. Last but not least, several studies in the recent years, not only in humans but also in the field of veterinary medicine, have displayed its value in assessing the structure of several musculoskeletal units like muscles and tendons.

I124

TAILORED PHYSICAL REHABILITATION IN THE ELDERLY

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Physical rehabilitation has four goals in general: compensation of functional limitation; preservation of autonomy in activities of daily living; social reintegration; and continuation of (adapted) professional activity. The goals of physical rehabilitation in the elderly are similar, although there are some specificities. In the process of rehabilitation, the following aspects of the elderly should be taken into consideration: physiological changes related to aging, co-morbidities and the previous level of function. There is an important place for comprehensive geriatric assessment in the identification of patients with a geriatric profile. Comprehensive geriatric assessment differs from a standard medical evaluation by including non-medical domains, by emphasizing functional ability and quality of life, and by relying on interdisciplinary teams. Comprehensive geriatric assessment has been defined as a multidimensional process designed to assess an elderly person's functional ability, physical health, cognitive and mental health, and socio-environmental situation. The geriatric interdisciplinary team typically includes a geriatrician, a nurse, a social worker, a physical therapist, an ergotherapist, a logopedic therapist and a pharmacist. The principal domains assessed in all forms of geriatric assessment are functional ability, physical health, cognitive and mental health, nutritional state, the socio-environmental situation and a medication review. Standardised instruments make evaluation of these domains more reliable and efficient. They also facilitate the communication of clinical information among health care practitioners and the monitoring of changes in the patient's condition over time. Physical rehabilitation in the elderly offers the following advantages: increase of exercise capacity, improvement of mobility, balance, muscle strength, neuromuscular coordination and cognitive function. Additionally, bone demineralisation decreases due to physical rehabilitation. However, the elderly are often withhold from rehabilitation programmes because of the fear of cardiovascular complications and musculoskeletal injuries. Different points of interest in the rehabilitation of elderly patients suffering from particular chronic diseases have been addressed (e.g. cardiopulmonary and cerebrovascular diseases, Parkinson's disease) as well as the rehabilitation aspects of orthopaedic problems and interventions.

I125

THE FIELD OF COMPETENCE OF PRM-SPECIALISTS IN EUROPE – NEW CHALLENGES

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Compared to most other medical specialties in Physical and Rehabilitation Medicine (PRM) the definition and description of the field of competence (FOC) is of special importance. This is due to the facts that the tradition of the speciality varies very much from region to region and that it in fact is a young speciality. The variation of the traditions can be demonstrated e.g. in the focus on physical interventions in some regions and on rehabilitation interventions in other regions. However, the speciality has been defined as one uniform speciality throughout Europe (1). As rehabilitation can be described within the framework of the ICF, the description of the field of competence of the speciality Physical and Rehabilitation Medicine should follow this model too (2). The field of competence is an umbrella term for expertise, skills and aptitudes of PRM specialists as well as the way of cooperation and interaction with other specialists and health professionals. Of course, the role of PRM in different settings (from acute hospitals to the community) and the parameters for the access to specialized rehabilitation programs are included too. Moreover the description of the field of competence of PRM has to compile in detail: diagnostic and assessment skills, treatments and modalities, teamwork in rehabilitation teamwork, the role of specialists in the rehabilitation process, the settings and parameters of PRM activities (incl. payment systems). Many steps towards such a European description already have been done within the Committee and Section, e.g. the publication of the White Book of PRM in Europe (2007) and the ICF-based conceptual description of PRM (2007). Actual a European description of the FOC of PRM is being prepared, based on a consensus paper of the FEDMER (planned in 2008/09). This paper will be the future basis of the description of the FOC in Europe. Based on such a paper, a series of descriptions, definitions and consensus papers will be developed, describing special aspects of the FOC more in detail. This work already has been started within the last 3 to four meetings of the Committee and during the intermediate cooperation of the committee members. These are: the position paper on the role of PRM in acute rehab units (ARU) and peripatetic acute rehab teams (ART), the position paper on the role of PRM in rehab teams (and access to therapists), the position paper on cooperation with neurologists in rehabilitation and the consensus paper on balneology. Papers on diagnostic and assessment skills, other treatments and modalities (e.g. electro stimulation, manual medicine), access to rehabilitation technologies and criteria for admission to rehab programs will follow. Additionally the field of competence in the special field of rehabilitation, e.g. rehabilitation in the elderly, or in children will follow. In order to involve more experts in this work, sessions and workshops on national, regional and European levels will be organized.

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I126

LEARNING AND EDUCATION AS PART OF THE REHABILITATION STRATEGY

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Learning is a cornerstone of rehabilitation. Brain injuries or more generally neurological injuries and loco motor injuries induce

physical, psychological or cognitive impairments; some of these impairments are amenable to rehabilitation programmes that include a learning process. According to the concept of plasticity of the motor function (1) two components of motor learning are important in physical and cognitive rehabilitation. The first part deals with brain systems mediating the practice of a motor skill. The second part concerns brain activity associated with motor skill acquisition during teaching. These two parts are strongly connected in a reciprocal interaction (2). During a session of rehabilitation two characters are playing different roles: the patient and the caregiver. The patient commonly has to learn, by practice and/or by instruction 'how to do' or 'how to perform' a task. However, even without any explicit instruction a person has the capacity to understand how to do a task, simply using implicit learning. Such rehabilitation using implicit learning is becoming an important field of research, notably when virtual reality technology is used (3). Thus explicit and implicit learning procedures have potential in all aspects of Physical and Rehabilitation Medicine; they are thought to tap into different neural pathways, including the 'mirror neurons' phenomenon. The caregiver has to be the teacher commonly using different instructions which can be summarized as follows: 'do it, like that' – 'do it, like I do it' or 'do it in a way that feels best for you'. Because knowledge of teaching and learning principles may help to design strategies to enhance outcomes, but may also help to avoid eventual mal-adaptation, the PRM specialist has to understand the theoretical background of these principles. Moreover when teaching, he/she should use 'standards' to support and justify his/her instructions. Some of these standards are defined as evidence-based principles of medicine that have been established in experimental conditions. However, considering the particular environmental conditions and the life project of the person, these standards may not be appropriate as they may not relate directly to the patient's functioning (4). Considering that the WHO definition of rehabilitation is: 'The use of all means aimed at reducing the impact of disabling and handicapping conditions and at enabling people with disabilities to achieve optimal social integration' (5), the PRM specialist might take full control of these problems even though he/she may perceive them in a different way than does his/her patient. The White Book on Physical and Rehabilitation Medicine in Europe states the following « The overall aim of rehabilitation is to enable people with disabilities to lead the life that they would wish » (6). Thus the doctor and more generally all caregivers, have to teach such people to make the most of their new functional capacities, but patients obviously have to teach the doctor and caregivers about the way in which they wish to exploit these capacities in accordance with the functions they wish to accomplish. Finally patient and caregiver, that is the trainer and the teacher, are involved in a reciprocal process of learning and teaching, being the one alternately the educator of the other one.

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I127

USE OF PHYSICAL THERAPIES IN REHABILITATION

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Modalities are physical agents that include heat, cold, water, sound, electricity and electromagnetic waves. They can be used as single treatment in order to produce a therapeutic response in tissue or as part of rehabilitation programmes. Thermotherapy involves applying heat or cold. Heat may work by improving circulation and relaxing muscles, while cold may numb the pain, decrease swelling, constrict blood vessels and block nerve impulses to the joint. Local hot and cold pack treatments are one of the most common modalities in physical therapy programmes. They are often used just before active or passive movement therapy as a pre-treatment. Therapeutic ultrasound is a form of mechanical energy consisting of continuous or pulsed high frequency vibrations producing mechanical and/or thermal effects. It increases cell permeability, reduces nerve conduction velocity of C fibers thus has anti-inflammatory and analgetic properties. By its thermal effects it reduces muscle spindle activity and consequently decreases muscle spasms and pain and increases collagen elasticity which may be useful just before exercise therapy. Electrotherapy includes different types of currents: NMES of the innervated muscle has been shown to be effective with the goal to improve endurance capacity and strength of skeletal muscle. It can be applied to counteract decrease or loss of muscular function. In patients with central nervous system lesions therapeutic electrical stimulation improves motor control. The functional electrical stimulation (FES) provides or assists directly functional tasks. NMES of denervated muscle has to be differentiated between complete denervation, acute denervation, chronic denervation, denervation without reinnervation, denervation with reinnervation and progressing denervation. There is empiric and scientific evidence for the benefit of electrical stimulation in the treatment of chronic skin ulcers as an additional therapy to standard wound care. Electromagnetic waves can be delivered by high-frequency irradiation (microwave diathermy, short wave diathermy). Although sometimes prescribed for pain control alone, deep heat is typically applied before exercise involving joints with limitations of joint motion to facilitate tendon extensibility and muscle relaxation.

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MANUAL MEDICINE – PART OF PRM-PRACTICE

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In Germany, the field of "Physical and Rehabilitative Medicine" is defined by the regulation on further education. It includes secondary prevention, interdisciplinary diagnostics, treatment and rehabilitation of physical impairment, structural and functional disorders with conservative, physical, manual and naturopathic therapies as well as methods of rehabilitative intervention. The regulation on further education orientates at the three levels of prevention, curative and rehabilitation based on ICD- and ICF-classification. Focussing on functional disturbances of health and in general, the diagnostic and therapeutic methods, especially of kinesiology, of Manual Medicine within the special fields and therapeutic methods are given a special importance in team work. In the classical fundamentals and effects of the methods and concepts of physical therapy, Manual Medicine is included in this field, especially in the regulation on further education. Manual Medicine recognizes and treats functional disorders in the locomotor system, the nervous system and the internal organs using all manual, diagnostic and therapeutic techniques to find and treat these disorders. In Germany, Manual Medicine is imparted in a structured way – once in a cross sectional area 'Physical Medicine, Rehabilitation, Naturopathic Methods' in the University Education of medical students. Concluding arguments for the integration of Manual Medicine in the discipline of Physical and Rehabilitative Medicine.

- is a medical activity with the locomotor system as a substrate;
- is a functional method of treatment using physical energy (kinetic, mechanic), are function arranging therapies;
- It meets the idea of body as physical quality of man under integral consideration beyond the segment;

- It consists of methods recognizing and treating functional disorders and consequently disturbances in activity and participation;
- It offers possibilities to treat disorders increasing central levels, such as influencing the stereotype, consequences of disease, mostly treated only during rehabilitation;
- Performance can be billable using the relevant instructions;
- Essential parts are done by therapists and physiotherapists and are recognized as performance;
- Education is defined by law and is realized by land, society and school. The Medical Association and the cost object are responsible for certification and quality control.

1129

TEAM WORKING IN REHABILITATION*Neumann V.**University of Leeds, Academic Dept. of Rehabilitation Medicine & Rehabilitation Medicine, UK*

In some parts of Europe, there is a strong tradition of multidisciplinary team (MDT) working in rehabilitation and many would argue that this is the only acceptable way of working. Others feel threatened by such working patterns – usually because they feel their professional status is being eroded. This talk will consider whether we all ought to be working in MDT's and, if so, what those team structures should be like. The characteristics of different types of MDT will be described. The speaker will then explore what evidence there is that these yield better outcomes for patients than other approaches. Examples from a range of clinical conditions such as stroke & musculoskeletal pain will be considered. The requirements for effective MDT working in rehabilitation & problems which cause teams to fail will be reviewed.

1130

BALNEOLOGY AS PART OF THE FIELD OF COMPETENCE OF PRM SPECIALISTS*Cantista P.**Porto, Portugal*

Balneology or Medical Hydrology has been an important modality in the area of Medicine with a wide scope of interventions which include prevention, treatment and rehabilitation of a large number of health conditions. Since early times mankind used water, steam or mud as therapeutic agents, first as a purely empiric exercise but in our times with a remarkable progress on its scientific basis. Almost every culture developed these procedures. Within Europe Medical Balneology is historically linked with the best Medicine practice. Great names of our profession were hydrologists in many of the European Countries. During the two last centuries we assisted of a growing interest and knowledge of the properties and therapeutic principles of these agents, including physical (hydrostatic, hydrodynamic, thermal), chemical, biologic and psychological factors in their action mechanisms. In many of the current 27 countries of the European Union, Balneology integrates the field of PRM or is highly related with its daily practice. The use of water as a natural physical agent or as a mean of body immersion to help Kinesitherapy techniques by buoyancy, hydrostatic pressure or hydrodynamic resistance is widely known. The importance of Balneology for our speciality was already recognized and in consequence of this a statement concerning hydrotherapy and balneology was approved in Hanover in 2004, during the General Assembly of the PRM Section of the UEMS. With the approval of the International Classification of Functioning, Disability and Health (ICF) in 2001, during the WHO General Assembly in Geneva, the relevance of the 'Contextual Factors' (both personal and environmental) in the development of a defined health condition was definitively recognized. These personal and environmental factors interact with the considered domains of the ICF Model (Body Structures and Function, Activities and Participation) and determine the true 'state of health'. If we think of the Balneology

principles we immediately may link them with this kind of model. In fact, probably there is no better example of interaction of our body structures and functions with the environment than what happens in a thermal spa ambience. In such an 'environment' that interaction may lead to an increment of 'activities' and facilitate 'participation'. Personal factors of course play here a major role. The concept of Health Resort Medicine emphasizes the search for an 'ideal place to treat' or at least a 'proper or good place to promote, treat or rehabilitate' a health condition. Either in the presence of an established disease (with their consequent impairments and disabilities) or when dealing with a potential health problem that we want to prevent, what is really important to achieve is to get the circumstances that may facilitate our action and help us to reach our goals. (Health education programs find here excellent locations to be implemented). Circumstantial factors such as specific climate characteristics (temperature, humidity, winds), geographic influence (altitude and atmospheric pressure, sun radiation exposure), thermal water treatments, adequate health behaviour and social interaction, may modify the final results of a therapeutic strategy allowing better outcomes. Although the evaluation methodology of these results is not easy, we have already good indicators of the benefits of the so called 'Health Resort Medicine'. As mentioned above Balneotherapy (including Hydrotherapy or Health Resort Medicine) is a medical field based on – specific modalities based on scientific evidence; – a team-orientated comprehensive approach aiming at an improvement of functioning and health; – specific medical knowledge and aptitudes (including diagnostic tools, interventions); – systematic use of environmental factors according to the ICF-model; – Proof of efficacy in prevention, therapy and rehabilitation. For these reasons there is a strong overlap with the field of Physical and Rehabilitation Medicine: besides some of the modalities, all other elements are included in PRM too. Facing this reality we think that PRM should take Balneology in consideration and implement its scientific research, good practice and education.

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TELEREHABILITATION – A NEW STRATEGY FOR LONG-TERM REHABILITATION MEASURES*Schupp W.**Fachklinik Herzogenaurach, Dept. Neurology, Herzogenaurach, Germany*

Introduction: The long-term effect of rehabilitation may be jeopardised due to a lack of sustained specific interventions. Treatment should be specific and maintained at a high frequency for enough long period of time to keep the patient's level of activity and participation. Telerehabilitation is a new approach in long term rehabilitation and after-care possibly compensating the lacks. *Aim:* Studies in nearly all fields of rehabilitation (esp. cardiac, stroke, post-surgery, diabetes rehabilitation) have been performed to demonstrate potential benefits of telerehabilitation measures. But most of the research has been technology focused and has consisted of small sample designs (1). This meets critical review from literature and experiences from own studies. *Patients and Methods:* Many studies have been performed in a home-based setting where patients trained motor, speech or cognitive skills on telemedically conducted exercise programmes. In many systems email or telephone exchange was integrated. Sometimes virtual environments and virtual reality have been used. In our own work we used a systems software package developed together with industrial partners including: - files for the prescription and monitoring the patients' performance and results by the therapists – tools for subjective assessment and e-mail exchange between patients and therapists – different training software being available on the market and well evaluated – new developed training sets in fields where no good training software was existing on the market - a statistical package for training effects and evaluation (can be sent to cost bearers like social health insurances) We performed different prospective evaluation studies, one in patients with chronic cognitive disabilities due to stroke or TBI (3), one in

aphasic patients to derive assignment criteria (4), one in cardiac patients for long term home based exercise training, and one in patients after joint replacement using image-based motor exercises. *Results:* Telerehabilitation systems can intensify the conventional face-to-face therapy services. The training effects were at least as high as by the usual therapy approach. It is well tolerated by the patients, even in older people. Positive side effects on mood or life style could additionally be proven. But telerehabilitation can not replace therapists as persons. Nearly all studies showed that the patients want to know and to have close contact to the therapists leading their telerehabilitation programme. Additional face-to-face sessions seemed to be a must. One argument often cited that the use of telerehabilitation will reduce the costs of medical care has not been well evaluated yet (2). *Conclusion:* Telerehabilitation tools provide a promising approach for long-term rehabilitation measures in an home based setting, esp. in rural areas. Before spreading the technologies, it requires further investigations within large patient cohorts, of cost-benefit and of cost-effectiveness in a complex health care service system.

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NEUROANATOMY AND NEUROPHYSIOLOGY RELATED TO SEXUAL DYSFUNCTION IN NEUROGENIC PATIENTS

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Introduction: Sexual dysfunction is a complication of neurogenic diseases and is most disabling amongst young patients (spina bifida, spinal cord injury, multiple sclerosis, etc.). In neurogenic patients erection is less prone to dysfunction compared to ejaculation. *Methods and Results:* Neuroanatomy and physiology of erection and ejaculation has been studied extensively but several misconceptions do exist and are repeated in lectures and publications. We revised the literature on the neuroanatomy and neurophysiology of erection, ejaculation and therapy of their dysfunctions in neurogenic patients and related the findings to clinical practise in neurourology. *Conclusion:* Neuroanatomy and physiology is well established for erection but some controversy remains in ejaculation.

I133

PERINEAL ELECTROPHYSIOLOGIC TESTINGS

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Neurophysiological investigations of perineal area allow to study the different somatic and autonomic pathways involved in bladder, anorectal and sexual control. Sphincter and pelvic floor muscles EMG is used to differentiate between normal, denervated, reinnervated, and myopathic muscle. Neurogenic changes may be attributable to injury at any level along the lower motor neuron supplying the perineal muscles, extending from the sacral nerve roots to the small branches within the external sphincter and bulbocavernosus muscles. Electrical stimulation of the dorsal penile or clitoral nerve elicits (somatic) sacral reflexes. Latency recordings of the bulbocavernosus reflex study all the sacral reflex arc and a such abnormality is in favour of neurogenic lesion source of urinary, sexual or rectal dysfunction. Recording of evoked potentials fol-

lowing repetitive stimulation of the pudendal nerves is possible: pudendal somatosensory evoked potentials (SEP) assess conduction in large fibre pathways between the site of nerve stimulation and the parietal sensory cortex. Pudendal nerve terminal motor latency (PNTML) can be measured by recording with a concentric needle electrode from the bulbocavernosus, the EAS and the urethral sphincter muscles in response to bipolar surface stimulation placed in the perianal/perineal region. This technique can be helpful in the evaluation of fecal incontinence, pudendal neuropathy and perineal pain. Using magnetic or electrical stimulation, it is possible to depolarise the motor cortex and record a response from the pelvic floor. The sympathetic nervous system mediates sweat gland activity in the skin. Changes in sweat gland activity lead to changes in skin resistance. On noxious stimulation (electrical pulse) a potential shift can be recorded with surface electrodes from perineal skin and the penis. The sympathetic skin response (SSR) is a reflex, which consists of myelinated sensory fibres, a complex central integrative mechanism and a sympathetic efferent limb with postganglionic nonmyelinated C fibres.

I134

PELVIC FLOOR MUSCLE ASSESSMENT AND TRAINING

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The pelvic floor muscles (PFM) comprise the urogenital and pelvic diaphragm. It is a three-layer muscle group with several different muscles, all with different fiber directions. A voluntary contraction most probably is a mass contraction with a combination of squeeze around the pelvic openings and an inward lift. Dynamic MRI has demonstrated that there is a movement of the coccyx in a forward/upward direction during contraction. During straining the coccyx is moved dorsally. Several studies have shown that more than 30% of women are not able to contract the PFM correctly at their first consultation, even after thorough instruction. In addition, 49% are performing a contraction that has no effect on the urethra. An effective PFM contraction lifts the levator plate inside the pelvis, reduces the levator ani hiatus, constricts the pelvic openings, increases the urethral pressure, and it may stop decent of the urethra during increase in intra-abdominal pressure. In order to perform a strong and quick contraction, the PFM must be well positioned and have sufficient cross-sectional area. A voluntary contraction before and during physical exertions such as coughing and sneezing can be learned, and can prevent urinary leakage and decent of internal organs. However, in healthy continent women, the PFM contraction is an antecipatory and automatic response. Voluntary contractions may only be used during single bouts of physical exertion e.g. to prevent leakage during coughing or lifting. The aim of PFM training is to build up the muscle function to the point where automatic response is possible. Different measurement methods can be used to assess PFM function and strength. In clinical practice visual observation of perineal movement and vaginal (rectal in men) palpation is often used to evaluate PFM function or ability to contract. (squeeze and lift). Today ultrasound can also be used for this purpose. Several palpation protocols are available. However, palpation and visual observation may be considered too subjective and has low responsiveness for scientific purpose of measuring muscle strength. PFM strength can be measured with urethral, vaginal or rectal pressures. However, to ensure correct contraction simultaneous observation of inward movement of the perineum is necessary. Urethral pressure measurement may be the most valid method. However, because of risk of infections, vaginal squeeze pressure is the most commonly used method. Several studies have shown that vaginal squeeze pressure is reliable. Dynamometers measure force directly. However, they too are flawed with other muscle activities influencing the measurements. EMG measures muscle activation and not strength. MRI and ultrasound are newer methods with great potentials for increasing our understanding of PFM anatomy and function. These methods can measure cross-sec-

tional area of the muscles, location of the PFM inside the pelvis and levator ani hiatus dimensions. Several randomised controlled trials (RCTs) have shown that PFM training is more effective than no treatment. Cure rates, defined as women's report of the condition vary between 56–70%, and cure rate defined as <2 g of leakage on pad test vary between 44–70%. There is a great heterogeneity in training programs, outcome measures and methodological quality between studies. Hence, meta-analysis is difficult and not recommended. However, more intensive training programs with close follow up and high adherence have demonstrated to be more effective than less intensive programs. Systematic reviews have shown that use of biofeedback together with PFM training gives no additional effect of training without biofeedback. Equally there is difficulty to evaluate the effect of electrical stimulation and vaginal cones compared to PFM training. A variety of different apparatus, techniques, and protocols have been used and the studies are flawed with small sample sizes. However, use of cones is more effective than no treatment. Pelvic floor muscle training alone or in combination with cones or biofeedback is safe, not invasive and physiological, and consensus statements based on RCTs and systematic reviews recommend it as first choice of treatment. Long-term effect has been shown in several studies. However, results differ and long-term effect implies adherence to a training protocol.

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I135

ELECTRICAL STIMULATION FOR URINARY INCONTINENCE

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Background: Urinary incontinence encompasses any kind of involuntary loss of urine in an inappropriate place. Urinary incontinence can cause a serious social and hygienic disorder in those who suffer from it. Over the years, many possible treatments have been tested, especially those that involve physical medicine. Physical medicine treatments include kinesiotherapy, electro-stimulation and behaviour modification techniques, notwithstanding the effectiveness of continence devices. **Electrical stimulation:** using alternating two-phase currents and electrode in the vagina or anus has two possible objectives: to strengthen the perineum in stress incontinence, or to diminish the detrusor reflex in the case of bladder instability. 50–100 Hz currents are used for the former, and 5–30 Hz for the latter. Normally patients are administered 20–30 min daily therapy sessions together with kinesiotherapy (pelvic floor exercises). Contraindications to this method include, but are not limited to vaginitis, fistulae, malignant vaginal tumours, vesicoureteral reflux, and heart pacemakers. Factors that influence results include the type and degree of incontinence, the patient's age, motivation and anatomo-functional characteristics. **Results:** Generally speaking, the results include: significant improvement or curing of light and moderate incontinence, curing of light prolapses and the stabilisation of moderate ones, control of the symptoms of grade 3 prolapses to prolapse surgery, the decrease of relapses after surgery for prolapse or incontinence, the decrease of prostate surgery post-op complications due to incontinence and the shortening of recuperation times, the improvement of urethral urgency where the administration of cholinergics is not indicated. In addition, it is possible to avoid foreseeable losses of urine.

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I136

BLADDER AND PELVIC FLOOR DYSFUNCTION IN MULTIPLE SCLEROSIS: THE ROLE OF CONSERVATIVE TREATMENT

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Introduction: Bladder, urethral sphincters, and pelvic floor dysfunction affects up to 90% of the multiple sclerosis (MS) patients and severely disturb their quality of life. Urinary symptoms are irritative (urgency, frequency and urge incontinence) and/or obstructive (hesitancy, interrupted stream, and incomplete emptying). Three main dysfunctional urodynamic patterns are described: neurogenic detrusor overactivity (NDO) without bladder outlet obstruction; detrusor-external sphincter dyssynergia (DESD); detrusor hypo or areflexia (DA). The pelvic floor muscles often are weak, mainly in female patients, and sometimes are spastic. **Conservative Treatment:** The urologic program in MS patients should be designed to promote continent, low pressure bladder storage and controlled emptying while minimizing symptoms in a manner that promotes improved quality of life and self-esteem. The management approach includes behavioural modification, pharmacological modulation, intermittent catheterization and pelvic floor rehabilitation (PFR). It is important to rule out urinary tract infections, urinary retention or high postvoid residual (PVR) of urine before embarking on a behavioural modification (including timed voiding). Pharmacotherapy is helpful in patients with relatively mild degrees of bladder dysfunction in helping to restore a satisfactory level of bladder function. Antimuscarinics for bladder overactivity and alpha-blockers, mainly in male patients to reduce bladder outlet obstruction, are the most prescribed drugs. Clean intermittent catheterization (CIC) is mandatory in patients with high PVR of urine, in combination with antimuscarinics. PFR has been reported to have some value in the treatment of detrusor overactivity (non-neurogenic and neurogenic). Some Authors have suggested the possible use of PFR as a treatment modality of bladder and pelvic floor dysfunction in MS. PFR includes pelvic floor muscle training (PFMT), electromyography biofeedback (EMG-BFB), and functional electrical stimulation (FES). The rationale of PFR is the stimulation of the striated pelvic floor muscles in order to inhibit the bladder overactivity, and reinforce the urethral closure mechanisms. The results of some studies suggest that PFR may have a place in the treatment of urinary symptoms of MS patients with a low Kurtzke score and without pelvic floor spasticity. **Conclusions:** It is mandatory that physiatrists and neurologists take care of bladder and pelvic floor dysfunction in MS patients, because empiric treatment without urologic consultation or urodynamic evaluation may be appropriate in many cases.

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I137

QUALITY OF CARE: A CORE ISSUE FOR PRM IN EUROPE

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The new Action Plan of the UEMS PRM Section is structured over three main issues: Education, Quality of Care and Domains of Competencies in PRM. The fast evolution of scientific knowledge makes life-long learning mandatory for ethical reasons. European physiatrists' participation in European congresses is growing, thus facilitating the exchanges of knowledge at a European and inter-

national level along with publications available on internet such as free full papers published by peer-reviewed journals. The PRM Section and Board will participate in the biannual scientific meeting of the European Society of PRM (Bruges 2008, Venice 2010). Three sessions will be organized under its banner: Education, Quality of Care, and Field of Competence of PRM. The PRM Section and Board have regular relations with international PRM journals such as the Journal of Rehabilitation Medicine (JRM) and Europa-MedicoPhysica (EMP). The White Book on PRM in Europe was published in these two journals. It has been translated into several other languages. These two journals agreed to publish educational papers with free access for trainees and multiple choice questions for distance learning. European physiatrists do need references, guidelines, and other material for initial and continuous education and professional development. Consensus conferences with a large participation of professionals involved in the field of rehabilitation have to be developed during our national and European congresses. The Sofmer methodology is of great interest and should be widely used (Establishing recommendations for physical medicine and rehabilitation: the SOFMER methodology. Rannou F, et al. *Ann Readapt Med Phys* 2007; 50: 100–10). We should publish our reports more often in PRM journals and use them as a way to improve our communication with the European and international physiatrists. Further to their publication in the journals, letters to the editor should be new ways of having feed-back from physiatrists all over Europe and the world. A new website for our section and board will be available in 2008, more friendly to use and to update, with information and reference texts in the different fields of our activity. We also have to keep in mind that in the health care management system based on efficiency, physiatrists will have to care for disabled persons and not only to cure them (Health, ethics and money: ethical issues as a result of budgetary constraints on public health expenditure in hospitals, 2007-06-28: <http://www.ccne-ethique.fr/index.php?langue=2,documentation101>)

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FUNDAMENTAL CONCEPTS ABOUT QUALITY OF CARE IN PRM

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Modern rehabilitation is based on the bio-psycho-social model in a continuum of care and includes contextual factors. A clinical standard of rehabilitation defines the quality of service and may relate to structure, process or outcome. It should be developed through a well-defined procedure and has professional, ethical, legal and financial implications. Accreditation is an extension of clinical standards and should be an independent review of process and outcome. The CARF accreditation is available in USA since 1966 and in Europe since 1996 but lacks in medical input and is fairly expensive for candidates. Some European countries have mandatory accreditation for health care providers, but usually, the professional content of the care is not evaluated independently. The UEMS definition of the Medical Act now contains the notions 'functioning' and 'rehabilitate' and it is important to harmonize the quality of care in PRM throughout the EU. Such harmonization may occur through developing clinical standards, not only on the size and equipment of the physical plant or on the professional qualifications of key staff, but also on the rehabilitation and treatment strategies chosen, on the minimum treatment volume/patient/day, on the minimum duration of program and on the mode of operation (e.g. single specialist practice, team with multidisciplinary orientation, demonstrable patient involvement), derived from best practice consensus and from Evidence Based Medicine. Furthermore, it is important that patient outcomes are monitored and that the audit spiral is emphasized. Ideally, a pan-European accreditation system should be medically driven, cheap and easily accessible. It should build on mutual respect and not be sensitive to cultural or organizational factors. Patient's rights and the advocacy on rights for the

disabled are to be included among the standards. Within the UEMS PRM section, a set of accreditation questions for self assessment on the program level has been developed, based upon the abovementioned core issues. It was decided to web base the system for easy access, administration, anonymity of candidates and distributed jury evaluation. After field testing, the system is now operative. We hope that it may promote an understanding of modern rehabilitation as a major personal empowerment service.

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ORGANIZATION OF A EUROPEAN PROGRAMME OF ACCREDITATION: AIMS AND GOALS, INTERNET TOOLS, PROCEDURE

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Quality of Care (QoC) is one of the major issues, which will occupy the attention of the UEMS PRM Section over the next few years. The Concepts: QoC is an ethical response to people with disabilities. It is delivered within our knowledge from the currently available evidence. It makes up an important part of our professional practice, but there is no legal nor financial obligation to participate in a European programme of PRM service accreditation. Publicising good programmes of care in PRM across the countries of Europe will provide valuable information for patients as well as for governments and payers. We considered that this recognition would also motivate the active participation of PRM Specialists and PRM facilities. The Programme of Accreditation is focused on Programmes of Care rather than on individuals or institutions. Information on these programmes is obtained through a questionnaire, which is then submitted to an International Jury of five members. A paperless Internet Based System allows the submission of programmes, the action of the Jury and the final display of the Accredited Programme on a public website. Anonymity is respected throughout the process, but it is possible for the Jury to consult with the candidate to improve the quality of both the application and the programme before the Jury's final decision. When completing the On Line Questionnaire, the applicant is requested to give an open description of his programme of care and to answer to a list of questions about the following items:

- Target population
- Aims and goals, with reference to the International Classification of Functioning.
- The procedure of care
- The unit delivering the programme – Location – Means devoted to the programme – Safety and patient rights – Patient rights
- The PRM specialist in the programme
- Team management in the programme
- Evidence-Based Medicine of programme; organization and records
- Monitoring and outcomes

After a two years pilot, the European Accreditation of Quality of Care in PRM will officially start in 2008. The initial criterion for participating in the accreditation process is that the applicant should be a European Board of PRM Certified Specialist. The other inclusion and exclusion criteria of a programme will also be described and an overview of the first accredited programmes will be given. Interaction with National Societies as well as comments from all users of this European Accreditation System will be welcome.

Website: www.euoprm.org

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THE JURY'S FUNCTION: THE DECISION PROCESS AND CONSULTATION WITH THE APPLICANT

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Background: European countries have developed different accreditation systems of health-care services with different aims. The UEMS PRM Clinical Affairs Committee discussed systems available world wide before developing its own accreditation project. Most of the known systems aim at the accreditation units, e.g. institutes. **Objectives:** To develop a programme orientated professional accreditation project that – besides serving the needs of all interested parties, like clients, other providers or third party payers – may help quality improvement activities and professional development of the applicants. **Procedure and Results:** During the first trial period the voting options for Jury members were yes, or no. Jury members also commented on week or strong points of the applications. The Chairman of the Jury and the Webmaster did see all the comments but members of the Jury could not see each others' comments or communicate among themselves. The final comments on the programmes were composed by the Chairman and sent only to the applicant. 23 applications were reviewed by the five members of the international Jury. Of these seven have been accredited, eleven rejected, the remaining ones being under consideration. Of the rejected applications the majority were poorly administered probably due to technical problems. This procedure did not help development of a uniform and refined evaluation concept of the Jury. Based on experiences a new procedure has been developed where the Jury members have a third voting option: 'under consideration' with compulsory commenting in such cases. In this second trial period Jury members can see their fellow-members comments and votes or even discuss problem areas. In our view this redesigned procedure can provide the necessary feed-back for further improvement of the accreditation process. **Conclusions:** The project has been developed on the basis of careful preparation and well designed trial period. The major advantages are the continuous fed-back for improvement of the accreditation process, the learning possibilities of the applicants, and a list of accredited European service providers who may find appropriate partners for benchmarking and further improvement.

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REASONS FOR AND METHODS OF PARTICIPATION IN THE ACCREDITATION PROGRAMME?

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Background: The Clinical Affairs Committee of the Union Européenne des Médecins Spécialistes, Physical and Rehabilitation Medicine Section, developed an Internet based accreditation system of Programmes of Care in PRM. **Objectives:** To present reasons and methods to participate in this accreditation programme. **Procedure and Results:** There are several reasons to participate in the accreditation programme. The main aim is to improve the quality of rehabilitation care delivered by the Physical and Rehabilitation Medicine department, by submitting their practice to an external and independent audit. The preparation of the files is a good opportunity to get the team together, to assess systematically their work and to confront their practice to international evidence based standards. The procedure can draw the attention of the team to some underestimated aspect of quality of care. Finally, Internet being a growing information source for the patients, the accreditation can be used to promote the program through display on www.euro-prm.org. **Method:** The method is relatively simple. The record includes short free texts and multiple choices questions. Ideally, the rehabilitation team should prepare the submission collectively. This is an ongoing process. The team is asked to present weak point to be corrected in the future and the jury could advise some possible improvements. **Conclusions:** A participation to the accreditation programme could be a great opportunity to improve the quality of rehabilitation care and the work of the multidisciplinary team.

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OVERVIEW OF ACCREDITED PROGRAMMES OF CARE

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Purpose: To overview seven programmes of PRM care, which were accredited during the first trial period organized in 2006–2007 by the UEMS PRM Section – Committee for Clinical Affairs. **Material and Methods:** More than 80 strong or week points of the questionnaire were scanned by the Jury. Seven programmes out of 23 applications have been accredited. Our overview shows a good variety of those seven rehabilitation programmes. Target populations were: a) geriatric in-patients after fracture, surgery and acute illness; b) out-patients suffering from musculoskeletal and neuromotor impairments; c) in-patients with stroke; d) in-patients suffering from traumatic brain injury; e) patients with various neurological disorders (stroke, Parkinson disease, movements disorders, multiple sclerosis, neuromuscular diseases, polyneuropathies, patients after brain trauma, patients affected from pain troubles); f) in-patients with spinal cord injury; g) in-patients after amputation (vascular problems, trauma and different types of tumors). This diversity explains why the different programmes could not be compared nor assessed according to their specific patient profile. Our assessment was thus based on 12 core criteria: 1) PRM intervention is part of the programme; 2) clear definition of admission/discharge criteria; 3) reasonable description of program purpose (expressed with ICF categories); 4) adequate number of patients per year; 5) adequate staffing (competence, numbers); 6) adequate continuing education for physicians and staff; 7) physician role should be rehabilitative; 8) clear EBM basis; 9) evident outcome measurements with audit spiral; 10) organized patients records; 11) complying with human rights issues; 12) complying with safety issues. **Results:** The percentage of programmes complying with each criterion was estimated. Over all 12 criteria, the mean percentage was high: mean –0.898; SD –0.105. We also overviewed the most positive and the weakest points mentioned by the authors of seven programmes. Multi professional approach was stressed out as a positive point in six programmes. On the other hand, weak points and actions plans differ from one programme to the other. **Conclusions:** This short overview of the first Programmes of Care accredited by the UEMS PRM Section show that this procedure may bring up very interesting information about good practice of Physical Rehabilitation Medicine throughout Europe, even though local conditions may lead to a range of different solutions. This will also give a valuable information to the patients, who are looking for well recognized services of care.

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POSTTRAUMATIC GERIATRIC REHABILITATION – ACCREDITATION OF THE QUALITY OF CARE IN PHYSICAL AND REHABILITATION MEDICINE

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Introduction: Accrediting a PRM program for geriatric rehabilitation within an acute care facility. **Program description, Target Population:** Geriatric patients after fractures, surgery and acute illness with the potential for functional improvement. **Aims and Goals:** Discharge at home, avoidance of dependency. **Procedure:** A multiprofessional therapeutic and rehabilitation program is provided by the staff members of the Institute of PMR. The team is led by 2 specialists of PRM and comprises 5 PTs, 2 OTs and 2 medical technical assistants. The team serves 48 beds belonging to the department of Internal Medicine and cares for treatment

and rehabilitation of geriatric patients. The unit delivering the programme: Institute of PMR within a 800 beds hospital and an adjacent 200 bed nursing home. Means devoted to the programme: Personnel: see above, + therapy. *Modalities*: therapeutic exercise (individual and groups) including strength and endurance training machines, electrotherapy, ultrasound, massage, lymphatic drainage, ADL training, splints and orthoses, medical specialist therapies such as manual medicine, injections, medical advice, etc. Safety and patient rights are defined by law and made known to each patient (e.g. by folders). Patients sign informed consent. In the programme the PRM specialist assesses the patients and formulates a rehabilitation related diagnosis (based on ICD and ICF). She orders additional examinations (e.g. X-ray, MRT scan, blood tests, etc.) and assigns multimodal therapy and rehabilitation procedures. For each patient the PRM specialist writes a medical report at admission and a standardised discharge summary. Therapeutic progress is reviewed regularly by PRM-specialist clinical rounds and interdisciplinary team conferences with PRM staff, internists, nursing staff, psychiatrist, psychologist and a speech therapist. If required therapeutic procedures can be modified immediately in response to altered clinical conditions. Long-term outcomes are not assessed up to date systematically, at present efforts are being made to obtain follow-up data. *Conclusion*: Accrediting the program structures the patient centered rehabilitation approach and reinforces the position of PRM within the interdisciplinary co-operation.

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GENERAL PHYSICAL AND REHABILITATION MEDICINE

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Target Population: Persons of any age; suffering from musculoskeletal and neuromotor impairments. The programme excludes the management of cognitive impairments, cardio-respiratory and pelvic dysfunction. *Aims and Goals*: Treatment of acute and chronic pain, correction of progressive or disabling deformities of the limbs and the spine, rehabilitation and guidance after surgery, especially after ACL reconstruction and after knee arthroplasty. *Procedure*: Ambulatory consultation. Most patients are referred, either by their GP or by one of the orthopaedic surgeons, who operate in our private hospital. However, free access remain possible for any patient. The first step is to set out a comprehensive medical and functional diagnosis by clinical and, if necessary, complementary investigations. This leads to decide the most appropriate strategy, which can be based on educational guidance, immediate intervention (manual therapy, local injections...), the prescription of physiotherapy (inside or outside our facility), the prescription of orthoses or prostheses. A follow up of the patient is scheduled, either on a planned protocol or on demand, according to the kind of situation. The Unit delivering the Programme: Our unit is a private medical office, inside an important private hospital (350 beds, 150 surgeons and physicians). In a building devoted to outpatient clinics, our PRM office is on the same floor than the orthopaedic clinic (11 surgeons) and a physiotherapy office (9 physiotherapists). Means devoted to the Programme: The PRM office is composed of 2 consultation rooms, a technical room devoted to orthotics and to isokinetic assessment. We are equipped also with EMG, podographic and balance platform, Spinal Mouse®, shock waves and cryotherapy. The physiotherapists facility, beside our office, includes an 80 m² training room, 8 individual boxes and a 12 m² rehabilitation pool with 3 levels of depth. All imaging techniques are available inside our hospital: X-rays, CT-scan, MRI, echography, scintigraphy, doppler, etc. *Safety and Patient Rights*: we do our best to cope with the 'Référentiel de moyens des cabinets libéraux' issued by the SYFMER (French PRM Professional Union). An emergency trolley is equipped with drugs and all the necessary equipment for respiratory and cardiac

resuscitation. Information about our programmes is displayed on our website: <http://www.orthopedie-et-readaptation.com>. The PRM Specialist in the Programme: two PRM specialists work in separate rooms. They are fully responsible for the medical and the functional diagnosis at each stage of the programmes. The treatment can be either operated by themselves or delegated by the mean of a medical prescription. *Team Management in the Programme*: Since all practitioners have an independent private practice, there is no hierarchy between PRM specialists and other participants to the patients care. No mandatory pathway is imposed to patients. Even though, there is a general agreement about the main goals to reach and about the features of treatments. This harmonization is made possible by frequent exchanges of opinions and information (oral and written reports), joint examinations of patients and regular CME meetings organized within the Private Hospital, but open to any external physicians, physiotherapists or nurses. An orthopaedic workshop facilitates an easy cooperation with external private orthotists and prosthetists for any kind of device (mainly foot, knee and spine). *Evidence-Based Medicine of the Programme, Organization and Records*: Our programmes are based on published guidelines and medical literature (Pubmed, Cochrane, Haute Autorité de Santé (<http://www.anaes.fr/>)) and on our internal exchanges of experiences. All medical and functional information about each patient is recorded in a digital database. After each consultation, several copies of the medical report are immediately printed, for the patient, for his GP and for his physiotherapist. Detailed prescriptions are given as well. *Monitoring and Outcomes*: those stored data can also be used for an assessment of the programmes, as we did in 1998 for ambulatory rehabilitation after ACL reconstruction. We intend to go further in this way in the following years.

I145

PRM AND PEOPLE WITH STROKE

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The Unit for stroke rehabilitation at the Institute for rehabilitation, Republic of Slovenia, was established by Ministry of Health in 1969. Rehabilitation of stroke patients is conducted by specialized team applying a multi-disciplinary approach. There are 36 beds available for the inpatient stroke rehabilitation and additional 4 for daily hospital. The rehabilitation team consists of 2 full time PRM specialists, 6 physiotherapists, 4 occupational therapists, psychologist, speech and language therapist, social worker, 2 university college graduated nurses, 16 nursing staff, and orthotist. Several consultants from various professions are also attainable. There is large outpatient clinic responsible for admission and follow-up of patients. There are constant connections with neurologic wards of acute hospitals all over the country. National Health Insurance is paying for the rehabilitation program. Comprehensive stroke rehabilitation has been developed on the foreign models. Quality of care has made up an important part of professional practice. With the aim to compare the present level of quality of our care to European standards we participated in the European Accreditation of Quality of Care in PRM accreditation procedure in 2006. Completing a questionnaire we were up to almost all demands. Weaknesses that turned out were: though we have had adopted a provisional statement of patients' rights following the Oncology Institute model and we've had used it at admissions the National law on patients rights had been still in parliament. And though we've had used our outcome data to bring improvements in the quality of our program's performance, we've had not made the long term overall outcomes of our program available to the public. Since we developed clinical pathway at the same time, many modes of rehabilitation process were defined more precisely. The accreditation procedure was an additional stimulation to look at our everyday practice and find out better solutions. Examples are records of team meetings and discharge planning.

I146

PRM AND PEOPLE WITH NEUROLOGICAL DISORDERS – PROGRAMME N°8**Dénes Z.***National Institute for Medical Rehabilitation, Brain injury Rehabilitation Unit, Budapest, Hungary*

Background: ISO based accreditation procedures are characteristic in health care system in Hungary. 76 from 160 hospitals have had ISO accreditation in the year 2004. Some hospitals have participated in standard based accreditation procedure (18), and a few have mixed versions (14) of accreditation. Accreditation procedures in Hungary have been organised and managed by different for profit firms, which are not specialised in hospitals' activities and focused mainly on the quality improvement process and not on the professional process or outcome. **Program:** Our unit is a part of a 320 beds national medical rehabilitation centre. The unit was established 28 years ago with aim to organise a structure for managing functional recovery of patients sustained traumatic brain injury. Our main activity is inpatient rehabilitation service on 40 beds for patients with acquired brain injury. Multidisciplinary rehabilitation team is led by PRM physician. **Procedures:** physiotherapy, occupational therapy, rehabilitation nursing, psychology, neuro-psychology, speech therapy (aphasia, dysarthria, swallowing problems), nutritional therapy, sport therapy, hydrotherapy, orthotic-prosthetic fitting. **Aims:** Take part in an accreditation procedure. Participate in a European programme of PRM accreditation. Search partners (e.g. benchmarking) for our quality improvement activities. **Result:** 22.11.2006. our program was accredited by the jury (Committee for Clinical Affairs of the PRM Section of the European Union of Medical Specialists). We had some comments and suggestions by jury for our further work about: substitutions, NGO activities, EBM strategy, and CME points. **Conclusions:** Our accreditation procedure was successful. The most positive points (strong points) of our program are: multidisciplinary team work and internal quality improvement activities. The weak points of our program are financial problems, substitution of specialists (neuropsychologist, speech therapist), and continuing education of staff (shortage of staff members).

I147

ACCREDITED PROGRAMME N° 9: PRM AND PATIENTS WITH NEUROLOGICAL DISORDERS**Giustini A.P.***Auxilium Vitae Volterra, Neurorehabilitation Unit, Volterra, Pisa, Italy*

The Programme is reserved to population affected from neurological impairments: stroke, parkinsonism, movements disorders, multiple sclerosis, neuro-muscle diseases, polyneuropathies, patients after brain trauma; patients affected from pain troubles. The Aims and goals are to organize and manage a suitable medical structure for Functional recovery. PRM specialists or Acute Units recommend their patients to the Unit with a clinical report on patient condition. The approach is multiprofessional with the closed and continuous collaboration of the Team, that consists of PRM specialists, Neurologists, Neuropsychologist, Psychologist, Nurses, Physio-therapists, Speech and Swallow Th., Music Th. and Entertainment Organizer. Patients' relatives and care-givers are involved in the Programme, also with the aim of Social Workers. The PRM specialist directs and supervises the Programme and coordinates the Team with weekly meetings. The Unit has 4 exercise rooms for treatment, 3 rooms for speech therapy and neuropsychology/psychology session and 2 rooms for recreational activities. All means devoted to the programme are collected in distinct spaces. All documents about Programmes are collected in clinical directories, accessible for consultation. Personnel and patients are provided by written standards from National Safety and Medical Bodies, Unit specific written rules and advertisements

about emergencies. All patients and relatives are informed about their rights. The Team personnel consults Journals and published Clinical Guidelines for updating and improving the quality of Programme. At discharge the patients are entrusted to other PRM specialists working near to patients county. The outcome data are regularly examined for Programme's performance improvements and statistical analysis and they are available to patients and clinical personnel.

I148

ACCREDITED PROGRAMME N° 18: PRM AND PEOPLE WITH SPINAL CORD INJURY**Kesiene J.***Vilnius University Hospital Santariskiu Klinikos, Physical and Sports Medicine Centre, Vilnius, Lithuania*

Target Population: Patients with SCI. **Aims and Goals:** Multidisciplinary rehabilitation of patients. **Procedures:** A multi professional therapeutic and rehabilitation programme is provided by 2 full time PRM physicians, 3 physiotherapists, 2 occupational therapists, 1 social worker, 1 psychologist, 7 nurses and 4 nurses assistants. The team serves 12 beds belonging to the Rehabilitation, Physical and Sports Medicine Centre (3 inpatients units - 100 beds and 1 outpatient unit responsible for first phase rehabilitation and follow-up of patients. The Rehabilitation Centre takes place within the 1000 beds Vilnius University Hospital Santariskiu Klinikos under the responsibility of the Health Ministry of Lithuania and of the University of Vilnius. **Procedures:** Physiotherapy, occupational therapy, psychology, speech therapy, nutritional therapy, orthotics, hydrotherapy. Payer of the programme is the National Health Insurance and rehabilitation is free for insured persons. Rights of patients are based on the 1994 WHO Declaration, on standard rules of equal opportunities (1993) and on the National law on patients rights (1996). Each patient signs an informed consent. The PRM Specialist in the Programme: PRM physician is the leader of the rehabilitation team. He assesses the rehabilitation potential of the patient. Team management in the programme: PRM physician coordinate interdisciplinary team work. **Organization and Records:** For each patient, the PRM specialist writes down a medical report at admission and a standardised discharge summary. Rehabilitation process is reviewed regularly by PRM specialists and the head of the Centre, by clinical rounds and rehabilitation team conferences. Some of the rehabilitation team meetings include the patients and their relatives. **Monitoring and Outcomes:** Assessment and evaluation, short- and long-term goals planning, Barthel Index, FIM, ICF recording, written team member documentation, clinical pathway.

I149

ACCREDITED PROGRAMME N° 19: REHABILITATION OF AMPUTEES**Presern Strukelj M.***Rehabilitation Institute for Rehabilitation, Rehabilitation of Persons after Amputation, Ljubljana, Slovenia*

Most of the patients are amputated because of vascular problems (peripheral vascular disease, diabetes mellitus), some of them because of trauma and different types of tumors. Unit for Rehabilitation of patients after amputation has 31 beds for inpatients and is the part of Rehabilitation Centre in Ljubljana. There are 2 full time PRM specialists, 3 physiotherapists, 2 occupational therapists, psychologist, social worker, part time 1 specialist of internal medicine-angiologist. We also have speech & language therapist and vocational specialist. There are 8 nursing staff and 2 university college graduated nurses and orthotics & prosthetic engineering service. There is large outpatient clinic responsible for admission and follow-up of amputee patients. PRM specialists also visit other hospitals to see candidates for admission. The

patients are admitted to the rehabilitation program as soon the skin of the stump is mostly healed. The patients proceed with elastic bandaging of the stump to shape the stump for prosthetic fitting. After admission the patients start to walk with special walking devices (PPMA – pneumatic post amputation mobility aid, Tulip limb, Femorette). So the stump is sooner shaped and the patients don't lose their walking scheme. They also have the training in ADL, and psychosocial treatment. Every vascular patient is examined by the specialist of internal medicine for the circulation in the remaining leg (measurement of perfusion pressures, oxymetric measurement of partial oxygen pressure, Duplex scan examination). The decision for prosthetic fitting is made by the whole rehabilitation team and is based on the patient's physical examination, comorbidity, the FIM, the measurements of ROM, the manual muscle strength and the 6-min walking test. With the European accreditation, the Institute for Rehabilitation, Republic of Slovenia, Department for Rehabilitation of persons after amputation got the award that our rehabilitation program is good. We wish to get some more beds for inpatients, so we will be able to admit persons after amputation as soon as possible after surgery, even with some small wounds on the stump (to avoid flexion contractures in knee and hip joint and to walk with wakening devices until the skin is complete.) We would like to have more physiotherapists for individual treatment, each person after amputation should also have psychological dealing.

1150

OPTIMISING OUTCOMES AFTER GUILLAIN BARRE SYNDROME

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Aim: To present the unique personal experience of Guillain Barré Syndrome (GBS) by a Rehabilitation Medicine specialist who previously treated patients with GBS. *Background:* The focus is on rehabilitation throughout the continuum of care

from acute illness to community. *Presentation:* Febrile illness for 10 days prior to admission. Sudden onset of symmetrical sensory neuropathy of hands followed by feet and ascending severe quadriplegia with cranial nerve involvement, associated dysesthesia and reaching the 'nadir' in two weeks. Intubation and ventilation required for 16 days. Lack of effective communication was a major issue. Associated bladder and bowel dysfunction was present. Plasmaphoresis received six times and gradual improvement noted in specific muscles. Fantasy and reality occurred in ICU. Dysautonomia observed with fear of acute complications. Significant and prolonged neuropathic pain experienced mainly in hands and feet and aggravated by foot splints and intermittent compression calf pumps. Episodes of feeling cold with discomfort occurred. Subsequent focus upon maintaining residual function and avoiding complications due to immobility. *Rehabilitation:* Medical rehabilitation commenced in the acute phase but was insufficient. Transfer to specialised stand alone rehabilitation hospital was personally difficult. Pain management was crucial to comfort and participation in therapies. Simple remedies were important in facilitating recovery. Hydrotherapy greatly relieved pain and boosted confidence. Aware of consequences of flaccid quadriplegia. Episodic sense of muscle tightening throughout the body during recovery. The physician-led multidisciplinary rehabilitation model of care was very effective. Institutionalization was a barrier to discharge where supports were much reduced. Family information and education was pivotal in the successful discharge process to the community. Phased return to normal activities was important. Residual symptoms and reduced level of fitness remain after 17 months. On-going goal-oriented hydrotherapy and fitness programmes improved outcomes. *Conclusion:* Experience provided significant insights into the GBS recovery process. Energy, knowledge and emotions were channelled into improving physical status. Medical rehabilitation in the acute phase was inadequate. The importance of a comprehensive, integrated, goal-oriented rehabilitation programme from acute to community-based on the ICF1 model and supported by a physician in rehabilitation medicine is essential to optimizing outcomes.

ORAL PRESENTATIONS

O1

DAR (DISABILITY AND REHABILITATION) WHO ACTION PLAN 2006–11*Puglisi A.**H-UNI-Switzerland*

Introduction: Hundreds of millions of people in the world are affected by some form of disability. 80% of them live in low-income families, most of them are poor and cannot access rehabilitation services. The number of disabled persons is growing disproportionately – population growth, medical advances which prolong life, war injuries, landmines, HIV/AIDS, malnutrition, chronic illnesses, drug abuse and road traffic accidents all contribute to this growth. **DISABILITY and REHABILITATION (DAR)** is a programme devised specifically to try to provide the rehabilitation services which such a situation requires. DAR's work is part of the International Classification of functioning, disability and health Programme (ICF). The ICF Programme describes how people co-exist with their health problems. It is an international classification of body functions and the active participation of a disabled person in the life of his/her community. **Mission:** Improvement in the quality of life of the individual via regional, national and global initiatives. The DAR Programme aims to offer equal opportunities

Association	Dissemination	Data
Development of capacity	Standard rules of the United Nations and WHO/OMS Programme	Rehabilitation structures
Help services		Community-Based Rehabilitation (CBR)

so that the individual may reach his/her optimum level of well-being, and be actively involved, together with his/her personal and family entourage: 1) Raise awareness about the magnitude and consequences of disability; 2) Facilitate the collection of data, and analyse and disseminate this data and information; 3) Support, promote and reinforce healthcare and rehabilitation structures for the differently-abled and their families; 4) Promote the development, production, distribution and servicing of assistive technology; 5) Support the development of policies which improve the rights and opportunities of the differently-abled; 6) Build capacity among health and rehabilitation policy makers and service providers, and in organizations of the differently-abled (DPO); 7) Develop a network of centres and associations which actively collaborate. **Objectives:** The main objective of this programme is based on the WHO/OMS international model which seeks quality improvement in the context of health conditions within the rehabilitation programme, optimizing recovery and social integration globally. DAR upholds the following objectives, providing both technical and organizational assistance: 1) Highlight the problems linked to disability in general within an organization; 2) Act as a catalyst for the restructuring of the health and social services, concentrating on the needs of all people affected by disabilities caused by chronic illnesses; 3) Develop a network between active multilateral organizations and disability and rehabilitation problems; 4) Support community involvement; 5) Support appropriate technologies; 6) Encourage global debate on social support and medical treatment; 7) Provide professional and consultative assistance; 8) Social inclusion of the disabled person and equal opportunities. **Conclusion:** To date members of the health and social sectors have considered only the medical aspect of disability, meaning that the individual in question has always been considered a non-autonomous being, rather than a person with the potential of leading an independent life. This strictly professional approach has reinforced the conception of the individual as a patient or a clinical case, and not as a person. The professionals involved in rehabilitation have a new role, that of demonstrating more positive attitudes towards disability, via their commitment to work in close collaboration with the disabled and their families, and sup-

porting the idea of an independent life and of active participation. In this way, new roles can be added to traditional rehabilitation so that it may be directed towards a closer relationship with families and communities. Collaboration between the specialist sectors of health, education, work and society is essential so that the disabled may receive all the services available to assist them in obtaining equal opportunities. In most nations the different sectors work best together at local rather than at national level. WHO/OMS promotes this type of international collaboration through its work with the UN and NGOs (non-Governmental organizations). The most important aspect of the whole DAR programme is involvement and promotion both of the participation of disabled people in order to improve their quality of life, and of the social inclusion of the Individual in the community.

O2

DISABILITY MANAGEMENT – A GLOBAL RETURN-TO-WORK-STRATEGY*Mehrhoff F.**Deutsche Gesetzliche Unfallversicherung (DGUV), Sankt Augustin, Germany*

Introduction: ILO-guidelines and UN-Conventions as well as the jurisdiction of several countries promote incentives for reintegration into working life of employees fallen ill. The first priority is to preserve employability and to protect the human resources. Quality criteria expressly consented to and experts with special skills are indispensable. **Aim:** On the basis of an educational program (25 modules) the so-called 'Disability Managers' (www.disability-manager.de) are watching employers, employees, insurers and service providers integrated in return-to-work-programs and individual cases. Nearly 600 'Certified Disability Management Professionals' in Germany and just as many worldwide act in accordance with international standards. **Methods:** This movement originally comes from Canada (www.nidmar.ca) and now reaches Europe. An interdisciplinary partnership concerned with the task of prevention and rehabilitation coming from several European countries such as Austria, Belgium, Great Britain, the Netherlands and Switzerland work closely with each other. On the basis of the report on their experiences they aim at combining medical with vocational know-how. Thus the employers, employees and insurers could benefit from this procedure. **Results and Conclusion:** The German Social Accident Insurance concerned with accidents at work and occupational diseases is one of the leader in the field of 'Disability Management' world-wide. In Bruges the background information concerning this international success story and the part Germany has in this will be presented. The results will be worthwhile for stakeholders concerned with rehabilitation.

The 4th International Forum on Disability Management will take place from 22–24 September 2008 in Berlin.

O3

JOBREHA OCCUPATIONAL PREVENTION AND REHABILITATION PROGRAMME FOR PATIENTS WITH MUSCULOSKELETAL DISORDERS: PHYSICIAN- AND PATIENT- REPORTED OUTCOMES*Schwarze M.¹, Fischer M.¹, Kreiß T.¹, Rebe T.², Wrbitzky R.², Gutenbrunner C.¹ for the JobReha Working Group***Hannover Medical School, ¹Dept. of Rehabilitation Medicine, Coordination Centre for Applied Rehabilitation Research and ²Dept. of Occupational Medicine, Hannover, Germany*

Introduction: The JobReha programme was launched after the implementation of legal requirements to establish workplace health promotion measures as soon as possible. It is based on the results of international studies indicating that a return to work after treatment for musculoskeletal disorders is more successful when

intervention starts early, a multidisciplinary approach is used and occupational/company and rehabilitation physicians and facilities work together. The systematic conceptualisation, implementation and evaluation of the outcome of the programme have meanwhile been achieved. *Aim:* To evaluate the quality of interface management and the benefits that workers/patients receive from the vocational rehabilitation programme. *Patients and Methods:* Occupational ($n=83$) and rehabilitation physicians ($n=87$) were asked to complete a questionnaire on time management, the quality of collaboration, and the relevance of information exchanged between the groups. The patients completed questionnaires on the quality of treatment received. The PDI (Pain Disability Index) and FFbH-R (questionnaire on back-related functioning) were used. Complete data sets with baseline and follow-up data from 89 patients were available for analysis. *Results:* Most of the rehabilitation physicians surveyed rated the workplace-related information received from occupational physicians as moderately relevant (37.9%) or highly relevant (44.8%) for rehabilitation therapy. Only 17.2% answered that the information was of low relevance. On the other side, occupational physicians rated the importance of further recommendations from the rehabilitation physicians concerning reintegrating the worker as very important (59.1%), important (34.9%) or unimportant (6%). The majority of patients rated the cooperation between the company and the rehabilitation clinic as very good (43.2%) or moderately good (49.4%). Patients rated the amount of workplace-related therapy elements as sufficient (72.3%), insufficient (24.7%) or as more than necessary (1.2%). The patients reported significant benefits for back-related functional capacity (Mean 73.3→78.4) ($p<0.001$) and a substantial reduction of pain-related work conditions (Mean 5.4→4.7) ($p<0.000$) at the end rehabilitation. *Conclusion:* The findings show a need for an increase of vocational rehabilitation.

* Dr. Thilo Busche, Norbert Cordes, Dr. Heinz-Hubert Daalman, Anke Eisenhauer, Thomas Henke, Markus Jähnke, Albrecht Jacobs, Dr. Detlev Kasprowski, Dr. Ingra Manecke, Dr. Wilhelm Moesch, Nicole Noll, Dr. Thomas Rebe, Jürgen Rodewald, Thomas Schröder, Dr. Michael Spallek, Dr. Frank Teumer, Heiko Wehe, Prof. Renate Wrbitzky

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O4

MIRROR THERAPY: FMRI PILOT STUDY ON MIRROR INDUCED VISUAL ILLUSIONS

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Introduction: Although mirror therapy has been used for the treatment of pain syndromes, such as phantom limb pain or complex regional pain syndrome (CRPS), as well as for upper extremity rehabilitation after stroke, the underlying mechanism remains unclear. In an attempt to identify neural networks associated with mirror therapy, we performed an fMRI study with mirror induced visual illusions. *Methodology:* A right handed finger tapping movement with and without a mirror was performed during an fMRI protocol in 18 right handed healthy subjects. Activation patterns in both conditions were compared with each other using group analysis. *Results:* Our data revealed that the mirror illusions induced an activation in two visual areas: the right superior temporal gyrus (STG) and the right superior occipital gyrus (SOG). *Discussion:* The STG lies in the region of the superior temporal sulcus (STS), an area which is anatomically linked with the mirror neuron system (MNS). The MNS is a core motor circuit known to be involved in motor representations like action observation, motor imagery and motor execution. Mirror induced visual illusions provide an ideal image presentation for action observation. Although we could not find activity in other regions

belonging to the MNS, we nevertheless hypothesize that the MNS might be the core neural network associated with mirror therapy. *Conclusion:* The activation in STG area due to mirror induced visual illusions might indicate that a possible underlying mechanism of mirror therapy lies within the activation of the MNS.

O5

EFFECTS OF LOW-DOSE NICOTINE ON NEURONAL OXIDATIVE STRESS STATUS

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Nicotine has been reported to be therapeutic in some patients with certain neurodegenerative diseases and to have neuroprotective effects in the central nervous system. However, nicotine administration may result in oxidative stress by inducing the generation of reactive oxygen species in the periphery and central nervous system. There is also evidence suggesting that nicotine may have antioxidant properties in the central nervous system. The antioxidant properties of nicotine may be intracellular through the activation of the nicotinic receptors or extracellular by acting as a radical scavenger in that it binds to iron. The possibility that nicotine might be used to treat some symptoms of certain neurodegenerative diseases underlies the necessity to determine whether nicotine has pro-oxidant, antioxidant or properties of both. In the present study we evaluated the effects of nicotine treatment (0.3 mg/kg b.w., i.p., SIGMA, 7 continuous days administration), on the antioxidant enzymes activity. We assessed the activity of superoxid dismutase (SOD), glutathione peroxidase (GPX) and malondialdehyde (MDA) in the prefrontal and temporal cortex homogenates after 7 days of continuous nicotine administration. The exposed animals had decreased levels of superoxid dismutase and glutathione peroxidase after nicotine treatment. The level of malondialdehyde was increased. These biochemical evidences suggested that exposure to a low dose of nicotine caused severe oxidative stress.

O6

THE PATTERN OF BRAIN ACTIVITY IN REACTION TO COMPLEX MOTOR STIMULATION DIFFERS IN MULTIPLE SCLEROSIS AND HEALTHY

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Introduction: Dysfunction of interhemispheric cooperation has already been described in multiple sclerosis (1). In our previous study (2), we found a trend to improvement of interhemispheric cooperation in connection with physiotherapy. *Aim:* In this study we examined it on fMRI using complex motor stimulation. We were interested whether it is influenced by physiotherapy (application of sensory-motor learning stimuli to effectively use the processes of the interneuronal network and activate a motor program). *Methods:* 12 stable patients with multiple sclerosis with prevailing motor impairment underwent two months physiotherapy on the neurophysiologic basis. Every patient was sex and age paired with a healthy proband who did not change their habits during two months. In group of patients the balance using Berg Balance Scale was evaluated. Both groups were examined twice on fMRI. We evaluated the difference in proportion of activated voxels in primary motor cortex in connection with finger flexion in the sequence of right – left (RL) hand and sequence of left – right (LR) hand between groups and before and after two months. *Results:* After the physiotherapy patients improved in balance ($p=0.02$). On fMRI, the examination 1 shows statistically significant difference between healthy probands and MS patients in the proportion of activated voxels for the right

hand (sequence RL – the movement is carried out by the right hand immediately followed by the left hand) as “navigator hand” (the first one) to ‘tandem hand’ (the second one). After the physiotherapy neither of the MS groups proved a statistically significant change in the proportion of voxels. As the examination 2 does not prove any difference between the healthy and MS patients in the proportion of voxels, in this sense we can think of the ‘recovery to the normal’. Nevertheless, the above mentioned conclusions need further verification on the larger sample of probands in the groups. **Conclusion:** This study confirmed the dysfunction of interhemispheric cooperation in multiple sclerosis and showed a hypothetical possibility to influence it by physiotherapy.

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1. Pelletier, et al. 2001.
2. Rasova, et al. 2005.

O7

GOOD OR BAD RECOVERY FROM APHASIA: A PET LONGITUDINAL STUDY TO TRACK ITS NEURAL CORRELATES

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Aim: To investigate the neural substrates of aphasia recovery, we performed a longitudinal study in patients after a left single perisylvian stroke. We compared behavioural and functional imaging results of patients with good recovery to those in patients with persistent deficiency. **Patients and Methods:** 13 aphasic patients were PET scanned twice at one year interval during a word generation task after a H2150 infusion. Patients were divided in two groups according to language performance on word generation at PET2. In the Good Recovery (GR) group, patients’ performance were indistinguishable to that of normal subjects in the same task, while patients from the Bad Recovery group (BR) still showed language disorders one year after stroke. Using SPM2, Language-Rest contrast was computed for both groups at both PET stages. Then, Session Effect contrast (TEP2–TEP1 >0) was calculated for both groups. ($p < 0.001$; $k=100$ for all contrasts). **Results:** At PET1, aphasia profiles in GR patients did not differ from BR ones except for better comprehension score and smaller size of infarcts, while at PET2, they showed better fluency and generation accuracy score. Generation-Rest contrasts show bilateral Postero-Superior Temporal Gyrus (PSTG) activations at PET1 in both groups, and major increase in left PSTG at PET2 for GR group only. The right PSTG activation decreased in both groups from PET1 to PET2. This was confirmed by the Session Effect contrast (Fig 2) that depicted for GR patients stronger activation of left temporal, left sensori-motor primary cortex, right thalamus and lenticular, right inferior parietal lobule and bilateral anterior cingulate; whereas for BR patients, only right frontal cortex was significantly more activated. **Conclusions:** The crucial role of the left temporal activation was confirmed, its increase was linked to behavioural recovery, when the role of the right temporal cortex seems temporary and not related to the quality of recovery. The right prefrontal activation of the BR group may represent a maladaptive strategy that interferes with, rather than promotes, aphasia recovery.

O8

PAIRED ASSOCIATIVE STIMULATIONS OF EXTENSOR WRIST MUSCLES IN STROKE PATIENTS

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Background: Paired associative stimulation (PAS) combining peripheral nerve and Transcranial Magnetic Stimulation (TMS)

induces changes in cortical motor excitability of hand muscles in normal subjects (Stefan and al. 2000) and in leg muscles in stroke patients (Uy and al. 2003). **Objective:** The motor recovery of distal upper limb in stroke patients is one of the major rehabilitation challenge. Paired associative stimulation was used in this study in order to induce plastic changes in the cortical representation of a wrist muscle: the Extensor Carpi Radialis muscle (ECR) in six hemiparetic patients, five months after stroke. **Methods:** Electrical peripheral stimulation, were applied on the paretic ECR followed 25 ms after by TMS on the lesioned side over the hotspot of the primary motor wrist area in patients. Paired stimulations were repeated during 30 min, each subject receiving 180 pairs of stimuli. Changes in cortical excitability was assessed by comparing the size of ECR and the level of Resting Motor Threshold (RMT) before and after associative stimulation. **Results:** Associative stimulation induced a significant ($+172\% \pm 18\%$, $p < 0.008$), and lasting (> 30 min) facilitation of the paretic ECR MEP in the six patients. A decrease of RMT was also observed in all patients ($-6.5\% \pm 2.4\%$). **Conclusion:** Plastic changes of cortical excitability of a wrist muscle could be induced by a prolonged paired associative stimulations in stroke patients. This might offer a new useful approach in the upper limb motor rehabilitation.

O9

MOTOR CORTICAL DISINHIBITION DURING EARLY AND LATE RECOVERY AFTER STROKE

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Background: Functional neuroimaging studies show adaptive changes in areas adjacent and distant from the stroke. This longitudinal study assessed whether changes in cortical excitability in affected and unaffected motor areas after acute stroke correlates with functional and motor recovery. **Methods:** We studied 13 patients with moderate to severe hemiparesis 5–7 days (T1), 30 days (T2), and 90 days (T3) after acute unilateral stroke, as well as 10 healthy controls. We used paired-pulse transcranial magnetic stimulation to study intracortical inhibition and facilitation, recording from the bilateral thenar eminences. F waves were also recorded. **Results:** At T1, all patients showed significantly reduced intracortical inhibition in the unaffected hemisphere. At T2, in patients whose motor function recovered, intracortical inhibition in the unaffected hemisphere returned to normal. In patients with poor clinical motor recovery, abnormal disinhibition persisted in both hemispheres. At T3, in patients whose motor function progressively recovered, the abnormal disinhibition in the unaffected hemisphere decreased further, whereas in patients whose motor function remained poor, abnormal inhibition in the unaffected hemisphere persisted. No modification of F-wave latency and amplitude were found in patients and controls. **Conclusions:** During early days after stroke, motor cortical disinhibition involves both cerebral hemispheres. Longitudinal changes in motor disinhibition of the unaffected hemisphere may reflect the degree of clinical motor recovery.

O10

THE IMPACT OF SIMULATED WEIGHT GAIN ON THE ENERGY COST OF WALKING IN CEREBRAL PALSY COMPARED TO NORMAL CHILDREN

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Introduction: Obesity and the inevitable decreasing power to weight ratio problem can become clinically apparent in the management of some patients with cerebral palsy. **Aim:** To investigate the effect of carrying 10% equivalent of body weight on the energy cost of

walking at self-selected speed in a group of children with Cerebral Palsy (CP) compared with an age matched control group (non-CP). *Patients and Methods:* Twenty-four children with cerebral palsy and 24 normal age and gender-matched children participated in this study. A portable respiratory gas analysis system (Cosmed, Italy), together with a series of timing gates, arranged around a figure of 8 track enabled assessment of the non-dimensional net oxygen cost of walking (NDNOC) [2]. Randomly ordered walking tests were performed, with and without added weight, equivalent to 10% of body weight. A resting period in sitting, during which the patient's baseline O₂ consumption was obtained was followed by an 8 min walk at self-selected speed. *Results:* The mean speed decreased in the CP group by 3% compared to no change in the non-CP. The standard deviation (SD) of speed of the CP increased by 16% compared to a 9% decrease in the non-CP. The SD of O₂ consumption in the non-CP increased by 14% and decreased by 10% in the CP. The NDNOC significantly increased ($p \leq 0.05$) with added weight and there were similar % increases in the mean, SD and range of NDNOC in both groups. *Conclusions:* Children with cerebral palsy (CP) challenged with carrying increased weight adopt a strategy of reducing walking speed and increasing their VO₂. Normal children maintain their self-selected walking speed whilst increasing O₂ consumption. Complex oxygen cost indices may mask these different compensation strategies.

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O11

PROSPECTIVE LONG-TERM FOLLOW-UP OF CONTINUOUS INTRATHECAL BACLOFEN IN CHILDREN AND YOUNG ADULTS WITH CEREBRAL PALSY AND SEVERE HYPERTONIA

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Severe spasticity or dystonia in children or young adults with cerebral palsy interferes with activities of daily living, transfers and functional mobility, or causes pain. Because these children often respond poorly to oral antispasmodics, continuous intrathecal baclofen was introduced to manage childhood hypertonia. In this prospective multicenter study, 48 spastic or dystonic cerebral palsy children and young adults between 4 and 26 years of age, were treated with continuous intrathecal baclofen and were followed for 4 years. The study was designed to measure the change in spasticity, range of motion, motor function and quality of life during 4 years of intrathecal baclofen administration. Also the adverse events were noted down. This study is valuable because of his prospective long-term follow-up of four years and the multicenter aspect. Results showed a significant improvement in the range of motion of the proximal joints in the four limbs, a significant decrease in the Modified Ashworth Scores (spasticity) for the lower extremities, and a significant positive change in the Canadian Occupational Performance Measure, but no significant improvement in the global Gross Motor Function Measure. The number of adverse events was limited in a period of four years. In conclusion, continuous intrathecal baclofen is an effective and safe treatment for relieving spasticity and dystonia in children and young adults with cerebral

palsy. Reducing spasticity or dystonia does not seem to lead to a significantly better motor function but improves the ease of care, sleep, patient comfort and quality of life.

O12

INTENSIVE THERAPY COMBINED WITH AQUATIC EXERCISE ON BONE DENSITY AND MOTOR ABILITY IN CHILDREN WITH SEVERE CP

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Introduction: Abnormalities of growth and development are prevalent in children with cerebral palsy (CP). Low bone mineral density – osteopenia was associated with severe CP. *Aim:* To evaluate the effectiveness of an intensive exercise program combined with aquatic therapy intervention on severe cerebral palsied children by measuring changes on bone mineral density (BMD) and gross motor abilities. *Patients and Methods:* Six children 6–8 years age participated in an intensive exercise program consisting of 3 h of exercises, 5 times a week for 12 weeks. In addition to the program three children also received a half an hour of aquatherapy, twice a day. Three children received only intensive therapy program. All participants underwent evaluation before and after the program. Speed of sound (SOS) and broadband attenuation (BUA) of the calcaneus were measured to determine a quantitative ultrasound index (QUI). Gross motor abilities were measured with the Gross Motor Function Measure (GMFM) scores. *Results:* Measurements of bone mineral density before and after the program revealed increases in bone mineral density in all children who received aquatic exercise therapy and one child who received physical therapy. All the subjects showed improvement in GMFM scores after the twelve weeks in domains B – sitting, and C – crawling and kneeling increased by an average of 14.2% and 13.8%, respectively. *Conclusion:* Intensive therapy program, including aquatherapy helps improve patient's gross functional abilities and BMD. There is potential value in additional research concerning the effects of combined therapy on BMD and functional abilities in children with cerebral palsy.

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O13

CONSTRAINT – INDUCED THERAPY FOR CHILDREN WITH CEREBRAL PALSY: A PRELIMINARY REPORT ON STUDY

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Introduction: After promising results in rehabilitation of adults, a constraint-induced therapy (CIT) for improvement of an affected hand function is used also in children with cerebral palsy (CP). *Aim:* The aim of our study was to identify the usefulness and efficiency of CIT in children with CP. *Patients and Methods:* The inclusion criteria for children: age of 18 months to 14 years, one-sided hand function impairment, some grasping ability, understanding of simple instructions and motivation of parents to continue with the program at home. Based on the results of evaluation with Assisting Hand Assessment (AHA) we decided upon inclusion of the child in CIT. An orthosis from the top of the fingers to the elbow was made for a child to be used in occupational therapy for immobilization of a non-affected hand (45 min, twice a day, ten consecutive days). Parents were

instructed how to proceed with the program at home for next 4 months. AHA was repeated after the 2nd, 4th and 6th month of the program. Parents were asked to report on their work at home. *Results:* 26 children were tested with AHA, 13 of them were included in the program. Eight children already concluded the whole program. Analysis based on AHA after 2nd and 4th month showed better use of the assisting hand. Results were statistically significant ($p=0.029$). 2 months after the end of the program none of the children showed any regression in their hand function. All parents reported they got enough information on the importance and the way of work at home. They were all satisfied with the duration of in-hospital program. Most of them managed to continue with program once a day for 30 min (mean score). They referred a time constraint and motivation of a child as partially important obstacles for work at home. Parents also noticed an improvement in hand function of their child. *Conclusion:* We believe that CIT is an efficient and useful method for improving a hand function of children with hemiparetic form of CP. Parents and children accepted it as a feasible program to be continued at home.

O14

ASSESSMENT OF EXECUTIVE FUNCTIONING IN CHILDREN AFTER TRAUMATIC BRAIN INJURY USING COMPARISON OF NEUROPSYCHOLOGICAL TESTS, BEHAVIOURAL MEASURES AND AN INTER-ACTIVE ECOLOGICAL MEASURE: A PILOT STUDY

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Purpose: Traumatic brain injury (TBI) often leads to executive functions deficits, responsible for severe longstanding disabilities in daily life activities. Sensitivity and ecological validity of neuropsychological tests of executive functioning have been questioned. The aim of this pilot study was to compare three types of assessments of executive functioning in children after TBI. *Methods:* We included 10 children aged 8 to 14, with moderate to severe TBI, and 18 matched controls. For the TBI group, executive functioning was assessed with cognitive tests (WCST, TMT-B, TOL, Rey figure and the six-part test). Executive impairments in daily life activities were assessed with the parents' ratings of the BRIEF and DEX-C. We designed an interactive ecological measure consisting of a cooking task, requiring preparation of two simple recipes with structured written instructions but little external help. We performed quantitative and qualitative analysis of the task. Wilcoxon signed-rank test was used to compare performances of the two groups on the cooking task. We used Spearman correlations to correlate the results of the different assessments. *Results:* Neuropsychological assessment indicated mild to moderate executive deficits. Over 60% of patients suffered moderate or severe dysexecutive deficits in daily life as rated by the parents' questionnaires (when available). In the experimental cooking task, all the quantitative and qualitative variables were significantly impaired in the TBI group (all $p<0.001$), with errors related to interaction with environment during task performance. Overall task performance discriminated well between the TBI and control groups. The number of errors in the cooking task was correlated with the WCST and the six-part test ($p=0.01$) but not with the questionnaires. This could be explained by the fact that 2 families did not answer the DEX questionnaire and 4 did not answer the BRIEF because they were from a non-French speaking background. *Conclusion:* This pilot study highlights the need for naturalistic assessments to better approach patients' dysexecutive impairments in complex activities of daily living, even in cases where questionnaires are not feasible. Our results suggest that a dynamic naturalistic task could be more sensitive than the cognitive assessment.

O15

TRAINING PROGRAMS IN CHILDREN? PROPOSITION FROM A LITERATURE REVIEW

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Introduction: Training programs is an increasingly widespread occupational practice with adults affected by chronic illness and/or handicaps; it's use is more recent with children and teenagers. *Aim:* To carry out a literature review concerning training programs with children, considering the target population, methodology, the results and limits. To propose a synthesis of the training programs with children. *Discussion and Conclusion:* Physical activity seems to be a good means of primary prevention in the healthy child, and of secondary prevention in the child afflicted with chronic disease or with a handicap. Thus it appears interesting to support the development of training programs, adapted and integrated in the global treatment of the sick or handicapped children, in the healthcare structures and in the home. It appears that these programs are feasible and do not undermine the children's health, but few studies bring clear data on the methods of the programs. The training programs used, not always validated, forecast: 2 to 5 sessions from 30 to 60 min per weeks, from 6 to 16 weeks, of activity and variable intensity, adapted to the pathology and the objectives. It would be necessary to validate programs of training programs adapted to the child, in order to allow their accessibility to the health professionals dealing with child afflicted with chronic disease and/or handicap.

O16

GRAPHOMOTOR DISORDERS IN AUTISTIC CHILDREN WITH NORMAL INTELLIGENCE

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Introduction: Several studies described motor control disorders in autistic children, even in groups of autistic children with normal intelligence (1, 2). Graphomotor skills are extremely relevant for children, not at least because they are linked to academic achievement. *Aim:* To describe the prevalence and nature of graphomotor disorders in children with normal intelligence that had clinical diagnoses of autism. *Patients and Method:* Thirty-two children, between 7 and 12-year-old, with autism and IQ >70 were assessed with the Movement Assessment Battery for Children (M-ABC) and a Dutch handwriting test 'Beknopte Beoordelingsmethode voor Kinderhandschriften' (BHK). The BHK evaluates writing speed and 13 qualitative aspects of the writing product. Summation of the 13 item scores offers a dysgraphia score. A control group of 32 children, matched for age, gender and hand preference were also assessed with the BHK. *Results:* As expected, the mean M-ABC performance of the autistic children was significantly poorer compared to the M-ABC standardisation group ($p<0.001$). Autistic children and control group did not differ in writing speed ($p=0.99$) but autistic children had a significantly higher dysgraphia score, representing lower quality of the handwriting ($p<0.001$). Inspection of the different items showed that the autistic children scored significantly higher for the items writing too large, irregular lines, dysfluent writing, irregular letter height and penmanship with tremor. These items suggest that the handwriting problems of autistic children are particularly explained by motor executive problems and less by visuo-spatial problems. The finding that the autistic children do not write slower suggests the use of more open loop strategies and less use of feedback to control the writing movement. *Conclusion:* Children with autism with normal intelligence are more at risk for poor penmanship.

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O17**PROTEUS SYNDROME**

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Introduction: Proteus syndrome (PS) is an extremely rare but over-diagnosed disorder of unknown etiology causing patchy or mosaic postnatal overgrowth. The onset of overgrowth typically occurs in infancy and can involve any tissue of the body, most commonly connective tissue and central nervous system. Diagnosing PS is difficult and controversial so strict diagnostic criteria need to be applied to prevent overdiagnosis. PS has a remarkable degree of interpatient variation in severity and extent. The tissue overgrowth is progressive and frequently leads to severe orthopedic complications. Patients with PS also have an increased risk of developing tumors and of premature death, namely due to deep vein thrombosis and pulmonary embolism. The prognosis is not well known but mostly depends on functional and psychologic consequences of deformations. **Patients, Methods & Results:** We present the case of a 10-year-old African girl with PS as defined by the most recent diagnostic criteria. There was no relevant family history. She was born with feet larger than average, macrodactily, syndactily of digits and a linear verrucous epidermal nevus in the abdominal flank. As she became older she developed disproportionate overgrowth of the legs with gigantic feet and a thoraco-lombar scoliosis but no evidence of facial and cranial lesions or cognitive deficits. She was first submitted to surgery for digit syndactily correction and later for bilateral second toe and metatarsi amputation. At the age of nine years she underwent bilateral transtibial amputation because of cardiac failure and severe gait disturbance. All these specimens exhibited lipomatous and hamartomatous lesions. The magnetic resonance of thighs and buttocks demonstrates diffuse lipomatous infiltration and vascular malformations. **Conclusion:** The management of patients with PS is challenging. This disease poses us permanent problems, initially in the establishment of the correct diagnosis and later given its aggressive and progressive course. The rapid overgrowth causes severe problems in most patients. Among other issues, we need to define the correct timing for surgical interventions, between the absolutely necessary and the contraindicated times. Effective management requires knowledge of the wide array of manifestations and complications of PS and a multi-disciplinary approach.

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O18**CHARCOT-MARIE-TOOTH DISEASE: A CHALLENGE IN REHABILITATION**

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Introduction: Charcot-Marie-Tooth disease (CMT) is the most common form of hereditary sensory motor neuropathy (HSMN) and is caused by a disorder in the peripheral nerve axon or the myelin sheath. It is a group of genetically distinct disorders with similar clinical presentations. Age at onset varies depending on the type of CMT. CMT is characterized by slow progressing weakness beginning in the distal musculature. Ambulation is frequently impaired, and falls are frequent. Later in the disease, weakness and muscle atrophy may occur in the hands, resulting in difficulty with fine motor skills. Ankle and foot deformities are common. Intellectual function and neuropsychological profiles are usually normal. The severity of symptoms is quite variable in different patients even among family members with the disease. **Patients and Methods/Results:** The authors report the case of four teenage sisters with CMT disease without pathologic familiar background. The youngest is so far asymptomatic. All the other siblings have distal weakness of the lower limbs, muscle atrophy, moderate gait impairment and cavus feet. Genetic diagnose was positive for CMT disease. **Conclusion:** Although no treatment exists to reverse or slow the natural disease process, treatments such as physical and occupational therapy often are useful. Rehabilitation programs focus on maintaining effective gait, orthotic prevention of deformities, strength and balance training. Patients should have regular multidisciplinary follow-up to anticipate and allow early detection of complications and to avoid significant and permanent functional limitations.

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O19**MEASUREMENT OF CAMT CAREGIVER CONFIDENCE**

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Aims: Due to advances in medical technologies, an increasing number of children are surviving or recovering from catastrophic illnesses, severe injuries, and congenital health conditions. Mothers typically provide primary caregiving supported by parent training programs, which assume mothers' confidence to care for their children assisted with medical technologies (CAMT), specifically tracheotomy, ventilator, and BiPAP/CPAP. Specific aims are to: 1) construct a caregiving survey form with both CAMT group-specific (tracheotomy, ventilator, and BiPAP/CPAP) and core Functional Caregiving items; 2) empirically pilot survey instrument with appropriate CAMT populations; 3) evaluate axiomatic measurement properties, model fit, and dimensionality, as well as reliability and validity of patient measures and item calibrations. **Patients:** The sample is 52 children assisted with tracheotomy, ventilator, and BiPAP/CPAP medical technologies from the Chicago, Illinois USA metropolitan area. All surgeries were conducted at Children's Memorial Hospital, Chicago. **Methods:** The following three questionnaires were developed to survey mothers' confidence to provide care for CAMT: – Tracheostomy (40 items); – Tracheostomy and Ventilator (36 items); – BiPAP/CAP by mask (31 items). All three forms collected caregiving responses with the following rating scale: 1) None, 2) A little, 3) Somewhat, 4) A lot, 5) Completely. Ratings were transformed to linear units (log-odds) with WINSTEPS software for Rasch measurement, which computes a log-odds transformation of both items and mothers total ratings, then models differences between mothers and items on a common scale with a one-parameter logistic function. Conformability of data to mathematical expecta-

tions was conducted with a Chi-square derived analysis of items and mothers. Dimensionality threats were assessed with principal components analysis of model residuals. *Results:* Items and mothers showed excellent overall consistency with measurement model expectations. Tracheostomy items were especially successful separating mothers into high and low levels of caregiving (Separation 2.66) and reliability was 0.86–0.88. Results show the Tracheostomy measurement dimension accounts for 77.8% of the raw rating variance and several smaller factors account for remainder (11.2%). *Conclusion:* These results provide clear empirical support for measuring mothers' confidence to care for their children assisted with medical technologies. Further analyses should clarify the external, concurrent, and construct validity of this dimension.

O20

GROWTH AND DEVELOPMENT OF PSYCHO-BEHAVIORAL DISORDERS IN CHILDREN AND TEENAGERS (AGE 10–18)

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Introduction: Due to the ever changing reality of modern day society, especially felt by the younger generation, major lifestyle changes have occurred that influence the state of health of the population. In this context, medical exams of different profiles (family medicine, pediatrics, orthopedic practice, rehabilitation) show a growing number of growth and somatic development. *Aim:* These disorders, functional and structural, (ex. Idiopathic scoliosis) are often neglected by the patients and accompanied by psycho-behavioral disorders. These facts have justified the initiation of a longitudinal prospective study that identifies these growth and development disorders. *Materials:* The study was conducted on 1000 children and teenagers (ages 10–18), grades IV to XI, in three different schools in Bucharest, whose locomotors and psyche have been evaluated. *Method:* We used special forms for analysis and clinical and functional interpretation to evaluate somathometric, anthropometry and psycho-behavioral forms. These special forms were used to detect subjective manifestations (ex. Somatic pain, tiredness) and objective manifestations of the spine, upper and lower limbs, breathing dynamics, effort endurance, and so on. *Results:* The screening was used to create a data-base by introducing the data from the special forms and the statistical interpretation of the data, using the SPSS software. The dynamics and the different relations of the parameters were monitored. This stage focused on identifying the percent of children who were within the normal growth limits and are able to withstand greater physical and emotional stress, and the group of children suffering from minor, medium functional or organic disorders, the last group being in need of special prophylactic programs or targeted rehabilitation programs (ex. scoliosis) and in some situations interdisciplinary medical care and medical and psychological counseling. *Conclusion:* From the statistical evaluation of 968 children, the distribution of cases with pain as a symptom and spine problems revealed 174 cases, with the highest percentage at dorsal level (122 cases) and lumbar level (114 cases).

O21

THE EFFECT OF CONSTRAINT-INDUCED MOVEMENT THERAPY FOR REHABILITATION OF LOWER LIMB FUNCTION IN STROKE PATIENTS

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The study objective was to evaluate the effect of intensive task-oriented training of lower extremity function following the principles

of constraint-induced movement therapy (CIMT). A one group pretest-posttest design with two pre-tests was applied. Twelve patients, (5 women, 7 men; mean age of 46.5 years) with average 47.4 months post-stroke, and at least some residual function in the affected lower limb, received two weeks of CIMT with 6 h daily training administered in a group setting. The intervention involved intensive practice of tasks related to lower limb function like sit to stand, stepping, stair-walking, gait under different conditions and on different surfaces, and balance and strengthening exercises. The training was carried out with systematic progress in task challenges according to the patients' progress in performance. A main focus during training was weight-shifting towards the affected side and increased use of the affected lower extremity. In addition, the patients used a constraint, i.e. an insole with nubs in the shoe of the non-paretic side with the intention to increase weight-bearing on the paretic leg. Two functional mobility tests, i.e. timed up and go (TUG) and four square step test (FSST), were used to evaluate performance during functional activities. Gait performance (velocity and symmetry), was assessed by an instrumented gait mat. Muscle strength was assessed by a wall-fixed dynamometer. The patients increased performance on both TUG and FSST ($p < 0.001$) as well as preferred ($p = 0.04$) and maximum ($p < 0.001$) gait velocity. No change in spatial and temporal gait symmetry was found. Muscle strength increased in knee flexors ($p < 0.003$) and extensors ($p < 0.001$) bilaterally and plantar flexors ($p = 0.008$) on the paretic side. In conclusion, task-oriented training for lower extremity function following CIMT principles seems to be feasible and effective in increasing lower limb function in chronic stroke patients.

O22

SHORT-TERM EFFECTS ASSOCIATED WITH LONG-TERM USE OF THE HANDMASTER ORTHOSIS IN CHRONIC STROKE PATIENTS

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Introduction: The Handmaster Orthosis (HMO)[®] is used for home-based neuromuscular electrical stimulation of the upper limb to reduce a.o. spasticity in stroke patients. In the Netherlands, a try-out period has been used to evaluate short-term effects based on which definitive prescription was decided. However, research has not provided consistent evidence for beneficial effects of the HMO on spasticity (1, 2) due to small samples and inadequate patient selection, and there is no insight in whether short-term effects predict long-term use. *Aim:* To evaluate short-term effects of the HMO and their association with long-term use in chronic stroke patients. *Patients and Methods:* A historic cohort study was conducted of chronic stroke patients who had been prescribed the HMO to reduce wrist flexor spasticity. Wrist spasticity (Modified Ashworth Scale (MAS_{wrist}); primary outcome measure), MAS_{elbow}, pain (VAS), oedema, and passive range of wrist motion were assessed prior to HMO prescription (T0), after 6 weeks try-out (T1), and 4 weeks withhold. Long-term use or non-use was evaluated by a questionnaire. Non-parametric methods were adopted for short-term effect (T0–T1) evaluation. Positive (PPV) and negative predictive values (NPV) were calculated to study the association of short-term effects on MAS_{wrist} with long-term use. *Results:* 110 patients participated; 78.2% were defined long-term (average 2.7 years after prescription) HMO 'users', and showed significant improvements on both primary and secondary outcome measures. Non-users showed short-term effects on MAS_{elbow} and VAS only. PPV for long-term use was 0.85 (95% CI 0.72–0.93). NPV was 0.28 (0.16–0.44). *Conclusions:* Short-term HMO effects were positive, especially in long-term users. Long-term use was associated with wrist spasticity reduction at short-term. However, also many patients without this reduction appeared long-term users. In other words, non-use was not associated with results at short-term. This implies the possibility of beneficial effects later than the applied try-out period.

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O23

WHAT IS BOBATH? A SURVEY OF UK STROKE PHYSIOTHERAPISTS' PERCEPTIONS OF THE CONTENT OF THE BOBATH CONCEPT TO TREAT POSTURAL CONTROL AND MOBILITY

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Introduction: Stroke physiotherapy is often described in terms of treatment approaches but there is little literature about how they are applied, which hampers the replication and application of findings. **Aim:** To establish which interventions were part of the UK's most widely used approach to stroke physiotherapy; the Bobath Concept (BC). We focussed on a key aspect of physiotherapy; the treatment of postural control and mobility problems. **Participants and Methods:** Using a written questionnaire constructed from previous work to identify the interventions used to treat postural control and mobility problems (1), 62 physiotherapists who regularly treated hospital-based patients with stroke from 25 hospitals across the UK reported whether interventions were a part of the BC. Frequencies and percentages were calculated. Interventions were classified as follows: –'Definitely Bobath' if >75% of participants felt it was part of the BC; –'Not sure' if 51–75% felt it was part of the BC; –'not Bobath' if <50% of respondents thought it was part of the BC. **Results:** Interventions involving facilitation techniques, practising the components of activities and mobilisations were considered 'definitely Bobath'. Exercise and the use of equipment were 'not Bobath'. There was uncertainty about 'practising whole tasks' and 'arranging independent practice'. **Conclusions:** UK stroke physiotherapists consider facilitation, mobilisation and practicing the components of an activity to be the 'crux' of the BC. They exclude exercise and the use of equipment and are uncertain about practicing whole tasks and independent practice. These views contrast with those of the British and international teachers of the BC (2, 3). Consequently, it was impossible to define the interventions that represent the BC. This limits the feasibility of further research in to the Concept. Future research should focus on the effectiveness of specific, well-defined interventions.

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O24

IMPROVED UPPER LIMB FUNCTION IN CEREBRAL PALSY USING INTERNET-BASED HOME TRAINING

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Introduction: The value of movement-based therapy in treating chronic conditions such as stroke or cerebral palsy is well recognized. However, such interventions frequently require intensive practice in a rehabilitation setting over several weeks and are thus expensive in terms of time and resources. **Aim:** The purpose of this study was to determine the effectiveness of a low cost, internet-

based training program aimed at improving arm and hand function in adults with hemiplegic cerebral palsy. **Patients and Methods:** Nine adults with hemiplegic cerebral palsy participated in the study. An upper limb/hand training system consisting of a laptop, webcam, target light board, and hand manipulation/discrimination devices was installed in each participant's home. The training protocol included unilateral and bilateral sequential reach movements to computer-generated locations on the target board and a series of hand sensorimotor tasks. Each training session was approximately 40 min long and occurred 5 days/week for 8 weeks. Participants interacted with research personnel using webcams 2–3 times a week. Performance data generated during each session were transmitted to the laboratory via the internet. Depending upon the level of improvement, task difficulty was increased throughout the training period. **Results:** Internet-based home training was associated with a significant reduction in the duration of unilateral forward reach movements for both the affected and less affected arms ($p < 0.01$), including a decrease in the time required to reverse movement direction from forward extension to flexion ($p < 0.05$). During bilateral sequential reaching movements, reach duration also decreased as did the time needed to stop moving one arm and reach the target with the other arm ($p < 0.01$) regardless of the order of arm movement. The ability to pick up and turn over playing cards with the affected hand significantly increased as did the ability to manipulate and identify objects in the absence of visual feedback ($p < 0.01$). A significant improvement in fingertip tactile discriminatory ability using a custom-designed pattern discrimination task was also seen for the affected hand ($p = 0.02$). **Conclusion:** These results indicate that an 8 week home training program leads to significant improvement in arm and hand function in adults with hemiplegic cerebral palsy and demonstrates the effectiveness of existing internet technology in delivering movement-based therapy.

O25

DEVELOPMENT OF A FRAMEWORK FOR EVIDENCE-BASED CHOICE OF OUTCOME MEASURES IN NEUROLOGICAL PHYSIOTHERAPY

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Purpose: Neurological physiotherapists recognise the need to include standardised outcome measures in their clinical practice but lack of information about the available outcome measures hampers utilisation. This paper reports the first stage of a project to identify the most clinically feasible and clinimetrically robust outcome measures for use in neurological physiotherapy. The aim of this stage of the project was to identify the domains that physiotherapists need to measure during a neurological assessment, the results of which will be used to inform systematic reviews in stage 2. **Method:** Focus groups were held using 3 patient vignettes to represent the acute, rehabilitation and community settings. Thirty senior neurological physiotherapists participated and were asked 'what would you observe, test or measure if assessing this patient?' Each of the authors analysed the data using independent thematic content analysis to identify and define the items and domains. Internal and external member checking ensured validity. **Results:** Items from the data collection were classified in to 17 domains that physiotherapists need to measure: weakness; range of movement/contracture; pain; muscle tone/spasticity; sensation; ataxia/co-ordination; personal fatigue; oedema; subluxation; postural impairment; balance impairment; walking impairment; upper limb; balance disability; walking disability; mobility disability and falls. **Conclusions and Implications:** The 17 domains that physiotherapists need to measure during clinical assessment were identified. In the second stage of the project (which is currently underway) these domains will inform systematic reviews to identify the most robust outcome measures for use in clinical practice.

O26

PANAH: A NEW ELECTRONIC AID FOR BRAIN-INJURED INDIVIDUALS WITH PROSPECTIVE MEMORY AND EXECUTIVE FUNCTION DEFICITS

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Introduction: People with acquired brain injury often suffer from prospective memory and executive (e.g. planning, self-initiation) problems resulting in functional dependence in every day life. The recent development of electronic memory devices attempts to compensate for these difficulties. **Aim:** The study examined the use of PANAH, a computerized system using mobile phones to provide memory prompts for individuals with brain injury. **Patients and Methods:** A computerized system was developed using agent technology and artificial intelligence to provide memory prompts for the initiation of activities of daily living through mobile phone messages. An ABA design was used to compare self-initiated performance in remembering to carry out target tasks both prior to, with and after the use of PANAH. 6 individuals with acquired brain injury living at home were included in the study. For each subject, 5–6 target tasks were selected for which external prompting was necessary. Baseline observation was 2 weeks followed by 2 weeks of training, 2 weeks of observation with the use of PANAH and after discontinuation another 2 week observation period followed. **Results:** All subjects showed an increase in self-initiated activities following the introduction of the system, 4 subjects even achieved 100% compared to a baseline achievement ranging from 15 to 77%. After discontinuing the use of PANAH, 2 subjects dropped again to their initial level while 3 others remained at the same level of independent functioning. **Conclusions:** PANAH can be used as an effective aid for the compensation of memory and executive deficits following acquired brain injury allowing a greater independence in everyday life. It is as well useful as a training device to develop daily routines or as a permanent aid for prompting to carry out daily tasks. The use of mobile phones is user friendly and less stigmatising compared to other electronic memory devices. The software system still needs further development to overcome some practical difficulties and increase its effectiveness.

O27

THE EFFECT OF REHABILITATION IN PATIENTS WITH ACUTE AND SUBACUTE MYOCARDIAL INFARCTION

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The aim of this study was to evaluate the effect of comprehensive rehabilitation on cardiac risk reduction in elder patients with acute and subacute myocardial infarction (MI). **Patients and Methods:** A total 70 patients (78.9% male, 21.1% female, mean age 61.45±9.82 years) with acute and subacute MI, treated with percutaneous transluminal coronary angioplasty (PTCA), or with medicine, were randomized into this study. Patients took part for 16±4 days in a standard in-patient rehabilitation program including physical activity, psychological care, education programs. The following noninvasive tests were performed: 6 min walking test, veloergometry, spiroveloergometry. **Results:** All patients showed improvement in physical capacity and reduction of cardiac risk during rehabilitation. At the end of rehabilitation the best results of achieved work load (W; MET) and better life quality showed patients who were treated with PTCA ($p<0.05$). **Conclusions:** Following acute and subacute myocardial infarction with high cardiac risk, elder patients may participate in a standard rehabilitation program without serious complications and with a significant increase in physical capacity and psychosocial status.

O28

CARDIOVASCULAR RESPONSES DURING KNEE EXTENSOR ISOKINETIC STRENGTH TESTING IN CHRONIC HEART FAILURE PATIENTS

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Objective: To assess the effects of isokinetic tests on heart rate in stable chronic heart failure (CHF) patients. **Design:** Cross-sectional analysis of baseline data from CHF patients. **Subjects:** Twenty-five CHF patients (23 men, 2 women) of mean age 52.6±11.2 years participated in the study. **Methods:** After a 10-min warm-up on a cycle ergometer, one lower limb was tested on isokinetic dynamometer. Three successive repetitions of knee flexion-extension at an angular velocity of 60°.s⁻¹, 180°.s⁻¹ and 20-repetitions at 240°.s⁻¹ were realized. Heart rate was recorded on average over 5 sec and was analyzed at the start and end of each exercise. Then, peak $\dot{V}O_2$ was assessed during maximal incremental test on cycloergometer. **Results:** Maximal values of heart rate were obtained during incremental exercise testing (cycloergometer) with respective means of 117.6±22.0 bpm. This corresponds to 97.6±14.0 % of the maximal HR noted at peak $\dot{V}O_2$. **Conclusion:** This study confirms that muscle strength isokinetic tests for CHF patients must be performed under the supervision of experimented clinician, who should judge the value and feasibility of the endurance test. The lowest velocities and a small number of repetitions appeared as the most secure procedures.

O29

ENDURANCE TRAINING INCREASES AEROBIC CAPACITY BUT DOES NOT AFFECT ISOKINETIC LEG MUSCLE STRENGTH IN CHRONIC HEART FAILURE

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Background: In patients with CHF, physical reconditioning improves exercise tolerance and endurance capacity. However, there is no evidence that endurance training programs affect skeletal muscle strength in such patients. **Design:** The present study investigates the effects of endurance training on isokinetic skeletal muscle strength and on aerobic capacity in chronic heart failure (CHF) patients. **Methods:** Eleven stable CHF patients (8 men, mean aged 54.3 years. and women, mean aged 49.3 years.) participated in a classical controlled in-hospital 8-week endurance training program. Progressive incremental exercise tests with gas exchange analysis and isokinetic strength measurements of knee flexors and extensors were conducted in all subjects before and after training at different angular velocities (60, 180, 240°/s). **Results:** After training, peak $\dot{V}O_2$ improved significantly (from 16.3±3.3 to 20.7±4.0 ml/kg/min; $p<0.002$) as did New York Heart Association (NYHA) functional class (2.2±0.4 to 1.5±0.5; $p<0.001$). Conversely, isokinetic strength at all angular velocities studied was unchanged after the training program. **Conclusion:** Isokinetic muscle strength was not improved in CHF patients participating in an endurance training program. A combined endurance and resistance protocol might be helpful for these patients whose frequently altered muscle strength undoubtedly contributes to their poor quality of life for everyday activities.

O30

COMBINED ENDURANCE-RESISTANCE TRAINING VERSUS ENDURANCE TRAINING IN PATIENTS WITH CHRONIC HEART FAILURE

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Introduction: Exercise training is an important non-pharmacologic adjunct to the treatment of chronic heart failure (CHF). Despite persisting controversy, the effect of resistance training on muscle strength and endurance might be highly relevant to CHF patients. **Aim:** This study was designed to compare the effects of combined endurance-resistance training (CT) with endurance training (ET) only on sub-maximal and maximal exercise capacity, ventilatory prognostic parameters, safety issues and quality of life in patients with CHF. **Patients, Methods and Results:** Fifty-eight CHF patients (NYHA class II-III) were randomized either to 6 months CT ($n=28$, 58 years \pm 11, left ventricular ejection fraction [LVEF] 26% \pm 7, VO₂peak 18.1 ml/kg/min \pm 4.5) or ET ($n=30$, 59 years \pm 11, LVEF 23% \pm 9, VO₂peak 21.3 ml/kg/min \pm 6.2). The increase in steady state workload (SSW; +63% vs +31%, $p=0.007$) and the decrease in heart rate at SSW ($p=0.002$) were significantly larger in CT- compared to ET-trained patients. Maximal exercise capacity (i.e.; VO₂peak, maximal workload) and work-economy (Wattmax/VO₂peak) evolved similarly. VO₂peak halftime was reduced following CT ($p=0.001$). Maximal strength in upper limbs increased significantly ($p<0.001$) in favour of the CT-group. CT also had a beneficial effect on health-related quality of life; i.e., 60% of CT-trained patients versus 28% of ET-trained patients reported a decrease in cardiac symptoms (OR=3.86, 95% CI 1.11–12.46, $p=0.03$). There were no differences with regard to improved LVEF, evolution of left ventricular dimensions, nor outcome data (mortality and cardiovascular hospital admissions during follow-up). **Conclusions:** In CHF patients, CT had a more pronounced effect on sub-maximal exercise capacity, muscle strength and quality of life. The absence of unfavourable effects on left ventricular remodelling and outcome parameters is reassuring and might facilitate further implementation of this particular training modality.

Reference:

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O31

ENHANCEMENT OF ISOKINETIC MUSCLE STRENGTH WITH A COMBINED TRAINING PROGRAM IN CHRONIC HEART FAILURE

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Background: Patients with Chronic Heart Failure (CHF) exhibit an impaired exercised tolerance that dramatically limits their functional capacity and alters their quality of life. **Design:** The aim of this study was to compare the effects of two types of training programs on isokinetic muscle strength and aerobic capacities in patients with CHF. **Methods:** A group of 23 stable CHF patients included consecutively followed an exercise training program, 3 days a week during 8 weeks. The first group (P1, $n=11$) exercised on a cycloergometer during 45 min at 65% of peak $\dot{V}O_2$. The second group (P2, $n=12$) followed a 45 min combined bicycle and quadricipital strength training. Strength training consisted of 10 series of 10 repetitions at 70% of maximal voluntary force. Incremental maximal cardiopulmonary exercise tests as well as an isokinetic quadricipital dynamometry evaluation were performed before and after training. **Results and Conclusions:** In P1, peak increased by 20% (22.3 \pm 4.9 vs. 17.8 \pm 4.5 ml.min⁻¹. kg⁻¹; $p<0.05$)

without any significant change in isokinetic muscle strength. In P2, peak VO₂ improved within the same range (20.5 \pm 2.8 vs. 18.6 \pm 3.7 ml.min⁻¹.kg⁻¹; $p<0.01$). This last rehabilitation program significantly increased isokinetic muscle strength at each angular velocities (+10.5 \pm 13.5%; +5.6 \pm 7.0; $p<0.03$, 180°.s⁻¹ and 60°.s⁻¹, respectively). Only the combined endurance/strength training program was associated with an improvement in both peak VO₂ and peripheral muscle strength, two significant parameters of outcome and quality of life in CHF.

O32

REPRODUCIBILITY OF THE SELF-CONTROLLED SIX-MINUTE WALKING TEST IN HEART FAILURE PATIENTS

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Introduction: The six-minute walk test (6WT) has been proposed to be a submaximal test, but could actually demand a high level of exercise intensity from the patient, expressed by a respiratory quotient (RQ) >1.0, following the guideline recommendations. Standardizing the 6WT using the Borg scale was proposed to make sure that all patients undergo a submaximal walking test. **Purpose:** To test the reproducibility of the 6-min treadmill cardiopulmonary walk test (6CWT) using the Borg scale and to make sure that all patients undergo a submaximal test. **Methods:** Twenty-three male heart failure patients (50 \pm 9 years) were included; these patients had both ischemic (5) and non-ischemic (18) heart failure with a left ventricle ejection fraction of 23 \pm 7%, were diagnosed as functional class NYHA II-III and were undergoing optimized drug therapy. Patients were guided to walk at a pace between 'relatively easy and slightly tiring' (11 and 13 on Borg scale). The 6CWT using the Borg scale was performed two times on a treadmill with zero inclination and patient control of speed with an interval of 24 h. During the sixth minute, we analyzed ventilation (VE, L/min), RQ, Oxygen consumption (VO₂, ml/kg/min), VE/VCO₂ slope, heart rate (HR, bpm), systolic blood pressure (SBP, mmHg), diastolic (DBP, mmHg) blood pressure and distance. **Results:** The intraclass correlation coefficients at the sixth minute were: HR ($r=0.96$, $p<0.0001$), VE ($r=0.84$, $p<0.0001$), SBP ($r=0.72$, $p=0.001$), distance ($r=0.88$, $p<0.0001$), VO₂ ($r=0.92$, $p<0.0001$), SlopeVE/VCO₂ ($r=0.86$, $p<0.0001$) and RQ<1 ($r=0.6$, $p=0.004$). **Conclusion:** Using the 6CWT with the Borg scale was reproducible, and it seems to be an appropriate method to evaluate the functional capacity of heart failure patients while making sure that they undergo a submaximal walking test.

O33

EFFECT OF MULTI-DISCIPLINARY REHABILITATION IN HEART FAILURE PATIENTS

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Emotional dysfunction is well-known in coronary and heart failure (HF) patients. Possibly better health outcomes in HF could be associated not only with physical but with multi-disciplinary rehabilitation involving psychological intervention. **Aim:** To assess the effect of multi-disciplinary rehabilitation in patients with HF and affective disorders. **Patients and Methods:** Comparative study was performed. 301 patients (197 men and 104 women, age, 60 \pm 1.4 years, left ventricular ejection fraction, 49 \pm 2.4%) with HF (NYHA I:II:III:IV as 9%: 47%: 36%: 8%) after stabilization of standard drug treatment were involved into physical rehabilitation ($n=169$), psychological intervention ($n=25$) and control ($n=107$) groups. The rehabilitation programme includes 3–5 days/week walking sessions lasting 20–60 min. Walking

velocity level was individually ranged according to perceived dyspnoea, fatigue, palpitation. The psychological intervention includes 6 sessions (18 h) of relaxation therapy. 6-min walk test (6MW), quality of life (QoL) (SF-36), depression and anxiety (Spielberger and Zung self-rated scales) were assessed at baseline, pre-discharge, 3 and 12 months after discharge. *Results:* At baseline HF patients were depressed and anxious in 52% and 95% cases respectively. The expected outcome of the physical rehabilitation was associated with 6MW and QoL increase ($p<0.05$). Physical rehabilitation was also associated with reduction in depressive symptoms and anxiety ($p<0.02$). The effect of relaxation therapy was associated with anxiety decrease ($p<0.02$), QoL increase ($p=0.001$). In addition patients involved into relaxation intervention demonstrated better 6MW ($p<0.001$). In the control group 6MW and quality of physical, emotional and social functioning were lower during the whole 12-months period. Affective disorders decrease was not observed in the control group. *Conclusion:* Multi-disciplinary (physical and psychological) rehabilitation in heart failure patients with affective disorders suggests better quality of life, mental and physical health outcomes.

O34

PSYCHOMETRIC PROPERTIES OF THE GERMAN VERSION OF THE MACNEW HEART DISEASE QUALITY OF LIFE QUESTIONNAIRE

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Introduction: The MacNew Heart Disease Quality of Life Questionnaire (MacNew) was developed to measure health related quality of life in patients participating in cardiac rehabilitation. It contains 27 items subdivided to three scales: an emotional scale, a social scale and a physical scale. The time frame of the questionnaire is scheduled for two weeks. International studies yield a satisfying validity, reliability and sensitivity of the MacNew (Höfer et al., 2004). Investigations of the psychometric properties of the German version of the MacNew in the German rehabilitation system is still pending. *Aim:* The aim of this work is to investigate the psychometric properties (acceptance, internal consistency, factor structure, sensitivity) of the German version of the MacNew. *Patients and Methods:* The MacNew was filled out by 3611 inpatients from 36 cardiac rehabilitation centres at the beginning (t0) and the end of rehabilitation (t1). The mean age was 69.7 years (SD=7.3). 35.2% of the patients were women. Cardiac events included myocardial infarction (45.6%), Bypass operation (43.9%), PTCA (39.6%) and valve operation (18.7%). *Results:* Two items had more than 7% missing data: For item 17 (limitations in doing sports or exercising) 10.1% were missing and for item 27 (limitations in sexual intercourse) 25.1%. For 84.5% of the patients all scales could be computed. We found neither floor nor ceiling effects. Response rate at t1 was 87.8%. Internal consistency was $\alpha=0.78$ for the physical scale, $\alpha=0.88$ for the social scale, $\alpha=0.93$ for the emotional scale and $\alpha=0.94$ for the global scale. Confirmatory factor analysis could not reproduce the proposed factor structure ($\chi^2=3342,185$; $df=227$; $p<0.001$; CFI=0.93; RMSEA=0.062). The effects found between t0 and t1 ranged from $d=0.80$ (emotional scale) to $d=0.91$ (global scale). For 63.9% the improvement was clinically important (Dixon et al., 2002). *Conclusion:* The MacNew is an accepted, internal consistent questionnaire to assess the health related quality of life of inpatients participating in cardiac rehabilitation. Furthermore the MacNew is applicable for measuring changes during cardiac rehabilitation. Its proposed structure of three factors could not be confirmed. As Dempster et al. (2004) proposed future research should focus on finding a better fitting factorial structure.

O35

THE EFFECTS OF COENZYME Q₁₀ IN EARLY REHABILITATION AFTER ACUTE CORONARY SYNDROME

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Aim: To investigate the effect of coenzyme Q₁₀ (CoQ₁₀) on the changes of several functional and biochemical parameters during early rehabilitation after acute coronary syndrome (ACS). *Methods:* 2–4 weeks after ACS the patients started with 50 min exercise therapy sessions three times a week with an overall length of 12 weeks. 58 patients were randomized into 2 subgroups: 31 patients received CoQ₁₀ (gelatine capsule form CoQ₁₀ dissolved in soya bean oil, Pharma Nord)100/200 mg/day (1/7 weeks) and 27 patients received placebo according to the similar scheme. The patients underwent breath-by-breath bicycle cardiopulmonary testing before and after the rehabilitation programme, while the functional indices of cardiorespiratory system, the markers of cardiometabolic risk factors and oxidative stress were measured: peak oxygen consumption and maximal workload, total cholesterol, HDL-cholesterol, LDL-cholesterol, triglycerides, ultra-sensitive C-reactive protein, conjugated dienes, baseline conjugated dienes, oxidized LDL and human autoantibodies against oxidized LDL. *Results:* After administrating the CoQ₁₀ in early rehabilitation after ACS most of the indices of cardiorespiratory reserve and functional capacity revealed a significant increase. In the study group the improvement in aerobic capacity was more significant than in the control group. The markers of cardiometabolic risk and oxidative stress did not demonstrate statistically significant change neither in the study group nor in the control group.

Table I. The improvement in the indices of cardiorespiratory function and exercise capacity in early rehabilitation after ACS

	Coenzyme Q ₁₀ x ^o ±Sx	Placebo x ^o ±Sx
1. Oxygen consumption at anaerobic threshold (VO ₂ AnTh; ml/min/kg) before	17.43±3.73	16.91±3.70
2. Oxygen consumption at anaerobic threshold (VO ₂ AnTh; ml/min/kg) after	19.83±4.63**	19.10±4.54*
3. Workload at anaerobic threshold (WAnTh;watts) before	105.38±24.37	95.19±31.91
4. Workload at anaerobic threshold (WAnTh;watts) after	119.47±37.93*	110.43±34.44*

O36

AMBULATORY LEFT VENTRICULAR ASSIST DEVICES: OUTCOMES OF AN INPATIENT REHABILITATION PROGRAM

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Introduction: The past decade has seen the development of implantable left ventricular assist devices (LVAD) as a management option for end stage heart failure. LVAD therapy improves cardiac output and exercise capacity (1), and may be used as bridging therapy (whilst awaiting heart transplantation) or as destination therapy (to prolong life for end stage disease). There is a paucity of information regarding the role of multidisciplinary rehabilitation for this condition (2). *Aim:* To provide an overview of the rehabilitation management of this condition by way of a case series. *Patients and Methods:* A retrospective audit of data from consecutive admissions to the Sacred Heart Rehabilita-

tion Unit between 2004 and 2007 following insertion of LVAD. **Results:** A total of 9 patients were admitted for rehabilitation. Mean admission Functional Independence Measure (FIM) was 91, and mean discharge FIM was 100. Complications included embolic stroke, arrhythmia, cardiac failure, and infection. Improvements in exercise parameters were achieved. **Conclusions:** The main role of rehabilitation following LVAD insertion is for those patients with severe debility and for neurological complications. Rehabilitation improves physical function, but precise guidelines for exercise training are yet to be determined. The LVAD is a complex device and medical complication rates are relatively high.

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O37

FUNCTIONAL CLAUDICATION DISTANCE: A RELIABLE MEASUREMENT TO ASSESS WALKING CAPACITY IN PATIENTS WITH INTERMITTENT CLAUDICATION

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Introduction: Disease severity and functional impairment in patients with intermittent claudication is usually quantified by the measurement of pain-free walking distance (intermittent claudication distance (ICD)) and maximal walking distance (absolute claudication distance (ACD)). However, the distance at which a patient would prefer to stop because of claudication pain is a much more accurate reflection of functional capacity in patients with intermittent claudication. We conducted a study in which the distance a patient prefers to stop was defined as the functional claudication distance (FCD), and estimated the reliability of this measurement. **Aim:** The aim of this study was to determine the reliability of FCD compared to the reliability of ICD and ACD. **Patients and Methods:** In this clinical reliability study, patients with intermittent claudication, following a supervised exercise program, were recruited from private physiotherapy practices. Inclusion criterion was intermittent claudication with an ACD of <1600 m on a standard progressive treadmill test. Exclusion criteria were the inability to walk on the standard treadmill protocol and reasons for discontinuing the treadmill test other than intermittent claudication. Enrolled patients performed a standard treadmill protocol twice within a period of three weeks. During each treadmill test ICD, FCD and ACD were determined. The primary endpoint was the reliability of walking distances as represented by the calculated intra-class correlation coefficients (ICC) and coefficients of variation (CV). The ICC may be between 0 and 1, in which 0 means not reliable and 1 highest reliability. CV represent the extent of variability between two repeated measurements. **Results:** Fifty-seven patients were included in this study. For one patient no FCD was measured, for unknown reasons, resulting in 56 patients available for the reliability analysis of FCD. The ICC of ICD, FCD and ACD were 0.940, 0.959, and 0.975, respectively. CV showed similar results, with 21.7%, 18.8%, and 13.2% respective variability between two measurements for ICD, FCD, and ACD. **Conclusion:** FCD is a highly reliable measurement for determining functional capacity in trained patients with intermittent claudication. This measurement could be used alongside or instead of ICD in future studies.

O38

COMMUNITY-BASED SUPERVISED EXERCISE THERAPY FOR INTERMITTENT CLAUDICATION: ONE YEAR RESULTS

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Introduction: Exercise therapy is a highly efficacious treatment for symptomatic relief in patients with intermittent claudication. Supervised exercise therapy (SET) is superior to non-supervised exercise programs (1). Results in literature are based on SET in a clinical setting. The major disadvantage of clinic-based SET is limited capacity. Furthermore, transport of patients to the hospital is expensive and time consuming. Therefore, a community-based concept of SET was developed (2). In this concept, patients with intermittent claudication are referred to trained private physiotherapists, equally dispersed over the region. **Aim:** The aim of this study was to determine effects after one year of SET in a community-based setting. **Patients and Methods:** All consecutive patients presenting at the vascular outpatient clinic with intermittent claudication, starting with community-based SET were potentially eligible. Exclusion criterion was the inability to walk the baseline treadmill test. SET was administered according to the guidelines of the Royal Dutch Society for Physiotherapy (3). At baseline and at 1, 3, 6 and 12 months of follow up a progressive treadmill exercise test was administered. Primary outcome measurement was mean increase in percentage of absolute claudication distance (ACD) compared to baseline. **Results:** From January 2005 through July 2006, 248 consecutive patients started community-based SET. After 12 months, 121 patients completed the program. Fifteen patients discontinued, stating they were satisfied with the regained walking distance. Main reasons for the remaining 112 patients for discontinuing were intercurrent disease, dissatisfaction with their walking distance and insufficient motivation for continuing the program. Mean percentages increase in ACD after 1, 3, 6 and 12 months were 84%, 172%, 198%, and 199%, respectively ($p < 0.001$). **Conclusion:** Supervised exercise therapy in a community-based setting is a promising approach to provide conservative treatment for patients with intermittent claudication.

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O39

SUPERVISED EXERCISE THERAPY FOR RECURRENT COMPLAINTS OF INTERMITTENT CLAUDICATION AFTER A PREVIOUS SUCCESSFUL VASCULAR INTERVENTION: LOW RISKS AND HIGH YIELD

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Introduction: Exercise therapy is recognised as the primary treatment for patients with intermittent claudication. If there is a role for

exercise therapy as secondary treatment is unknown. *Aim:* This pilot cohort study investigates whether supervised exercise therapy has clinical benefits in patients with recurrent complaints of intermittent claudication after a previous successful peripheral vascular intervention. *Patients and Methods:* Consecutive patients were included returning to the vascular surgery outpatient clinic with recurrent complaints of intermittent claudication after a successful vascular intervention at least one year before and with a restenosis of at least 50% in the previous treated arterial segment. Patients received a standard program of community based supervised exercise therapy according to the national physiotherapy society guideline. Main exclusion criterion was the inability to walk the baseline treadmill test for at least 10 m. Main outcome measurements: initial claudication distance (ICD) and absolute claudication distance (ACD), measured by a progressive treadmill test at baseline and at one, three, and six months of follow-up. *Results:* Twenty-three consecutive patients were included. A total of 60.9% of patients completed the supervised exercise therapy program. The mean percentage of increase of ICD was 411% ($p=0.002$) after a follow-up of 6 months. The increase in ACD at 6 months was 317% ($p=0.002$). In none of the patients who completed the program, a re-intervention occurred. *Conclusion:* Sixty percent of patients with recurrent complaints of intermittent claudication after a previous successful vascular intervention, have clinically significant benefits of a supervised exercise therapy program. These benefits include facilitating their quality of daily life, as well as evasion of a second vascular procedure with associated morbidity and mortality. This study forms the basis for further research on expanding the indications for supervised exercise therapy.

O40

RELIABILITY OF TREADMILL TESTING IN PERIPHERAL ARTERIAL DISEASE – A META-REGRESSION ANALYSIS

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Background: Treadmill testing is the primary assessment tool for evaluating walking ability in patients with peripheral arterial disease. Different treadmill protocols are being used, both several continuous (C-) as well as graded (G-) protocols. Outcome measures reported are the initial claudication distance (ICD) and the absolute claudication distance (ACD). The use of different protocols might hamper the ability to compare results of different studies. Ideally, future studies should use a treadmill protocol that has the highest reliability. *Patients and Methods:* We conducted a meta-analysis to identify the most reliable treadmill protocol. Reliability was assessed by the intraclass correlation coefficient (icc), which may be between 0 (not reliable) and 1 (highest reliability). We searched Medline (until February 2008) and hand searched the reference list for relevant articles. There were no restrictions on language. Randomised controlled trials assessing reliability of treadmill testing were identified. Inclusion criteria were the use of a C- or G-protocol, repetition of the protocol within 3 weeks and a reported or calculated icc. We developed a meta-regression method for the icc, which was applied to identify dependency of the C- and G-protocol and velocity and grade of the treadmill on the ICD and ACD. *Results:* We identified 8 studies in which 658 patients were included. Meta-regression analysis showed reliability of the ICD of the C- and G-protocol (as assessed by the icc) of 0.85 and 0.83 respectively, without dependency of the reliability on velocity or grade. For the ACD reliability was significantly better for the G-protocol (0.94) than for the C-protocol; reliability of the C-protocol was dependent on grade of the treadmill (0%, 10% and 12%) with an mean icc of 0.76, 0.89, and 0.9, respectively. *Conclusions:* A graded treadmill assessment protocol has the highest reliability using the absolute claudication distance as outcome measurement.

O41

MANUAL DRAINAGE WITH OR WITHOUT DEEP OSCILLATION® IN LOWER EXTREMITY OEDEMA

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Purpose: Post thrombotic syndrome and lymphatic disease are a major source of oedema. Once developed, it becomes a chronic and substantial problem, with no ideal method of reduction. Manual drainage (MD) is frequently used but its efficacy, alone, is limited. Add the deep oscillation® of the Hivamat®200 an interesting effect? The purpose of this study was to evaluate whether MD and Hivamat® applied separately or simultaneously increase the reduction of oedema and to assess the relative merits of each treatment. *Method:* From Sept 1st to Nov 30th 2007, 10 consecutive patients (3 males, 7 females; mean age 40 years, range 83 to 55 years) with unilateral old oedema (6 phleboedemas – PO – and 4 lymphoedemas – LO) of the lower limb were included in this study. MD and Hivamat® were used twice: once separately, once simultaneously. The 16 min session of the 3 procedures were spaced in time by 15 min rest. The order of execution offered 6 possibilities and was at random permuted after each case. Using a Hg plethysmograph (SeriMed PL2) gauge fitted at 10 cm below the knee, relative volumetric variation was assessed continuously during all the study (108 min). *Results:* Whatever the technique, all limbs experienced a progressive calf reduction. Volumetric calf decrease reaches 0.0902 % ∂ V/min manually, 0.0711 % ∂ V/min by mean of Hivamat® and 0.1568 % ∂ V/min by mean of simultaneously methods. These data show that the combined method promote greater decongestion than the MD alone, MD decongestion whose is superior to the Hivamat® alone. Our study failed to detect major differences between PO and LO, possibly related to the small number of subjects. Further studies in a larger number of patients are needed to clarify the involved mechanism and differences between methods. *Conclusion:* This small study suggests that the addition of Hivamat® to the MD could improve treatment outcome in patients with lower limbs oedema. Subjects did not feel any discomfort. No adverse reactions were recorded.

O42

VALIDATION OF THE DUTCH VERSION OF THE WALKING IMPAIRMENT QUESTIONNAIRE

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Introduction: The Walking Impairment Questionnaire (WIQ) is a frequently used method to evaluate patients with peripheral arterial disease (PAD). The WIQ was validated in the English language in 1990 and evaluates the degree of walking impairment in patients with intermittent claudication (IC) on a scale from 0 to 1. The WIQ is a short and easy questionnaire containing three domains; walking distance, speed and the ability to climb stairs. *Objective:* The aim of this study is to validate the Dutch version of the Walking Impairment Questionnaire (WIQ) for patients with symptomatic peripheral arterial disease (PAD). *Patients and Methods:* Translation of the WIQ was performed according to the formal forward-backward translation method. Cultural adaptation took place for the first domain, walking distance, in which 'American feet' and 'living blocks' were translated into meters. Hundred and twenty patients filled out the Dutch version of the WIQ, as well as two generic quality of life questionnaires, RAND-36 and EuroQol. To measure the functional (FCD) and absolute claudication distance (ACD) a treadmill test was performed. Applicability, expressed as concurrent validity, construct validity and internal consistency, was determined by comparing three domains of the WIQ with the quality of life

questionnaires and walking distances as described above. *Results:* The concurrent validity, expressed as the Spearman rank correlation coefficient between the WIQ and ACD, was 0.50 ($p < 0.001$). The correlation coefficient of the construct validity between the WIQ and the EuroQol was 0.40 ($p < 0.001$). Significant correlations were found between the WIQ and three domains of the RAND-36. Clinical relevance of the WIQ was shown by dividing the total scores of the WIQ in tertiles (0–0.32, 0.32–0.51 to 0.51–0.96) and calculating the corresponding means of the ACD (170 m (SD 66), 300 m (SD 134) to 352 m (SD 184)). Internal consistency determined by Cronbach's alpha was 0.92. *Conclusion:* This study shows that the Dutch version of the WIQ is a valid and reliable instrument for measuring walking impairment in patients with intermittent claudication.

O43
COMMON GOALS IN MEDICAL REHABILITATION OF OSTEOARTHRITIS AND CARDIOVASCULAR DISEASES

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Aim: The purpose of this review is to point out the common goals of the medical rehabilitation in cardiovascular disease and osteoarthritis. *Materials and Methods:* We studied 52 elderly patients, 25 men and 27 women, diagnosed with 1st degree HTA, moderate osteoarthritis. In addition all patients present different risk factors for the cardiovascular and osteoarthritis. The rehabilitation program, with a duration of 6 months consisted of 60 min/day of moderate physical activity, 5 days per week. The physical training hour has been structured into 3 parts. As general assessment tool of life quality in medical rehabilitation management of cardiovascular and arthritis patient was used Functional Independence Measure (FIM) score. *Results:* After 6 months of moderate physical training all patients have presented a decrease of the systolic and diastolic values of the arterial blood pressure and improvement of characteristic lab parameters. The weight loss and the decrease of the waist's circumference have been noticed. All patients have presented an improvement of the articulate mobility, of the muscle tone and also a pain decrease and joints stiffness decrease. FIM score had an improvement of 50% from baseline. *Conclusions:* A regular physical activity is extremely important in order to maintain the health, having beneficial effects for the arterial hypertension and also for the osteoarthritis: improves the functional capacity of the patient, reduces the risk factors and/or aggravation for the main diseases, increasing the patients' quality of life.

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2. Hochberg MC, et al. Guidelines for the medical management of osteoarthritis. Part II. Osteoarthritis of the knee. *American College of Rheumatology. Arthritis Rheum* 1995; 38: 1541–6.

O44
BODY BIOELECTRICAL IMPEDANCE IN DIABETES MELLITUS AND THE MODIFICATIONS PRODUCED BY CARDIO-RESPIRATORY PHYSICAL ACTIVITY

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Introduction: In Diabetes Mellitus type II there is scientific evidence of the modification of body composition. *Aim:* To evaluate,

using bioelectrical impedance analysis (BIA), the body composition between healthy subjects and diabetics; and to evaluate the effect of programmed aerobic physical activity in patients with diabetes mellitus type II. *Materials and Methods:* 50 subjects. 25 healthy subjects and 25 diabetics. Determined: Age, sex, body mass index (BMI), glycemia, heart rate and blood pressure. Calculated by BIA: Total body water (TBW), intracellular water (ICW), extracellular water (ECW), fat free mass (FFM) and total fat mass (TFM). 17 diabetics were included in a program of cardio-respiratory physical activity 3 days a week for 2 months. Glycemia, six minutes walking test and BIA were obtained pre and post-activity. *Results:* Statistically significant differences ($p < 0.05$) were found among groups:

	Diabetic	Non-diabetic
Age (years)	54.3	49
BMI	32.6	26.6
Fat mass (%)	40.6	33.4
Muscle mass (%)	59.4	65.7
Impedance		
1 KHz	555.8	621.5
50 KHz	476.2	531.8
Reactance		
50 KHz	88.2	98.3
100 KHz	70.44	78.6

The BIA and the six min walking test results improve in the diabetic group after the physical program ($p < 0.05$). A moderately negative correlation was observed between the BMI and the impedance results ($p = 0.01$), and between the age and reactance ($p = 0.003$). The glycemia obtained a positive correlation with the impedancimetry ($p = 0.003$). *Conclusions:* 1) There are differences in body composition between diabetics and non-diabetics. 2) The BIA shows a correlation between BMI and glycemia in diabetics. 3) The impedance values decrease approaching those of non-diabetics, which is correlated to the modification in the body composition. 4) There is an improvement in the respiratory function and a decrease in the glycemia in diabetics after a programmed aerobic physical activity.

Reference:

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O45
EVALUATION OF OSTEOPOROSIS WITH PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY AND FACTORS INFLUENCING BONE LOSS IN PARAPLEGIA

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Aim: To compare changes in bone parameters in paraplegic men and able-bodied controls and to assess the influence of factors in bone loss. *Patients and Methods:* To calculate bone parameters: bone mineral density (BMD) trabecular, BMD total and BMD cortical, cortical thickness and Stress Strain Index, a bone strength estimator at 14% (SSIPol2) and 38% (SSIPol3) of the tibia length proximal to the distal end of the tibia, and to study the influence of positive and negative factors (age at injury, duration of paralysis (DoP), spasticity, ambulation and daily activities) on bone structure, 31 complete chronic paraplegic men (>1.5 years) separated in group A [$n = 16$, Thoracic (T) 4–T 7 neurological level of injury (NLoI)] and group B ($n = 15$, T 8–T 12 NLoI) compared with 30 healthy men as control group, were examined by peripheral quantitative computed tomography (p QCT XCT-3000, Stratec, Germany) in distal epiphyses and midshafts of the tibia. *Results*

and Conclusion: In groups A (mean age: 26.8 years, DoP: 6.3 yrs) and B (mean age: 37 years, DoP: 4.3 years) all bone parameters were significantly decreased ($p=0.001$), compared with controls. A higher loss of trabecular bone is observed in high paraplegics meaning that the cortical shell is more affected in low paraplegics. The use of standing frames or long braces orthoses resulted in significantly higher bone mass (BMD trab, BMD tot) and geometric parameters (cortical thickness), independently of the functional level, suggesting a positive effect in bone. No significant relationships were found between bone loss and any other of positive and negative factors.

Reference:

1. Dionyssiotis Y, et al. Bone loss and mechanical properties of tibia in spinal cord injured men. *J Musculoskelet Neuronal Interact* 2007; 7: 62–68.

O46

MECHANICAL PROPERTIES OF THE DISTAL TIBIA IN HIGH LEVEL COMPLETE SPINAL CORD INJURED (SCI) MEN ARE SIGNIFICANTLY DECREASED IN COMPARISON TO LOW LEVEL COMPLETE SCI

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Introduction: The importance of the Neurological Level of Injury (NLoI) in mechanical strength of paraplegics' legs is inadequately investigated. **Aim:** To compare possible changes in mechanical properties of tibia in SCI patients with NLoI>Thoracic (T) 7 vs. patients with NLoI between T7 and T12. **Patients and Methods:** Twenty four men were studied: 16 had complete chronic SCI separated in group A [$n=8$, high paraplegia: T4–T7 NLoI, mean age: 26.8 years, Duration of Paralysis (DoP): 6.3 years] and group B [$n=8$, low paraplegia: T8–T12 NLoI, mean age: 37 years, DoP: 4.3 years] compared with 8 healthy men (group C). All underwent peripheral quantitative computed tomography (p QCT XCT-3000, Stratec, Germany) of the left tibia. Bone Mineral Density (BMD) trabecular, BMD total, were measured at 4%, Stress Strain Index (SSI2) at 14% and BMD cortical, Stress Strain Index (SSI3) at 38% of the distal end of the tibia. SSI difference (δSSI_{2-3}) was calculated between 14% and 38% sites. **Results:** Compared to group C SCI patients had significantly decreased BMD (p -value<0.0005 for C group vs. T4≤NLoI≤T7 group and vs. T8≤NLoI≤T12 group), indicating severe bone loss. Concerning the NLoI, SSI difference between 14% and 38% sites (δSSI_{2-3}) was significantly increased in group B compared to A, ($p=0.03$). **Conclusion:** These differences between groups A and B in δSSI_{2-3} despite the similarity in BMD maybe attributed to differences in loading. The NLoI, adversely affect the bone strength in the distal tibia.

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O47

BODY COMPOSITION IN SPINAL CORD INJURED MEN

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Introduction: Spinal cord injured (SCI) subjects lose lean tissue mass and bone but gain body fat. **Aim:** This study describes differences in total body, upper and lower limbs in lean mass (LM), fat mass (FM), bone mineral content (BMC), and body mass index (BMI) between persons with paraplegia following SCI and controls. The influence of the duration of paralysis in relation with regional LM, FM, BMC and total body composition was also investigated. **Patients and Methods:** To estimate regional (upper and lower limbs) and total body BMC (g), lean and fat tissue mass (g) whole body dual X-ray absorptiometry (DXA, NORLAND X-36, USA) was used in 64 men (mean age 32.3 years), 31 with complete traumatic spinal cord injury in chronic stage (>1.5 years), Thoracic (T) 4–T 12 neurological level of injury compared with 33 able bodied controls of similar age, height, and weight. **Results:** BMI was significantly decreased in paraplegics. BMC and LM were significantly decreased and FM was increased ($p<0.0005$) in the lower limbs and in the total body composition in paraplegic patients compared with controls. The correlation of BMI with FM was statistically significant in paraplegics and controls ($r=0.57$, $p=0.001$ and $r=0.73$, $p=0.0001$, respectively). Upper limbs' FM was correlated with the duration of paralysis in total paraplegic group ($r=0.43$, $p=0.020$). **Conclusion:** These results suggest the development of significant alterations in body composition of chronic SCI men.

Reference:

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O48

A STUDY OF BONE MINERAL DENSITY IN DISABLED ADULTS AT A NATIONAL REHABILITATION HOSPITAL

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Background: Patients with disability are at risk of falling. They may also have other risk factors for osteoporotic fractures including vitamin D deficiency, periods of prolonged immobilisation and hypogonadism. **Aim:** To examine prevalence of increased fracture risk among disabled adults, using World Health Organisation diagnostic categories of low bone mineral density. **Design, Subjects, Setting:** Cross-sectional study of adult patients at the National Rehabilitation Hospital Dublin, disabled for at least 3 months due to acquired brain injury, spinal cord injury, other neurological condition or lower limb amputation. **Methods:** Subjects completed a questionnaire, had laboratory investigations including measurement of 25-hydroxyvitamin D, and had DXA (dual energy X-ray absorptiometry) of the lumbar spine and at least one hip. **Results:** There were 255 participants, 178 males, 77 females. Mean age was 48.7 years (SD15.6). Vitamin D deficiency occurred in 56 (22%), insufficiency in 104 (40.8%). Low bone mineral density occurred at at least 1 site in 51.8% of patients, 37 (14.5%) with Z-score below expected range for age, 59 (23.1%) with osteopenia and 36 (14.1%) with osteoporosis. At the hip, 43.6% had low BMD, 25 (9.9%) with Z-score below expected range for age, 54 (21.4%) with osteopenia and 31 (12.3%) with osteoporosis. On linear regression analysis, ambulatory status and duration of disability were independent predictors of BMD at neck of femur ($p=0.002$, $p=0.001$, respectively) and total proximal femur ($p<0.001$ for both). **Discussion:** In over half of our patients with a disability, fracture risk is at least doubled at a minimum of one site, risk increasing with time since disability. **Conclusion:** All disabled patients who are unable to walk out of doors at 3 months post-onset of disability should have DXA assessment.

O49

THE EFFECT OF EXERCISE IN THE IMPROVEMENT OF THE BOND DENSITY IN PATIENTS WITH OSTEOPOROSIS UNDER PHARMACEUTICAL TREATMENT WITH TERIPARATIDE

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Aim: The aim of this study is to present the preliminary results of the effect of exercise in the improvement of the bone density in elderly patients with osteoporosis under pharmaceutical treatment with Teriparatide. **Material and Method:** During the last three years, Teriparatide was administered to 63 patients (53 women and 10 men) with mean of age the 75 years (range 65–80). The indication for Teriparatide administration was established senile osteoporosis as documented by DEXA. At initial evaluation of osteoporosis using this method, the mean measurement of loss of bone density was 26% (range 19–28) before commencement of therapy Tscore L₁-L₄ was 3.7 (range 3.2–4.2), Zscore L₁-L₄ 2.6 (range 1.9–2.6). All patients were submitted to a complete laboratory, biochemical and radiological investigation including complete blood count, serum calcium, 24 h urinary calcium, thyroid function tests (T₃, T₄, TSH), phosphate, magnesium, calcitonin, and X-rays of pelvis, hips and lumbar spine to investigate the presence of osteoporotic fractures. The duration of treatment was 18 months with concurrent administration of calcium and vitamin D₃. Two groups of patients were compared, group A composed of 36 patients (30 women and 6 men), who simultaneously with the pharmaceutical treatment were submitted in weekly program of exercise with 3 h walking or swimming and 2 h of muscular strengthening exercises and group B composed of 27 patients (23 women and 4 men), who were treated only with pharmaceutical treatment. **Results:** After the expiry of treatment, the measurement of bone density using the DEXA method and the remaining clinical/laboratorial control revealed significant increase in the bone mass and a definite improvement of the biochemical parameters in all patients. The mean loss of bone mass, twelve months after initiation of therapy, was 18% (range 17–24%), Tscore L₁-L₄ 3.2 (range 3.1–3.9), Zscore L₁-L₄ 1.5 (range 1.4–2.0) for the patients of group A, while the mean loss of bone mass for group B was 20% (range 19–24%), Tscore L₁-L₄ 3.5 (range 3.3–3.9), and Zscore L₁-L₄ 1.7 (range 1.6–2.0). At the end of treatment (18 months duration), the mean loss was 8% (range 7–14) Tscore L₁-L₄ 3.1 (range 2.9–3.5), Zscore L₁-L₄ 1.3 (range 1.1–1.4) for the patients of the group A and for the group B the mean loss was 10% (range 9–14) Tscore L₁-L₄ 3.3 (range 3.0–3.8), Zscore L₁-L₄ 1.4 (range 1.2–1.4). **Conclusions:** According to the above findings, we consider that the results till now are promising. The use of Teriparatide in patients with established osteoporosis shows that it opens new horizons for the future treatment and confrontation of the illness. There are strong evidence that it helps to the reduction of risk for fractures, the reduction of pain and generally the improvement of quality of life in individuals of third age with osteoporosis. These are more efficiently in combination with the physical exercise.

O50

BONE QUALITY, VERTEBRAL FRACTURES AND CALCIUM INTAKE IN A POPULATION-BASED STUDY IN SOUTHERN ITALY

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Introduction: A low dietary calcium intake is an important risk factor for osteoporosis and reduction of bone strength, related to

modifications of quantity and quality of bone structure. Quantitative Ultrasound (QUS) gives us information about both bone quality and quantity. Calcium requirements are high and increase in elderly. In general calcium supplements are of importance in preventing bone loss and in reducing fracture risk in subjects with a low calcium intake. **Aim:** The aims of our study were to quantify nutritional calcium intake in a population of post-menopausal women living in Southern Italy and to compare this and stiffness values to presence and number of vertebral fractures. **Patients and Methods:** We examined 741 post-menopausal women. 581 women had prevalent vertebral fractures measured through computerized morphometric examination. 160 women had not any vertebral fracture. We measured bone mineral density and calcaneal bone stiffness by QUS. **Results:** In our sample population, the mean daily calcium dietary intake was 480.63 mg/die. It was slightly higher in no fractured women (mean 502.88 mg/die), than in those with more than one vertebral fracture (mean 455.40 mg/die). In all our population, however, the daily calcium intake resulted to be very far from the minimum required. As for stiffness values, the analysis of the data showed a significant reduction in fractured women. In particular, mean stiffness values in no fractured women was 82.06, while in women with at least one vertebral fracture the mean stiffness value was about 68.56. The multi-variate non parametric analysis (Kruskal-Wallis test) showed that both daily calcium intake and stiffness are related to presence and number of vertebral fractures. **Conclusion:** Calcium supplementation should be strongly recommended to all osteoporotic patients. QUS may be an effective and useful tool for epidemiologic screening of osteoporotic patients. In fact, low calcaneal stiffness resulted to be strongly associated with the presence and number of vertebral fragility fractures.

References:

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O51

CLINICAL PRACTICE GUIDELINES FOR REHABILITATION IN KNEE OSTEOARTHRITIS BY SFR (FRENCH SOCIETY OF RHEUMATOLOGY) AND SOFMER (FRENCH PHYSICAL MEDICINE AND REHABILITATION SOCIETY)

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Introduction: EULAR recommendations for knee osteoarthritis (OA) recommend nonpharmacological treatment, particularly physical exercise (1). The possible modalities of exercise treatments are numerous and depend on the rhythm, duration and type or technique and whether they are conducted individually or in groups, but recommendations for the type of exercise are lacking. **Aim:** To develop clinical practice guidelines for prescribing exercise therapy in knee OA. **Patients and Methods:** The SOFMER 3-stage method for developing guidelines involves systematic literature review, collection of information about professional practice and final scientific committee review, including patient opinion. The topic was the value of individual or group exercise programs, exercise supervision or not by a physical therapist, and the impact of compliance with

exercise. *Results:* The benefit of individual exercise is low to moderate for pain, strength and ability to walk. The effectiveness is not maintained over time if the exercise program is not continued. The benefit of collective exercise is low to moderate for pain, strength, balance and ability to walk. There is no evidence of the superiority of one modality over the other (individual or collective). A program of initial physical exercise supervised by a physiotherapist, then an unsupervised program at home with compliance monitoring is recommended. The type, intensity, and frequency of the exercises must be adapted to each patient. The OA location and gravity, functional need, and characteristics of patients are useful for future studies. For better efficiency, an exercise programme for OA must be associated with the means to improve compliance. These means may concern the choice of the population: people having performed physical activities previously, having a positive opinion of the programme and having a human and material environment favourable to its fulfilment. Whatever the exercises proposed, they must be adapted to the physical capacity and the condition of the patient in terms of pain (professional consensus). A preliminary explanation of the expected results, auto-evaluation by use of a diary, and long-term support (by phone call or mail) by a health care professional favour compliance with exercise. *Conclusion:* Exercise therapy is effective for knee OA, although complementary randomized controlled studies are necessary to characterize the best exercises and their intensity and frequency for management of knee OA.

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O52

EFFECT OF PEMF ON KNEE OSTEOARTHRITIS: A RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED STUDY

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Introduction: Pulsed electromagnetic field therapy (PEMF) is a one such treatment modality that is used in the knee osteoarthritis treatment. There are inconsistent findings in the literature about the effect of PEMF in osteoarthritis. *Aim:* The aim of this study was to evaluate if PEMF has additional effect on the classical physical treatment in knee OA composed of hot pack, therapeutic ultrasound and terminal isometric exercises. *Patients and Methods:* Forty patients (29 women and 11 men), ages 44 to 78 (mean age was 61.3±7.8 years) were included in our study. Patients with knee osteoarthritis (Kellgren-Lawrence criteria grade 2 and above and an average pain intensity of 40 or more on a 100 mm visual analog scale [VAS]) recruited from outpatient physical medicine and rehabilitation clinic were randomly assigned to receive PEMF or sham PEMF treatment. Both the PEMF and sham group treatment session lasted 55 min in duration, 10 sessions in 2 weeks. In each session 20 min hot pack, 5 min therapeutic ultrasound and 30 min PEMF or sham PEMF was applied to each knee of the patients. Patients were evaluated by the Western Ontario and McMasters Universities Osteoarthritis (WOMAC) Index and VAS at the baseline and at the end of treatment. *Results:* In both groups age, gender, duration of complaint and body mass index of patients was statistically similar. At baseline, both PEMF and sham treatment groups had similar mean Kellgren-Lawrence osteoarthritis scores, grade 2.6 and grade 2.3 respectively ($p=0.135$) and similar mean WOMAC subscales (pain, stiffness and physical function) scores ($p=0.684$, $p=0.796$, $p=0.675$ respectively). Both PEMF and sham treatment groups showed statistically significant improvement in WOMAC pain and functional scores at the end of treatment ($p<0.001$ in both groups). There were no statistically significant differences between WOMAC pain, stiffness and physical function scores in both groups after treatment ($p=0.906$, $p=0.855$, $p=0.809$, respectively). There was neither difference in concomitant used paracetamol dose in both groups ($p=0.289$). *Conclusion:* The results of this study

show that PEMF does not have additional effect on the classical physical treatment in reducing symptoms in knee OA.

O53

CLINICAL PRACTICE GUIDELINES FOR PERIOPERATIVE REHABILITATION IN TOTAL KNEE ARTHROPLASTY BY SOFMER (FRENCH PHYSICAL MEDICINE REHABILITATION SOCIETY) AND SOFCOT (FRENCH SOCIETY OF ORTHOPAEDIC SURGERY)

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Introduction: Perioperative rehabilitation seems to be effective for final results of total knee arthroplasty, but clinical practice guidelines concerning this kind of rehabilitation are lacking (1). *Aim:* To develop clinical practice guidelines concerning perioperative rehabilitation for total knee arthroplasty. *Patients and Methods:* The SOFMER 3-stage method for developing guidelines involves systematic literature review, collection of information about professional practice and final scientific committee review, including patient opinion. Questions were asked about preoperative multidisciplinary rehabilitation, predictive criteria for transfer of patients to a rehabilitation ward after total knee arthroplasty and early postoperative rehabilitation. *Results:* Preoperative rehabilitation for patients undergoing total knee arthroplasty has benefit in terms of length of hospital stay and discharge destination (to a rehabilitation ward or home). A preoperative rehabilitation program comprising at least physical therapy and education is recommended. Multidisciplinary rehabilitation, comprising occupational therapy and education, is desirable for the most fragile patients because of major disability, comorbidity, or social problems. The main criteria determining transfer to a rehabilitation ward are demographic criteria such as older age or female sex; psychosocial and environmental criteria such as living alone, feeling unable to return home directly (preoperative education could modify this criterion); and surgeon advice based on the pre- and postoperative clinical and functional status. Early continuous passive motion does not seem to increase the frequency of complications and seems to help with rapid recovery of the joint range of motion. *Conclusion:* Complementary studies must be undertaken to define the minimum perioperative rehabilitation program for total knee arthroplasty. Economic criteria such as length of stay in hospital, rehabilitation costs and patient satisfaction must be considered.

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O54

EVIDENCE FOR THE EFFECTIVENESS OF BRACING IN LOWER-LIMB OSTEOARTHRITIS BY SFR (FRENCH SOCIETY OF RHEUMATOLOGY) AND SOFMER (FRENCH PHYSICAL MEDICINE AND REHABILITATION SOCIETY)

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Background: EULAR recommendations for knee and hip osteoarthritis (OA) recommend nonpharmacological treatment, particularly bracing (1). **Aim:** To develop clinical practice guidelines concerning the use of bracing – rest orthosis, knee sleeves and unloading knee braces – for lower-limb osteoarthritis. **Method:** The SOFMER (French Physical Medicine and Rehabilitation Society) methodology, associating a systematic literature review, collection of everyday clinical practice, and external review by multidisciplinary expert panel, was used. **Results:** Few high-level studies of bracing for lower-limb osteoarthritis were found. No evidence exists for the effectiveness of rest orthosis. Evidence for knee sleeves suggests that they decrease pain in knee osteoarthritis, and their use is associated with subjective improvement. These actions do not appear to depend on a local thermal effect. The effectiveness of knee sleeves for disability is not demonstrated for knee osteoarthritis. Short- and mid-term follow-up indicates that valgus knee bracing decreases pain and disability in medial knee osteoarthritis, appears to be more effective than knee sleeves, and improves quality of life, knee proprioception, quadriceps strength, and gait symmetry, and decreases compressive loads in the medial femoro-tibial compartment. However, results of response to valgus knee bracing remain inconsistent; discomfort and side effects can result. Thrombophlebitis of the lower limbs has been reported with the braces. Braces, whatever kind, are infrequently prescribed in clinical practice for osteoarthritis of the lower limbs. **Conclusion:** Modest evidence exists for the effectiveness of bracing – rest orthosis, knee sleeves and unloading knee braces – for lower-limb osteoarthritis, with only low level recommendations for its use. Braces are prescribed infrequently in French clinical practice for osteoarthritis of the lower limbs. Randomized clinical trials concerning bracing in lower-limb osteoarthritis are still necessary.

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O55

HIL-THERAPY IN ‘PAINFUL SHOULDER’ SYNDROME FROM PARTIAL TEAR AND TENDINOPATHY OF THE ROTATOR CUFF – EFFECTS AT CELLULAR LEVEL

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Introduction: The objective of the different kinds of treatments in the ‘painful shoulder syndrome’ is not the complete restoration of the cup, rather a functional as well as structural recovery from the inflammatory and degenerative conditions of the tissues, that can constitute an aggravating factor in the evolution of the disease, painfulness, as well as functional disability. Recently, treatments based on mechanical stimulation by devices which deliver physical energy to the tissue are regarded with growing interest. **Aim:** *i)* To evaluate the therapeutic impact of tissue stimulation due to physical energy delivering by Nd:YAG laser pulses (HIL-Therapy); *ii)* to compare the efficacy of HIL-Therapy with high-energy shock-waves, a first-level treatment for the considered disease; *iii)* to establish a relationship between the efficacy of HIL-Therapy and the effects at cellular level. **Patients and Methods:** 40 subjects were treated and clinically controlled for a period of 360 days. We randomly formed two homogenous for sex and age groups of 20 units. These groups were treated consecutively with two different methods of physical energy: the former (group A) with 10 sessions of HIL-Therapy; in the latter (group B) a Spark Gap Electro-hydraulic HMT Evotron was used. Moreover, in both groups of patients, passive and active kinesiotherapy was associated. The effects at cellular level were studied on cell cultures treated by pulsed Nd:YAG laser. Cell response was analysed by immunofluorescence, autofluorescence and PCR techniques. **Results:** We monitored net and lasting benefits induced

by HIL-Therapy (80% patients), comparing them to the clear and lasting benefits obtained by a shock-wave treatment (80% patients). The efficacy of HIL-Therapy can be explained through mechanical stimulation of tissues, mainly due to photomechanical stress. In fact, changes in cell energy metabolism, cytoskeleton organization and the production of extracellular matrix components have been observed in cell cultures. **Conclusion:** Based on our experience of clinical and instrumental observation, we can conclude that it is possible to codify a routine approach in the therapeutic-rehabilitative course in the case of incomplete lesions of the rotator cuff through the integrated use of physical energies, such as HIL-Therapy, in association with rehabilitation exercises.

O56

CLINICAL EFFECTS OF ACUPUNCTURE AND EXERCISE THERAPY IN THE TREATMENT OF FROZEN SHOULDER IN SUBACUTE PHASE AFTER STROKE

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Aim: To determine how acupuncture and exercise therapy, affects motor function of the hands of patients in the sub-acute phase after stroke, and if acupuncture reduces shoulder pain and upper limb spasticity, thereby indirectly improving movement. **Material and Methods:** Prospective, randomized, single blind clinical study of 20 patients, age 60–70 years, in the sub-acute phase after stroke. Subjects were divided into two groups: Group A, treated with acupuncture and exercise therapy (AP-ET) and Group B, treated with exercise therapy (ET) alone. Assessment included a comprehensive interview and administration of the Brunnstrom’s stages, Functional Independence Measure (FIM), Modifies Ashworth Scale (MAS), Upper Extremity Function Test (UEFT), Motor Activity Log (MAL), active and passive Range of Motion (aROM, pROM), Fugl-Meyer test of upper extremity function (FMA), Croft Shoulder Disability Questionnaire (CSDQ) and Visual Analogue Scale (VAS) of pain. The Gosset t-Test was used for the statistical analysis. **Results:** Analyses showed a statistically significant difference in the pre-treatment as compared to post-treatment scores within each study group for all parameters examined ($p < 0.01$ in all cases). Analyses showed a statistically significant difference in certain parameters in ET group as compared to the AP-ET group with greater mean values recorded in the AP-ET group for VAS, Brunnstrom, CSDQ, passive and active abduction after therapy. In all other cases, the AP-ET group had greater mean values for some parts of the Amount Scale (comb, VHS cassette, phone), How Well Scale (comb, phone, finger food) and the UEFT (comb, fork, phone, juice box, finger food). All other parameters showed no statistical differences between the two different therapy groups. **Conclusion:** The results confirm the hypothesis that acupuncture is useful in the treatment of frozen shoulder in stroke patients, however, given the small patient population, further studies are needed to verify these results.

O57

ACUPUNCTURE AND CHRONIC HEADACHE IN PATIENTS ‘NO RESPONDERS’ TO PHARMACOLOGIC THERAPIES

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Consecutive patients suffering from chronic migraine (CM) (code 1.5.1) or MOH (code 8.2) plus migraine (codes 1.1; 1.2) accord-

ing to the ICHD-2 criteria and attending the headache center of the 'Sapienza' University of Rome were included in the study. 10 patients, all women, were asked to fill the headache daily diary in which they recorded frequency (expressed in days of headache per month), pain intensity measured by visual analogue scale (VAS) 0–10, disability measured by the Migraine Disability Assessment (MIDAS), impact of headache on patients' quality of life by the Headache Impact Test (HIT-6). Monthly medications intake type of overuse medications were also recorded. All patients were no responders to pharmacologic therapies and were submitted at 10 sessions of acupuncture treatment 1 time a weeks. In the 70% of patients VAS decreased of 5 score as well as there was a reduction of headache episode as documented in the headache daily diary.

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O58

CONTINUOUS PASSIVE MOTION IMPROVES PAIN BETTER IN ADHESIVE CAPSULITIS

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Introduction: Painful stiffening of the shoulder, "frozen shoulder" is a common cause of shoulder pain and disability. Continuous passive motion (CPM) is an established method of preventing joint stiffness and of overcoming it. **Aim:** A randomised, comparative prospective clinical trial was planned to compare the early response to different rehabilitation methods (CPM versus physiotherapy treatment protocol) for adhesive capsulitis taking into consideration the clinical efficacy. **Patients and Methods:** A total of 51 patients with frozen shoulder were included in this study. Patients were randomly assigned to receive daily CPM treatments or physiotherapy treatment protocol. Parameters were measured at baseline and after 4 week. All patients were evaluated with respect to pain (Visual Analogue Scale) at rest, pain at movement, pain at night, measurement of Range of Motion (ROM) (shoulder flexion-extension, adduction-abduction, internal-external rotation were assessed), Constant functional shoulder score and the shoulder pain and disability index. The first group ($n=29$) (CPM group) received CPM treatments for one h once a day for 20 days during a period of 4 weeks. The second group ($n=22$) (PT group) had daily physiotherapy treatment protocol including active stretching and pendulum exercises for one h once a day for 20 days during a period of 4 weeks. All patients in both group were also instructed in a standardised home exercise program consisting of passive ROM and pendulum exercises to be performed every day. **Results:** In both groups, statistically significant improvements were detected in all outcome measures compared with baseline ($p<0.05$). However pain reduction evaluated with respect to pain at rest, at movement and at night was better in CPM group ($p<0.05$). Also CPM group showed better shoulder pain index scores compared to physiotherapy group ($p<0.05$). **Conclusion:** CPM treatments provides better response in pain reduction than the conventional physiotherapy treatment protocol in the early phase of treatment in adhesive capsulitis.

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O59

SPLINT FOR BASE OF THUMB OSTEOARTHRITIS: A 12 MONTH MULTICENTER RANDOMIZED CONTROLLED STUDY

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Purpose: Splints for base of thumb osteoarthritis (OA) are recommended in international guidelines but evidence for their efficacy in randomized trials is missing. The objective was to assess the efficacy and acceptability of splints for base of the thumb OA. **Methods:** Study design: A multicenter randomized controlled trial with 12 month follow-up; Setting: Two tertiary care hospitals in France; Patients: 112 (101 women) patients with base of thumb OA; Intervention: 57 patients received custom-made neoprene splint and usual care (intervention group) and 55 usual care (control group); Outcome measures: Primary outcome was pain assessed on Visual Analog Scale (VAS, range 0–100) at one month. Secondary outcome measures were, pain at 6 and 12 month, disability assessed by the Cochin Hand Function Scale (CHFS, range 0–90) and patients' global opinion on VAS, pinch strength (Newtons), closure of the first web (degrees), lateral angulation (%), radiographic progression (Kallman trapezio-metacarpal subscale, range 0–10). Tolerance and compliance were recorded. Intention-to-treat analyses were performed by use of the last observation carried forward technique. **Results:** Fourteen patients (5 in the intervention and 9 in the control group, 12.5%) were lost to follow-up at 12 month. Patients in the intervention and control group did not differed at baseline. Pain at 1 month had decreased but did not differed in both groups (37.9 ± 25.1 in the control and 35.9 ± 21.7 in the intervention group, $p=0.66$). Pain at 12 month was significantly lower in the intervention group than in the control group (25.1 ± 24.1 and 39.5 ± 24.2 , $p=0.002$). Disability assessed by the CHFS at 12 month was slightly increased in the control group and slightly decreased in the intervention group but was not statistically different in both groups ($p=0.28$). Patients' global opinion on disability at 12 month was significantly lower in the intervention than in the control group (27.0 ± 23.1 and 39.2 ± 22.2 , $p=0.005$). The radiological progression was marginal and similar in both groups for the trapezio-metacarpal joint. Pinch strength, closure of the first web, and lateral angulation were not modified in the intervention and control groups. In the intervention group, 86% of patients wore their splint more than 5 nights a week at 12 month and no adverse effect was observed. **Conclusions:** Our results suggest that for patients with base of thumb OA, use of splints has a slow acting positive effect on pain, may prevents disability, is safe and acceptable.

O60

EFFECTS OF KINESIO TAPING METHOD AND LOW-FREQUENCY ELECTROMAGNETIC FIELD APPLIED TO THE KNEE JOINT IN RHEUMATOID ARTHRITIS (RA) PATIENTS

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Introduction: Relevant progress has been made in the medical management of RA, but physical therapists still need to search for effective interventions in treatment of this disease. Kinesio Taping (KT) method contribute to alternations of the blood flow, reduce of edema, decrease of inflammation process and pain. **Aim:** The aim of the study was to compare the effectiveness of KT method and low-frequency electromagnetic field (LFEMF) in management of edema and pain in knee joint in RA patients. **Patients and Methods:** 34 women with RA (aged 35–79 years, mean disease duration

15.1±9.5 years) participated in this study. Subjects were randomly assigned into: KT treated group (18 subjects) and LFEMF treated group (16 subjects) which underwent treatment of more symptomatic knee. The applied therapies (including identical therapeutic exercise program) lasted two weeks. Pharmacotherapy did not change throughout the study. Before and just after the treatment maximal synovium thickness was measured in the suprapatellar bursa using ultrasound images and knee pain was assessed with Visual Analogue Scale (VAS) in all subjects. Additionally, the measurements of circumference and range of motion of the knee joint were performed. **Results:** Mean values of suprapatellar bursa thickness decreased by 2.2 mm in KT group and 0.90 mm in LFEMF group. Mean values of VAS scores were reduced by 1.48 and 0.87 in KT and LFEMF group, respectively. In KT group, knee joint range of motion significantly increased and circumference decreased. No differences in these parameters in LFEMF group were found. **Conclusion:** Kinesio Taping and low-frequency electromagnetic field significantly contribute to decrease of edema and pain in knee joint in RA patients but Kinesio Taping seems to be more effective method.

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O61

LYPHHEDEMA TREATMENT WITH SOUND WAVES

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Introduction: Manual lymphatic drainage (MLD) is accepted to be one of the most effective treatments for lymphedema. Sound waves (SW) has been said to be useful in lymphedema treatment: diminishing volume, and other symptoms like heaviness and tightness, but there is slight scientific information about it. There is an available SW device authorized for human health career by the European authorities. **Objective:** To evaluate the efficacy of sound waves treatment in upper limb chronic lymphedema. To compare SW with MLD treatment. **Patients and Methods:** Women with chronic breast cancer related lymphedema were recruited in an outpatient hospital rehabilitation setting. They were randomly assigned to 10 daily sessions of manual lymphatic drainage (MLD) and then 10 daily sessions of sound waves (SW) treatment, or first the SW sessions and then the MLD sessions. There was at least a month of clearance time between MLD and SW treatments. Investigators and outcome assessor physicians were blinded for assigned treatment. Every patient was explored just before the first and just after the 10th session of every treatment. Upper limbs volume was registered, and visual analogic scales (VAS) for pain, heaviness and tightness were done. Differences in volume and VAS scales were obtained. Wilcoxon paired test, Spearman correlation and Man-Whitney tests were done at a significance level of $p < 0.05$. **Results:** 14 Patients were recruited: 8 did first MDL, and 6 did first SW. The upper limb volume reduction measured at the end of SW was an average of 105.64cc ($p=0.007$) while the volume change at the end of MLD was not significant. By the SW pain VAS reduced an average of 10.5 mm ($p=0.017$); heaviness VAS reduced an average of 15.5 mm ($p=0.005$) and tightness VAS change was not significant. By MLD treatment only tightness VAS reduced an average of 19.5 mm ($p=0.006$). There was no order treatment application influence in the results. **Conclusion:** The SW treatment was effective in reducing volume, pain and heaviness in women with related breast cancer lymphedema. It was more effective than MLD in the same outcomes.

O62

INFLUENCE OF LOCUS OF CONTROL ON PATIENT RESPONSE TO SEMG BIOFEEDBACK THERAPY FOR MYOFASCIAL PAIN OF THE UPPER TRAPEZIUS

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Introduction: Current literature presents mixed results using surface electromyographic (sEMG) biofeedback for treating myofascial pain. Biofeedback protocols emphasizing timely return of sEMG values following activity are reported beneficial for some patients while increasing pain in others (2). Interactions between personality traits, such as locus of control, and sEMG biofeedback are hypothesized to account for response differences (2). **Aim:** This study assessed the relationship between treatment response to sEMG biofeedback and perceived locus of control (LOC) for patients with myofascial pain. **Patients and Methods:** Forty-four female patients (age 24–67 years), with trapezius myofascial pain, completed psychometric assessments 16PF, Personal Orientation Inventory, and the Rotter Scale. Patients completed six training sessions involving repetitive scapular elevation and retraction, with sEMG feedback on trapezius activation and recovery time following repetitions. A visual-analog pain scale assessed pre and post-treatment pain intensity and a modified Arthritis Impact Measurement Scale addressed the relationship between pain changes and daily function. **Results:** Reductions in sEMG amplitude were not significantly associated with decreases in reported pain. Reduced muscle recovery time did not significantly decrease pain on average, however, the distribution was bimodal. Post-treatment changes in pain intensity correlated +0.68 with LOC. Factorial analysis of treatment response using a quartile split into internal and external LOC groups showed significant improvement for internals, yet increased reported pain for externals ($p=0.007$). **Conclusions:** Training trapezius muscles to recover quickly from activity via sEMG biofeedback reduced pain intensity for patients with myofascial pain manifesting internal LOC and consistently increased pain for patients with external LOC. These findings suggest screening for internality/externality may be a useful patient selection approach for sEMG biofeedback to help maximize treatment effectiveness or reduce potential adverse patient reactions.

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O63

DOES A WOBBLE BOARD TRAINING PROGRAMME IMPROVE SINGLE LEG STANDING BALANCE IN YOUNG ADULT FEMALES?

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Introduction: The wobble board is frequently used in the rehabilitation of balance; however information concerning its effect on normal balance is not well understood. **Aims:** This study investigated the effect of 3 weeks of daily wobble board training on single leg standing balance in the normal young adult female. **Subjects and Methods:** Twenty young healthy females with a mean age of 26.7 years (± 4.1) consented to take part. All were free from previous lower limb injury. They were randomly divided into an experimental and a control group. Data collection was performed prior to and after a three week period. During this period, the

experimental group used a wobble board daily for a total of 20 minutes. A force platform was used to measure the parameters of sway area and sway frequency that were calculated according to the method of Hufschmidt et al. (1). Each parameter was assessed for single limb stance in dominant (D) and non-dominant (ND) lower limbs during both eyes open (EO) and eyes closed (EC) conditions. A series of two-way ANOVAs were used to identify significant findings. *Results:* No significant difference in the sway area pre and post wobble board was found. The EC stances resulted in significantly larger sway areas but dominance was not a significant factor ($p < 0.05$). Sway frequency was significantly higher in the frontal plane than in the sagittal plane for both EO and EC stances ($p < 0.05$). *Conclusions:* Normal single leg standing balance appears not to be improved by wobble board training. Alternatively, the adopted force platform stance testing protocol may not be able to detect minute improvements that potentially occur in the more challenging dynamic wobble board environment. Further dynamic testing protocols involving the force platform would help address this issue.

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O64

EFFECTS OF DIABETES REHABILITATION PROGRAM

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Introduction: Type 2 Diabetes affects millions of people across diverse ethnicities and age groups and can lead serious problems. Exercise is generally recommended for treatment but research suggests adherence recommendations is low. *Aim:* To determine effects of lifestyle education and regular supervised exercise in quality of life and metabolic factors. *Patients and Methods:* Multi-disciplinary study that enrolled 82 patients with diabetes type 2. They should undergo a detailed medical evaluation for an individualized exercise prescription and blood samples were taken, before and during the program revising at three and six months. Combined supervised aerobic and resistance training, including warm-up and cool-down period, twice a week in Hospital and once at home, during eight weeks, 50–60 min per session. After two months, they should have adopted better health habits. *Results:* 51 women and 31 men, age: 58.6 (standard deviation 14.5) years old, HbA1C: 6.9 (standard deviation 1.4), Cardiac frequency: 93.7 beats per min and O₂ saturation: 95 %. Frequency of Dislipemia: 60%, HTA: 61%, BMI >25: 84%. Antidiabetic oral treatment: 74%, Insulin: 32%, Diet: 55%, none treatment: 4%. After finished Rehabilitation Program we have found decrease cholesterol levels ($p < 0.001$), triglyceride levels ($p = 0.021$) and seric HbA1c ($p = 0.034$). Physical exercise associated with insulin improves cholesterolemia ($p = 0.005$), furthermore triglyceridemia, cholesterolemia and seric HbA1c in patients treated with antidiabetics oral treatment ($p < 0.05$). In patients non treated with one antidiabetics or insulin we also found improvement in blood tests ($p < 0.05$) as well improvement of HbA1c in non obese compared with obese patients ($p < 0.05$). *Conclusion:* Supervised physical exercise practised regularly is fundamental in the rehabilitation of diabetics type 2. Physical exercise associated with education, medical treatment and diet has shows better therapeutic benefits.

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O65

REHABILITATION OF PATIENTS WITH METABOLIC SYNDROME BY USING PHYSICAL ACTIVITY MONITORS

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The present study is aiming to demonstrate the benefit of monitored physical activity on patients with metabolic syndrome (MS). We conduct a randomized prospective study of 18±0.7 weeks on 46 voluntary patients. The patients were divided in two groups: study group (32 patients) – monitored and registered physical activity using a pedometer and a heart rate monitor (HRM); control group (14 patients) – subjective assessment of physical activity using the Borg scale of perceived exertion. General indications regarding the diet and an individualized physical training programme were set for each patient. Four patients (12%) from the study group and three (21%) from the control group dropped out from the study, not having a specific problem. After 18 weeks of study, 4 patients (12%) from the study group and 1 patient (7%) from the control group deed not meet anymore the IDF criteria of MS. We noticed a significant improvement in the study group of %BF (32.75±5.73 vs. 24.77±4.21, $p < 0.0001$) and DASI (45.66±6.24 vs. 40.58±8.52, $p = 0.02$) comparing to control. In conclusions, monitored physical activities for 18 weeks at moderate intensity have beneficial effect on MS components, decrease body fat and improve functional capacity of the patients with MS. The study is a clear demonstration that using simple devices, we can improve the results of exercise training programme - pedometer and HRM are not only safe and effective for improving daily physical activity, but a solution to increase the exercise compliance in patients with MS (the drop outs were almost double in the control group!).

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O66

EFFECT OF PLANTAR SOMATOSENSORY INPUT THERAPY ON PERCEIVED VERTIGO INTENSITY IN PATIENTS WITH BENIGN AROXYSMAL POSITIONAL VERTIGO

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Introduction: Recent literature suggests that plantar somatosensory stimulation reduces some aspects of vertigo (1). A recent study found passive application of plantar transcutaneous electrical nerve stimulation (TENS) effective as active plantar pressure for lowering vertigo intensity in normal subjects (2). While various plantar stimulation modalities appear to reduce experimentally induced vertigo intensity in normals the question remains whether plantar stimulation will reduce vertigo severity in patients with vestibular pathologies. *Aim:* This study's aim was to investigate the effect of plantar somatosensory stimulation on episodic vertigo intensity in patients with benign paroxysmal positional vertigo (BPPV). *Patients and Methods:* This study was a within-subjects design involving 17 patients (age 27–67 years) with BPPV who had previously undergone canalith repositioning without complete vertigo resolution. Participants completed six treatment sessions during which three episodes of vertigo were induced. Immediately following each induction, the participant was provided one of three plantar stimulation

treatments; direct pressure, TENS, or placebo. Treatment order was changed at each session so that after six sessions, each participant had experienced all treatment order permutations. After each vertigo episode, participants rated intensity on a visual analog scale. Treatment responses were compared with repeated measures ANOVA followed by multiple contrast analysis. *Results:* While not significantly different in effectiveness from each other, passive plantar TENS and active plantar pressure significantly reduced vertigo intensity over 'subsensory stimulation' placebo ($p=0.037$). Patients subjectively reported a preference for direct pressure over the other conditions. Six patients expressed feasibility concerns over implementing a plantar stimulation strategy when experiencing episodic vertigo outside the clinic setting. *Conclusions:* These findings suggest that plantar somatosensory stimulation has the potential to attenuate the intensity of episodic vertigo in individuals with BPPV.

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O67

SPECIAL ATTENTIONS IN THE ELECTROTHERAPY AND LIGHT FOR THE PATIENTS WITH METALLIC CONTENTION

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Introduction: It is not totally sustained the theory that the patients with metallic contents are not eligible for electrotherapeutical procedures. *Aim:* To establish if there is an absolute interdiction in using electrotherapy procedures in patients with metallic contentions and to analyse the factors that permit us using this kind of procedures. *Material and Method:* When treating with electrotherapy an light therapy, in various combinations, our 120 patients with metallic contentions we looked to this interdiction with a lot of reserves, taking into account each case: the place of contentment reported to the place of application of electrotherapy, the type of therapy witch would be applied and the grade of 'risk – benefice' witch would result within this analysis. We observed that: 1) There is the possibility to carry out electrotherapeutical procedures, with tegument application through classical electrode, only in the "longitudinal" technique and only on the muscular zone through the immediate neighbour of the elementary bone, affected by the contentment. The controlled intensity will be the liminary or the ultraliminary. 2) Some applications could be done in the short magnetic waves, only with specialized machines witch can offer the possibility to work into a pushing level (with a small frequency, 10–100 Hz) and with chosen power. 3) It is possible to apply therapy in the ultra short waves field (microwaves), locally. Within these cases, we can not pass the max power of 25W. 4) It is possible to apply ultrasound treatments with special machines working on 2–3 MHz, with ultrasonically intensities witch can not exceed 0.5 w/cm². 5) The light therapies are allowed (infrared, ultraviolet, polarized light). The allowed application distance will be respected and the therapy length will be adjusted in order to avoid an extra heating. *Results:* There is a selective action of each type of electrotherapeutical treatment, on the biological tissue exposed to the electric energy. As a general rule, it appears that with an increase of the frequency of the energy from the process of interaction between the electromagnetic energy and the biological substance, the absorption of the biological material

increases with the square of the initial frequency and therefore, the length of the incision in the biological tissue will drop. *Conclusions:* There is no absolute contraindication in using one or other electrotherapy and light procedures at patients with metallic contentions. Electrotherapy and light therapy could be applied when we aim a major benefice, when we know the composition of the content, its location, and when we own modern electrotherapy generators that permit using this application in a specific manner.

O68

PULMONARY REHABILITATION – COMPONENTS AND BENEFITS OF A MULTIDISCIPLINARY PROGRAM

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Pulmonary rehabilitation is an integral part of the clinical management and health maintenance of patients with chronic respiratory disease. Individuals with chronic obstructive pulmonary disease (COPD) still comprise the majority of patients referred for pulmonary rehabilitation. However, it has become clear that regardless of the type of disease, all chronic respiratory patients can benefit from pulmonary rehabilitation. Deconditioning, malnutrition, effects of hypoxemia, steroid myopathy, hyperinflation, diaphragmatic fatigue, frequent hospitalizations and the effects of various medications result in peripheral and respiratory muscle dysfunction, nutritional abnormalities, cardiac impairment, skeletal disease and psychosocial dysfunction. The patients and their families are approached an included in an interdisciplinary program, in witch several health care professionals work together to a common goal. Pulmonary rehabilitation has proven its efficacy in reducing symptoms, decreasing disability, increasing participation in physical and social activities, and improving the overall quality of life. These benefits are achieved through patient and family education, exercise training, psychosocial and behavioural intervention, and outcome assessment. The authors make a review of the literature of the core components of a pulmonary rehabilitation program and its evidence-based benefits.

O69

OUTCOMES OF AN INPATIENT REHABILITATION FOLLOWING CARDIO-PULMONARY TRANSPLANTATION

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Introduction: Organ transplantation is now a realistic management option for patients with end stage cardiac or pulmonary disease, with five-year survival rates of greater than 70% (1). This improved survival has led to a shift in scientific interest to include physical function and quality of life (2). Physical therapy and multidisciplinary rehabilitation is now an integral part of the management. (3). *Aim:* The purpose of this paper is to provide an overview of the rehabilitation management following heart and lung transplantation, and to provide outcomes of an inpatient rehabilitation programme. *Patients and Methods:* A retrospective audit of data for all cardio-pulmonary transplant patients admitted to the Sacred Heart Rehabilitation Unit between 2002 and 2007. *Results:* A total of 69 patients underwent inpatient rehabilitation. These included 23 heart, 30 bilateral lung, 12 single lung and 4 combined heart/lung transplants. Mean admission Independence Measure Functional (FIM) was 92, and the mean discharge FIM was 102. Interruptions to the rehabilitation programs occurred for 33% of patients, mainly due to graft rejection or sepsis. *Conclusions:* The rehabilitation of the cardio-pulmonary transplant recipient can be complicated by factors including graft rejection, opportunistic infection, neurological complications, deconditioning, psychosocial issues and the

effects of chronic disease. Transplant recipients require complex immunosuppressive medication regimens, with complications including proximal muscle wasting, neuropathy and tremor. Cardiac transplant recipients have additional limiting factors including autonomic denervation, diastolic dysfunction, and vasculopathy. This paper demonstrates the benefits of inpatient rehabilitation, and the complex management issues for this condition.

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O70

IMPROVEMENT OF THE PATIENT'S VENTILATION BY CORRECTING THE SLID RECUMBENT POSITION IN THE ICU

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Introduction: The correct positioning of the patient in bed is essential for the whole period of his hospitalization, especially in the transitional period of recovering his own respiration after full mechanical support. Patients may be malpositioned although the attending staff may follow protocols regarding the appropriate posture in bed. The back of the patient must be placed 300–450 for optimal ventilation, according to the current bibliography. Downward sliding increases patient's kyphosis and eventually leads to lung's restriction ability for expansion during inspiration. **Aim:** The purpose of the study is to evaluate the relationship of the distance between the hinge of the bed and patient's greater trochanter with patient's ventilation. The angle of inclination will remain the same during the whole measurement. **Method:** Selection of the patients that will be enrolled in the study will be based on their primary bed position. The distance between the hinge of the bed and patient's greater trochanter must be obviously big. Blood PO₂ is being collected and verified by a second measurement after 15 min. After repositioning the patient and a lapse of 15 min we repeat the procedure of blood collection-analysis. The following parameters will be studied:

α PO₂, α S β PO₂, β S γ PO₂

α : measurement while in the slid position; β : verification of the measurement in the slid position; γ : measurement in the corrected position

Results: Ten patients have been selected that met the inclusion criteria. In 5 their position has been corrected up to 15 cm (group A), while in the remaining 5 the correction was bigger than 15 cm (group B). Patients in group A didn't demonstrate any alteration in the parameters (0.8 mmHg±0.4). On the other hand patients in group B had an improvement of 15.44 mmHg±5. **Conclusion:** Significant increase in blood PO₂ occurred after repositioning of patients if they were found more than 15 cm below their proper position in bed. (The trial is ongoing until a statistically significant difference is attained.)

O71

PHYSIOTHERAPY IN ASTHMATIC CHILDREN, CONTROVERSIES AND PRACTICE

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Last years, with modern asthma-treatment and asthma-prevention, some controversies appears about the benefits of physiotherapy in asthmatics. During broncho-obstruction, accessory breathing musculature is activated with increased O₂-consumption and CO₂ production, and in severe broncho-obstructive attack that leads to hypoxemia, hypercapnia, and metabolic acidosis. In some severe asthmatics, (long-lasting and uncontrolled) at least after years: pulmonary hypertensio and cor pulmonale, is possible. **Aim:** Review of our hospital morbidity for bronchial asthma in 10 years period, and our experience with pulmonary physiotherapy. **Material and Methods:** Retrospectively, 4324 (12.11% from total hospitalized in that period) children with bronchial asthma were analyzed. Age: 3–19 years. males: 2492 (57.63%), females: 1832 (42.37%). They all used classic medicaments and physiotherapy treatment. **Results:** Drainage secretion was taken by trained physiotherapist with technique of "forced expectoration" for eosinophil detection in 2973 (68.75%) and for bacteriological investigation of expectoration in 1469 (33.97%) children and etc. At attack: Patients were set in adequate position for reliable economical breathing and relaxation techniques (previously exercised in symptom-free period) were used. Aerosol-inhalation therapy was used in 3198 (73.96%) patients. Asthmatics with infection and bronchore had postural drainage together with toraco-percussions in 1240 (27.98%) or/and vibromassage in 1397 (32.31%), together with: modified and adequate techniques and positions for release of expectoration. In asymptomatic periods: Education of patients for relaxation techniques, breathing exercises, corrective gymnastic, conditioning exercises and etc. **Conclusion:** Respiratory kinesitherapy, if it is used adequately, adapted to the diseases phase can be useful method even for treatment of the asthmatics, but especially for their rehabilitation Complementary with other methods it contributes for difficulties releasing in asthmatic patients.

O72

SENSITIVITY OF SNIP AND OTHER RESPIRATORY MEASUREMENTS IN ALS

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Introduction: The main cause of death in Amyotrophic Lateral Sclerosis (ALS) is respiratory insufficiency. The use of sensitive and reliable tests to detect early changes and evaluate them on follow-up, in short periods, is relevant. **Aim:** To investigate the value of some respiratory tests in detecting changes on follow-up in ALS patients. **Subjects and Methods:** 20 unselected patients (7 women, 6 bulbar-onset, 56±9.8 years) with definitive/probable ALS (reviewed El Escorial criteria), were prospectively studied. They were evaluated a mean of 18 months after disease onset (time 0) and 4–8 months (5.4±0.97) later (time 1) with: functional ALS rating scale (ALS-FRS) and respiratory subcore (ALS-FRSr), forced vital capacity (FVC), maximal inspiratory pressure (PImax), mean O₂ saturation overnight (SatO₂), mean amplitude of phrenic nerve response (Phr) and sniff maximal inspiratory pressure (SNIP). Wicoxon Signed Rank Test was used for differences between observations. Percentage of decrement for relevant measurements was compared by Spearman correlations. $p < 0.01$ was considered as significant. **Results:** ALS-FRS, ALS-FRSr, Phr and FVC declined significantly. PImax decrement approached significance ($p = 0.013$). SNIP showed a tread decrement ($p = 0.04$) and SatO₂ did not change significantly ($p = 0.101$). Mean percentage of changes for Phr (16.4±15.9), FVC (17.2±17.0), ALS-FRS (19.8±16.0) were comparable. **Discussion:** SNIP is usually a sensitive test to detect early changes and easily applicable if orofacial weakness. The conventional FVC is not sensitive in detecting early changes, but useful on longitudinal evaluation. ALS-FRS is a sensitive and has prognostic value. Phr is a non-volitional test which can be applied in both bulbar and spinal ALS patients. In our study, SNIP was not sensitive to detect changes in a short period of time. However, FVC and Phr are sensitive in evaluating respiratory function in ALS patient included in clinical trials.

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O73**EFFICIENCY OF DYNAMIC ELECTRO NERVOUS STIMULATION IN PATIENTS WITH AN INITIAL STAGE OF ARTERIAL HYPERTENSION**

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Introduction: One of the effective methods in patients with arterial hypertension (AH) treatment is dynamic electro nervous stimulation (DENS). DENS is a new method of transcutaneous electro nerve stimulation (TENS), consisting short electric impulses influence on reflexogenous zones. The form of these impulses is constantly reacting on change of skin resistance in subelectrode zone. However the mechanisms of hypertensive effect of DENS are not sufficiently investigated. The purpose of the research is estimation of DENS efficiency in patients with an initial stage of AH. **Patients and Methods:** Two groups of patients (12 persons in each group) with the first stage of AH and not more than second group of risk were included in study. The first group was treated by DENS without any medicines during 10 days. The second one was a control group. Daily monitoring of electrocardiogram (ECG) with rhythm of heart variability (RHV) studying and arterial pressure (AP) was performed in both groups before and after treatment. Besides an endothelial functions by duplex scanning of brachial artery with reactive hyperemia test and quality of life by questionnaire SF-36 were investigated. **Results:** Significant decrease of daily systolic AP from 132.5 ± 13.2 mm Hg to 124.3 ± 19.1 mm Hg ($p=0.034$) and maximal daily heart rate from 143.0 ± 10.7 to 133.1 ± 9.2 ($p=0.028$) was shown. The analysis of vegetative status performed by RHV showed reduction of sympathetic nerve system tonus and increase of parasympathetic tonus. The results estimation of reactive hyperemia test showed significant increase of brachial artery diameter ($p=0.011$). Quality of a life index had significant tendency to improvement. **Conclusion:** DENS exerts significant hypotensive affect in patients with initial stage of arterial hypertension. Vegetative status of hypertensive patients has a tendency to normalization. DENS improves quality of live.

O74**MODIFIED BALK-WARE PROTOCOL FOR AEROBIC CAPACITY EVALUATION IN SUBJECTS AFTER SEVERE TRAUMATIC BRAIN INJURY**

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Introduction: Subjects after TBI show low tolerance to sustained physical activity and reduced cardio-respiratory fitness due to very possible injury of the cardiovascular and respiratory centers in the medulla oblongata. **Aim:** Aim of the study was to test aerobic capacity of subjects after severe TBI exposed to submaximal physical effort and to evaluate the modified Balke-Ware protocol. **Patient and Methods:** Ten participants (two female) after severe traumatic brain injury (mean GCS 6.5, range 3–8), who were discharged from the hospital post-acute setting were tested approx. 9.5 months (range 2–30) after injury. All subjects passed internist examination, ECG and blood pressure control in supine position. Subjects then performed the modified Balke-Ware protocol, which consisted of 2-min warm up at 0% incline with 3.2 km/h speed, followed by increase of the speed on 5.3 km/h for 1 min and then gradual increase of inclination by 2% every minute

with constant speed of 5.3 km/h, until the inclination reached 14% in eight minutes. During the test we continuously observed ECG, heart rate (HR), oxygen consumption (VO_2), minute ventilation (VE), respiratory exchange ratio (RER), oxygen pulse (O_2/HF) and ventilatory equivalent for oxygen (VE/VO_2). Indications to stop the test was subjective feeling of exhaustion, safety precautions, VO_2 reached the plateau with an increase of workload, HR over 90% of maximal predicted ($220 - \text{age}$) or RER over 1.15. **Results:** All participants but one reached the grade of inclination of 12% or 14%. Five subjects finished the test completely and their HR was 90% of age predicted in that moment and their average RER was 1.08 (range 0.96–1.17). The average VO_2 of those five subjects was 34.5 ml/kg/min. In three subjects we stopped the test one grade before last and reason was reaching maximal predicted RER in two and reaching the VO_2 plateau in one subject. **Discussion:** All participants but one female showed high cardio-pulmonary performance within the 90% of maximal predicted HR. We conclude that aerobic capacity was not the reason for the fatigue reported in daily activities. Modified Balke-Ware protocol showed to be safe for testing aerobic capacity in TBI subjects.

O75**APPLICATION OF AGGRESSIVE PROGRAM REHABILITATION AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION**

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Aim: The purpose of this study is to present the results of application of aggressive program rehabilitation after anterior cruciate ligament (ACL) reconstruction with the use of autograft. **Patients and Method:** In the five-years period 2002–2007, 19 patients with rupture of the ACL (9 men and 10 women) with mean age 29.3 years (from 21 until 37) underwent operation in the General Hospital of Rhodes. In eleven of them the rupture was accompanied with medial meniscus tear, 4 had tear of the medial and lateral meniscus, 1 had medial meniscus tear with partial rupture of the medial collateral ligament and 2 of them did not suffer from other ligament or meniscus injury except from the ACL rupture. The patient underwent reconstruction with the use of autograft. Quadruple band of hamstrings in 8 patients and bone-patellar tendon-bone in 11 patients. Before the operation full range of motion of the knee had been achieved in all the patients. The mean follow-up period was 10 months (6 until 13 months). The same aggressive rehabilitation program was applied to all the patients. Walking with progressively increasing bearing from the first post-op day, use of crutches for 7 to 10 days, special program of kinesiotherapy, jogging in 3 months and complete return to the previous the injury level of activities in 6 months. **Results:** The stability and the range of motion of the knee, the muscular strength, the balance and the proprioception of the knee were evaluated. The Lysholm and IKDC evaluation scales were used. In 16 (84.2%) patients the results were excellent in 2 (12.5%) were well while a male patient had new injury and sustained rupture of graft. **Conclusions:** The application of aggressive program of rehabilitation after ACL reconstruction does not only allow faster return in the previous the injury level of activities, but is also accompanied with excellent functional results.

O76**RANDOMISED PLACEBO-CONTROLLED TRIAL ON EFFICACY OF DYNAMIC ELECTRONEUROSTIMULATION IN KNEE OSTEOARTHRITIS**

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Knee osteoarthritis (OA) is a chronic disorder which causes pain, function impairment and disability. There is an urgent need of new effective and safe methods of symptoms relief in OA. Dynamic electrostimulation (DENS) is a new method of transcutaneous electrostimulation. Sinusoidal form of impulse developed by DENS devices depends on and changes according to changing of skin surface resistance in subelectrode zone. The aim of this study was to investigate the efficacy of DENS on pain and joint function in knee OA. *Patients and Methods:* 58 knee OA patients were randomly assigned to 10 standard daily procedures of DENS (30 patients) or placebo-DENS (28 patients). The groups did not differ in age and main clinical features of OA. Outcome measures were as follows: intensity of pain according to VAS, joint mobility according to goniometry and physical ability (test 'Stand and Go', sec). The symptoms of OA were assessed before and after the procedure by the independent investigator during 1, 3, 6 and 10 days of treatment. Pain and joint mobility were assessed at the most affected joint. *Results:* Intensity of pain decreased during the treatment in DENS group ($p_{\text{trend}}=0.0001$) and did not change in placebo group ($p_{\text{trend}}=0.133$). The difference between DENS and placebo groups in pain on VAS became statistically significant at 6th day of treatment ($p=0.003$). Test 'Stand and go' showed difference between DENS and placebo at 10th day ($p=0.011$), joint mobility did not differ during the whole study ($p=0.071$). There was no tendency to DENS effect diminishing during the treatment based on differences between symptoms before and after each procedure ($p=0.072$ for pain relief, $p=0.481$ for physical ability). *Conclusion:* DENS was superior over placebo in pain relief and physical function in knee OA. The difference became statistically significant at 6-10th procedure. The DENS effect did not diminish during the treatment.

O77

PHYSICAL ACTIVITY AND FUNCTIONAL LEVEL OF PATIENTS SUFFERING FROM RHEUMATOID ARTHRITIS AND OSTEOARTHRITIS

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Aim: The aim of the study was to evaluate various factors influence on physical capacity of patients suffering from rheumatoid arthritis and osteoarthritis, relation between physical activity and functional level of patients, compare level of those indices with data of the healthy population representatives. *Patients and Methods:* Study groups were examined at Rehabilitation Physical and Sport Medicine Centre of Vilnius University Hospital Santariskiu klinikos. Physical condition indices of patients' dependence from the patient gender, age, duration of disease, inflammatory process intensity, physical activity and functional intensity of physical rehabilitation program were evaluated. 154 persons (113 females and 41 males) suffering from rheumatoid arthritis and 129 persons (83 males and 46 females) suffering from osteoarthritis, 86 healthy persons had been examined. *Results:* The physical condition indices of newcomers to in-patient department with RA and OA were different from healthy persons in a statistically reliable manner (more 30% $p<0.05$); the same trend was between groups of males and females in both groups of patients and healthy persons (more 25%, $p<0.05$). The patients underwent the proposed complex physical rehabilitation program, which was dosed by individual functional intensity (the main group), according daily living physical activity needs, or by traditional physical rehabilitation program (control group). Physical condition of the patients was evaluated at the beginning and by the end of the rehabilitation cycle; outcomes were also evaluated after 0.5 year. Data were compared with physical condition indices of healthy persons of the same age and profession. By the end of rehabilitation, the physical condition indices of patients who were undergoing the main program, had reached the level of indices of healthy persons. After completion of the complex physical reha-

bilitation program, the differences became statistically unreliable between patients groups and healthy persons. The length of stay in rehabilitation program of those patients was shorter; the decrease of inflammatory process intensity was faster in comparison with the patients who were undergoing the control program. *Conclusions:* This study show that complex individual physical rehabilitation program can compensate influence diseases and hypodynamia to physical condition indices of patients suffering from rheumatoid arthritis and osteoarthritis in period of rehabilitation.

O78

THE INFLUENCE OF MENSTRUAL CYCLE ON ANKLE PROPRIOCEPTION

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Introduction: Proprioception is generally considered as an important risk factor in the development of ankle injuries (1–3). Moreover, it seems to be more important in females than in males (4). This might be explained by an alteration in proprioception due to the hormonal variations of the menstrual cycle. Surprisingly, the influence of hormonal variations during the menstrual cycle on ankle proprioception has never been investigated before. *Aim:* The aim of this study was to examine the effect of the phases of the menstrual cycle on ankle proprioception. *Patients and Methods:* Ankle proprioception changes during three different phases of the menstrual cycle (menstrual, follicular, and luteal phase) were assessed. Active and passive joint position sense of dominant leg of the subjects was measured using the Biodex 2 isokinetic dynamometer. The absolute reposition errors from the target angles have been evaluated by repeated measure analysis of variance in three hormonally verified phases of menstrual cycle. *Results:* No significant interaction was observed between ankle joint position sense test and the menstrual cycle. *Conclusion:* We did not identify ankle joint position sense alteration across the menstrual, follicular and luteal phases of the menstrual cycle. We suggest that the menstrual cycle does not significantly affect ankle joint position sense.

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O79

EVALUATION OF MUSCLE FUNCTION IN PRE AND POSTMENOPAUSAL WOMEN

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Introduction: The treatment of osteoporosis which focuses only on bones ignores muscle function and balance elements directed connected with this disease, the prevention of falls and fractures. *Aim:* Our purpose was to study differences in kinetic parameters of pre and postmenopausal women which influence balance and muscle function. *Patients and Methods:* Two hundred and thirty-seven women were included in the study separated in three groups: Group A included 61 osteoporotic postmenopausal women taken antiosteoporotic drugs and calcium/vitamin D supplementation (mean age 65±9.6 years), group B consisted of 117 healthy postmenopausal

women (mean age 62.9±9.8 years), and group C included 59 healthy premenopausal women (mean age 35±7.6 years). For the measurement of the objective parameters of movement we used the mechanography system in Leonardo platform (Novotec, Pforzheim, Germany) which measures forces, calculates through acceleration the vertical velocity of centre of gravity and also using force and velocity it calculates power of vertical movements. After explaining in all participants the process, they jumped on the platform (two leg jump). Weight was recorded on the platform before the jump and height was measured with a wall-mounted ruler. **Results:** Height decreased ($p<0.0005$), while BMI and weight increased significantly with age ($p<0.0005$, $p=0.008$). In groups A, B all kinetic parameters (velocity, force, jump height, power), were statistically decreased ($p<0.0005$) in comparison with group C. **Conclusion:** The results suggest that in all postmenopausal women (with or without pharmaceutical treatment) a decline in the kinetic parameters is expected. Jumping mechanography gives to the clinician additional information in order to prevent falls and fractures in postmenopausal women.

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O80

DANCERS DON'T SWAY

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Introduction: Balance is essential for an independent and self-determined life. Good balance is associated with independence in housework, shopping, and travel; poor balance is a major risk factor for falls and fall-related injuries. Social dancing may improve coordination and postural behaviour. Thus, the aim of our study was to assess the relationship between dancing habits and postural stability in healthy subjects. **Patients and Methods:** Random sample of 85 healthy adult subjects (53 f, 32 m; mean age 33 years, range 18–79), recruited from the Austrian population. We included subjects who were non-dancers and subjects performing social dancing regularly (i.e. dancing ≥ 2 x/month). Postural stability was measured by means of the modified Sensory Organization Test (mSOT; Pro Balance Master system, Neurocom Inc., Clackamas, USA). This test consists of four different conditions (standing on a stable or sway-referenced measurement platform, with open or closed eyes, respectively), that are performed three times each. A single trial lasts 20 seconds. Subjects are secured by a safety harness. Data was compared using the Mann-Whitney *U* test. **Results:** Data is presented as median (25%; 75%). In the composite score of mSOT there was a statistically significant difference between the two groups (Non-dancers: 82 (77.75; 86), regular dancers 86 (83; 88), $p=0.002$). The mSOT subtests 4 (87.33 vs. 90.67, $p<0.001$) and 5 (69.83 vs. 75, $p<0.02$) showed statistically significant differences between the two groups. For subtests 1 and 2 no difference was observed. **Conclusion:** Regular dancers perform significantly better than non-dancers in the more challenging posturographic tests (i.e. standing on a sway-referenced platform). Dancing lessons could be beneficial when included in balance training programs.

O81

EVALUATION OF PAIN TREATMENT WITH TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION IN PATIENTS WITH PAINFUL DIABETIC POLYNEUROPATHY

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Introduction: Pain in diabetic neuropathy can develop as a symptom (1) and can be treated with various agents, including transcutaneous

electrical nerve stimulation (TENS). Intensity of pain is commonly primary outcome in therapeutic trials, more important in evaluating effect of treatment are also becoming improvements in physical and emotional functioning, but we need more objective methods for the assessment. Quantitative sensory testing (QST) is commonly applied in patients with diabetic neuropathy, covering every aspect of the neuropathy, from diagnosis to therapy. **Aim:** To determine whether managing pain with TENS in PDN can be evaluated with QST. **Methods and Patients:** Thirty patients with PDN were treated with TENS three consecutive hours a day for three weeks. The effect of the treatment was evaluated by the visual analogue scale (VAS), a thermotest and with Short Form-36 Health Survey (SF-36). **Results:** In all the patients, thermal-specific and thermal pain sensitivity determination showed remarkable quantitative and qualitative abnormalities in all the measured places. After the therapy the percentage of patients with qualitative abnormalities decreased, together with reduced thresholds in dorsum of the foot, lateral leg and anterior thigh. On VAS, the patients experienced on average 48.5% (± 54.0) regression of pain and rated their quality of life with SF-36 similar on seven domains, except on bodily pain domain on which rates were significantly better ($p<0.01$). **Conclusions:** TENS efficiently reduces pain in patients with painful diabetic neuropathy and with the activation of large sensory myelinated fibers subserving touch, pressure and vibration ($A\alpha$ and $A\beta$) influences small myelinated ($A\delta$) and unmyelinated (C) fibers. This effect can be confirmed with a thermotest. The thermotest could be used for the assessment of the effectiveness of therapy with TENS.

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O82

EARLY CERVICAL MOBILIZATION IN PATIENTS WITH POST-TRAUMATIC CERVICAL SYNDROME – A PILOT STUDY

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Introduction: Post-Traumatic Cervical Syndrome is a common consequence of cervical trauma caused by a whiplash mechanism, relevant due to the high socio-economic cost attached. **Aim:** To analyze the benefits of early cervical mobilization for Post-Traumatic Cervical Syndrome and make a descriptive study of the sample. **Patients and Methods:** 106 patients from the Traumatology Emergency Service of the San Carlos Hospital in Madrid with Post-Traumatic Cervical Syndrome I-II (QTF Classification) were included. Each patient was randomly distributed to one of two groups: 1) With early cervical mobilisation (repeated cervical movements, 3 times/day, 15 min); 2) Without it. Both groups received analgesics, non-steroidal anti-inflammatory drugs for one week, cervical cold-packs for three days and cervical thermotherapy from the fourth day. Patients were asked to answer a questionnaire, at 4 and 12 weeks following the accident, to assess their condition. **Results:** 96.2% of patients could be followed-up to 12 weeks. Differences were found between the groups for the questionnaire at both follow-ups. The experimental group used less medication and showed lower percentage of sick-leave. Women of both groups showed slower recovery in comparison to men. The prototype of patient was: Female, 28–37 years old, level of studies middle-high, driving a car and impacted from behind. **Conclusion:** This study supports the use of an early mobilisation regime following soft tissue injuries of the neck to achieve better, and faster recovery. This mobilisation could be performed at home after being explained by a professional.

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O83

WHAT AIMS FOR REHABILITATION OF CHRONIC LOW BACK PAIN PATIENTS: DATA FROM A COHORT OF PATIENTS

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Aims: To identify therapeutic goals from the data of assessment of the patients. **Methods:** A cohort of thirty patients with common chronic low back pain (CLBP) (15 male, 15 female, mean age 42 years –22 to 54) have been assessed in this study: a) the gender, age, body mass index, pain intensity (VAS), pain expression (Saint Antoine Hospital Pain Questionnaire), anxiety (STAI), depression (BECK), disability (Roland-Morris), fingertip-floor distance; b) the peak torque of the flexor and extensor muscles of the trunk (Cybex 6000); c) the reduction of the Quality of Life (QOL) (Dallas questionnaire) has been measured for the different items gathered in activities of daily living (ADL), social interactions (IS), professional (W), mood (AD). **Results:** Comparing men and women we observed only significant differences according to the muscular strength. Pain intensity was only correlated with lumbar stiffness. Lumbar stiffness was correlated with QOL. QOL was also correlated with disability and depression. **Discussion:** In this population we observed an unusual link between pain intensity and lumbar stiffness (2). The QOL was mainly affected by the depression (1). The relations between pain and the other symptoms have to be revisited (3). The muscular impairment was usual but poorly correlated with the other symptoms. **Conclusion:** From these data, rehabilitation aims would be to improve the muscles and the flexibility of the trunk but a psycho-behavioural approach would be also useful.

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O84

HOW TO ESTABLISH CLINICAL PRACTICE GUIDELINES FOR PHYSICAL MEDICINE AND REHABILITATION: THE SOFMER METHODOLOGY?

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Introduction: Precise recommendations for pharmacological treatment are easy to formulate with simply the drug name and exact dosage. Nonpharmacological recommendations such as rehabilitation are less easy to formulate in helping practitioners and patients make decisions about appropriate health care for specific clinical circumstances. **Aim:** To develop a specific methodology to elaborate recommendations for rehabilitation interventions that could be adapted more closely to the daily practice of physicians and facilitate the correct prescription of a clear intervention and thus better clinical improvement for the patient. **Methods:** By studying and learning from the EULAR methodology (1), the MOVE consensus (2), and the Philadelphia panel (3), we have elaborated a new method to develop recommendations for rehabilitation, one that is based on published results of clinical trials, evaluation of daily practice

in France and multidisciplinary expert opinion, including patient opinion, to elaborate recommendations for rehabilitation interventions. **Results:** The following steps were used: choice by a steering committee of questions relevant to the topic; systematic literature search by professionals of several databases (PubMed, Pascal Biomed, and Cochrane); analysis of articles by multidisciplinary experts; evaluation of physicians' prescription and daily practices for rehabilitation; and final external review by a reading committee composed of multidisciplinary health care professionals and patients. This methodology was used twice in France, first in 2006 to establish recommendations for rehabilitation in lower-limb osteoarthritis. **Conclusion:** This SOFMER method may help physicians and patients accept recommendations for orthopaedic rehabilitation, which have a pivotal role in treatment for joint diseases.

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O85

ULNAR NERVE NEUROPATHY IN TRAUMATIC BRAIN INJURY PATIENTS

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Patients who sustained a traumatic brain injury (TBI) have a higher incidence of peripheral nerve injuries. A variety of nerve injuries is seen, the most frequent of which is ulnar nerve entrapment (UNE) at the elbow. The most common cause of UNE after TBI is periarticular heterotopic ossification (HO). Two case studies of UNE after TBI due to elbow flexor spasticity without HO are presented. The dynamic anatomy of the cubital tunnel accounts for the irritation of the ulnar nerve in patients with spasticity. Most of these patients have no subjective complaints. The diagnosis is made only when intrinsic atrophy is noted in the hand. To achieve an earlier diagnosis we advise not only to perform an X-ray and ENMG evaluation in patients with spasticity of the elbow flexors, but to also add an ultrasound evaluation, which can lead to an earlier diagnosis and treatment, and thus to a better outcome. Prolonged compression of the nerve leads to incomplete recovery.

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O86

REFERRED SENSATIONS AFTER TRAUMATIC NERVE INJURY OF THE HAND – IMPLICATIONS FOR UNDERSTANDING CENTRAL NERVOUS SYSTEM REORGANISATION

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Objective: The aim of this study was to explore if patients with traumatic peripheral nerve injury of the hand perceived referred

sensations, which are sensations that are perceived to be emanating from a body site other than the one that is stimulated. Referred sensations have been reported following amputation, somatosensory differentiation, local anaesthesia, stroke, and spinal cord injury and CRPS type 1 and provide evidence that reorganization takes place in the adult brain with extreme rapidity. *Design:* Patients with sensory loss due to a traumatic peripheral nerve injury underwent a standard neurologic examination on the face, upper body and legs involving light touch with a cotton swab. Patients were asked to describe the location of the stimulated site, the sensations emanating from it and any other sensations they experienced. Patients that tested positive were longitudinally followed. *Results:* We found clear and reproducible referred sensations in three out of 10 patients that were examined. The first patient reported referred sensations on his cheek and contralateral hand. The second patient reported referred sensations at several occasions and with different modalities at his cheek, ear, shoulder and contralateral hand. A third patient had a completely distorted mapping of the skin area of the hand. *Conclusions:* Referred sensations in traumatic nerve injury were found, providing evidence of reorganization of the central nervous system after peripheral injury. The referred sensations indicate a non-optimal reorganization of the central nervous system and may be one aspect that explains the inferior recovery after the peripheral nerve injury.

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O87

AN UNUSUAL CASE OF CHONDROCALCINOSIS

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A 64-year-old woman complained of swelling of the thumb on her right hand. She first noticed pain and swelling two and a half years ago. On monthly basis the pain got worse and then diminished. Both clinical and radiological examination showed a complete swelling of the carpometacarpal joint and a mass effect of the interossei of metacarpal I and II. Initially the lesion was suspected to be a malignant tumor and a biopsy was taken. On histological examination the tissue consisted of infiltrations of macrophages and giant cells. There was no evidence of malignancy. There were depositions of calcified materials. The diagnosis of calcinosis was made. The precipitation of crystals of calcium pyrophosphate dehydrate in connective tissues may be asymptomatic or associated with several clinical features. Chondrocalcinosis refers to radiographic calcification in hyaline and/or fibrocartilage. Chondrocalcinosis has been found to affect from 8 to 10 percent of individuals aged 60 and older (1). There is no major sex predominance. Over the years scientific insights into the pathogenesis of the formation of calcium pyrophosphate dehydrate crystals has grown. Although in most cases the deposition of crystals is idiopathic, sometimes an underlying disorder is associated with the disease, particularly in young persons (2). Most of the patients with chondrocalcinosis are asymptomatic. Chondrocalcinosis should be considered as a differential diagnosis in patients with acute or subacute attacks of arthritis (most over the age of 65).

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O88

CASE REPORT: EOSINOPHILIC FASCIITIS: AN UNUSUAL CAUSE OF CHRONIC EXERTIONAL COMPARTMENT SYNDROME OF BOTH LOWER LEGS

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Introduction: Chronic exertional compartment syndrome (CECS) is an uncommon cause of lower leg pain. Although the syndrome is mostly diagnosed in athletes, eosinophilic fasciitis is a very rare cause of CECS. While it is clear that elevated tissue pressure is responsible, the exact pathophysiology of the pain sensation remains unknown. *Aim:* Tracing the etiological factors of chronic exertional compartment syndrome can avoid unnecessary surgical treatment. *Patients & Methods:* We report one case of a 21-year-old female with an unusual cause of chronic exertional compartment syndrome of both lower legs. We reviewed the literature concerning the etiology of CECS. *Results:* In this case the lower leg pain due to a chronic exertional compartment syndrome was the first symptom that led to the diagnosis of eosinophilic fasciitis, an uncommon connective tissue disease. The patient was successfully treated with immunosuppressive drugs and there was no need for surgical treatment. *Conclusion:* In case of chronic exertional compartment syndrome, a profound etiological work out is essential since surgical treatment can be avoided.

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O89

CROWNED DENS SYNDROME

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We present a 75-year-old man admitting at the emergency department with vague cervical pain since 5 weeks, strongly increased the last two days. He has also fever up to 37.8°C. Clinical examination reveals a marked restricted motion of the cervical spine, without meningeal signs. Biological tests show a strongly elevated CRP and sedimentation rate. Differential diagnosis includes meningitis, cervical spondylodiscitis and polymyalgia reumatica/giant cell arteritis. MRI and CT imaging show inflammation and calcification in the atlantodental joint. The diagnosis of 'Crowned Dens Syndrome (CDS)' is made. The CDS is a clinical-radiological entity characterised by calcification of the ligaments surrounding the odontoid process of the axis and by acute attacks of cervicooccipital pain, with fever, rigidity (particularly in rotation) and general signs of inflammation lasting from days to several weeks. CT imaging at the C1–C2 level is the reference standard and is superior to MRI in identifying these calcifications. Other inflammatory diseases and tumors should be excluded. Underlying causes are mostly crystal (such as calcium pyrophosphate dihydrate or hydroxyapatite) deposition diseases, but it may be accompanied by other diseases affecting the joints such as rheumatoid arthritis, seronegative spondylarthropathy and systemic sclerosis. Prednisolone and nonsteroidal anti-inflammatory drugs are the

recommended treatment for symptom relief. The crowned dens syndrome is probably more common than previously recognized, especially in elderly patients.

O90

COMPARATIVE STUDY OF DIET OPTIMIZATION AND PHYSICAL TRAINING IN PATIENTS WITH OSTEOARTHRITIS AND METABOLIC SYNDROME

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Introduction: Many of our elderly patients which suffer from Osteoarthritis (OA) have associated comorbidities, such as complex metabolic syndrome (MS). **Aim:** The comparative evaluation effects of diet and physical training upon patients with MS and OA. **Materials and Methods:** A randomized prospective study of 17±0.6 weeks on 42 patients. The inclusion criteria of the study was patients with MS, based on International Diabetes Federation (IDF 2005) and vertebral and knee OA, divided in two groups (27 patients - with diet and exercise and 15 - the control group, with diet only). It was record the body mass index (BMI), body fat (BF), lean mass and body water percent, systolic blood pressure (SBP) and diastolic blood pressure (DBP) at inclusion and after 2, 12 and 17 weeks. The physical activity level (PAL) was estimate by counting the daily number of steps during one week of current activity, using a pedometer (F. Bosh) and by measuring the Duke Activity Status Index (DASI). It was record also the MS lab parameters in the beginning and at the end of the study. At baseline, PAL and daily caloric intake (with Harris-Benedict equation) were determined. General indications regarding the diet and an individualized exercise training programme (cycloergometry exercise training, 3 times 6±2 min at 65–80% of maximal heart rate separated by 3±1 min active pauses, five times/week) were set for each patients in the study group. **Results:** After 16 weeks of study, 12 patients (44%) from the training group and 2 patients (13%) from the control group deed not meet anymore the IDF criteria of MS. We noticed also in the training group a significant improvement of DASI (mean difference (MD)=8.57±2.44, $p<0.001$ vs. 0.76±0.53, $p=NS$), BF percent (MD=5.08±1.4%, $p<0.001$ vs. 0.36±0.08%, $p=NS$), SBP (MD=2.71±0.6mmHg, $p<0.05$ vs. 0.82±0.45mmHg, $p=NS$) and HDL (DM=2.9±0.7mg/dl, $p<0.05$ vs. 0.3±0.24mg/dl, $p=NS$). **Conclusions:** A general diet recommendation along with individualized exercise training programmes for 17 weeks at moderate intensity has beneficial effects on MS components and improves the physical capacity of the patients with OA. The pedometer can be a valuable tool in estimating daily physical activity which can increase the PAL and motivation to move in patients with MS and OA.

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O91

PROLIFERATION THERAPY IN REHABILITATION PRACTICE – GENERAL CONCEPT AND PRACTICAL EXPERIENCE

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Introduction: Rehabilitation of soft tissue injuries – tendons and ligaments is challenging task because of high level of recurrence.

Classical approach known as a RICE (rest, ice, compression, elevation) is efficient on short term basis. The concept is based on combination of rest and suppression of acute inflammatory reaction. Considering poor blood supply of tendons and ligaments and inflammatory response as a part of natural healing process application of anti-inflammatory substances (ice, NSAID) will shut down “healing cascade” and produce incomplete restoration of damaged structures. Immobilization will create stiffness to the joints and more restriction of blood supply. As a result, laxity and instability of ligaments and tendons will develop. It will create early degeneration of the joint itself as well as surrounding supporting structures. To avoid such unfavorable outcome recurrent and chronic injuries should be treated with proliferate substances which will initiate regenerative process of damaged ligaments and tendons. **Aim:** To present general concept of proliferation (prolo) therapy in treatment of chronic musculoskeletal disorders. Also one and half year practical experience will be demonstrated. **Material & Methods:** Overview of literature related to concept and practical application of prolotherapy as well as retrospective study of 12 patients treated in our clinic. **Results:** Twelve patients, 4 men and 8 women received prolo therapy injections for variety of disorders; 4 lateral epicondylitis (tennis elbow) 3 plantar fasciitis, 3 patellar tendinosis (in 2 cases combined with knee osteoarthritis) and 2 for rotator cuff syndrome. All patients got significant improvement in pain reduction (measured by VAS) and functional achievement (measured by different functional tests). **Conclusion:** Our initial experience with prolotherapy in management of chronic soft tissue injuries are very encouraging. Reduction of pain and improvement of function were persisted for more than 6 month and in some patients for more than 1 year after initiation of treatment.

O92

PROSTHETIC MANAGEMENT OF CHILDREN WITH UPPER LIMB AMPUTATION

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Introduction and Aim: The aim of the study was to review the prosthetic management of children with congenital and acquired upper limb amputation in the Rehabilitation Department, ‘La Paz’ Hospital (Madrid, Spain). **Patients and Methods:** A retrospective analysis has been developed by reviewing medical files for children who visited the outpatient clinic from 2002 to 2007. The following data were collected: age, etiology, level of amputation, type of prostheses and also the occupational therapy training (OT). The functional status was evaluated with the Abilhand-Kids questionnaire due to the lack of other specific scales that are validated on the Spanish population. The related literature was also reviewed. **Results:** Twenty kids (8 male, 12 female). In 18/20 was congenital etiology, the more frequent level of amputation was the forearm (60%). Most of the children (16/20) received passive prostheses as the first option. Thirteen of them, were fitted with myoelectrical prostheses once they got the complete passive prostheses integration on DLA (Daily Live Activities). All the children received OT training with an optimal functional integration of the prostheses. **Conclusion:** We consider highly important the early upper limb fitting of these children due to both the cerebral plasticity and the possibility of cortical integration of the prostheses. This early fitting does easy up both the manual activities and the motor development of the children. The use of OT is a key as part of the prosthetic process. It is also important that parents can assume responsibility for the training of their children and achieve the same efficacy as the therapist in training them. Long-term studies are needed to determine the functional outcome of the early fitting with myoelectrical prostheses.

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O93

AMPUTATIONS AND CONGENITAL DEFICIENCIES OF THE UPPER LIMB IN PEDIATRIC POPULATION – 27 YEARS REVISION

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Introduction: Congenital skeletal deficiencies are the principal cause of upper limb amputation in the first decade of life whereas between the ages of 10 to 20 years is trauma. The first prosthesis of children with upper congenital limb deficiency must be adapted between 3 and 9 months in order to contribute to psychological and motor development, allowing the use of both upper limbs to crawl and assuming the standing position. Using a prosthesis later (2 to 5 years) results in a higher rejection rate because at this age, children already developed compensatory techniques. The steps of psychological and motor development are used to guide the prosthesis and components prescription. **Material and Methods:** The authors made a retrospective study consulting clinical files of children followed in consultation in the Paediatric Development and Rehabilitation Service, from 1980 and 2007, with the diagnostic of upper limb amputations and congenital deficiencies. From this population, the children with a prosthesis were selected and divided in two groups according to diagnostic. The final goal was to evaluate the efficacy of prosthesis utilization in this population. **Results and Conclusion:** The prescription at the correct time, the adequate rehabilitation program and family teaching are the key points for the child's functional independence. However, it is important to separate the concept of prosthesis function and its use. Benefits and losses should be discussed before prescription and beginning of rehabilitation treatment.

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O94

MANAGEMENT OF PAIN IN AMPUTEES

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Pain affecting the residual limb (stump) or felt in a phantom limb is an important factor influencing the outcome in amputees. This presentation will review causes of pain and the many strategies used to alleviate it. The focus will be on management of neuropathic pain and the use of physical modalities and psychological interventions as well as drug therapies in this context. Evidence for efficacy of each approach to management will be discussed.

O95

COMPARISON OF LIFE QUALITY BETWEEN PATIENTS WITH SALVAGE VS UNILATERAL BELOW KNEE AMPUTATIONS

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Introduction: It is well known that lower extremity salvage procedures need a long treatment period and that they are expensive. To

the best of our knowledge, functional evaluation of these patients and functional comparison between lower extremity salvage and amputations have not been performed up to date. **Aim:** In this study, we aimed to compare the functional outcomes of lower extremity salvage and amputation procedures. **Patients and Methods:** Nineteen patients who had major lower extremity trauma were recruited. Of those patients, 10 had below knee amputations and nine had lower extremity salvage procedures, and none of the patients had any accompanying diseases. Visual analog scale (VAS) and short form-36 tests were applied to all patients. Reoperations of each patient were also recorded. Energy expenditure index during walking in daily living activities was calculated. In order to determine the functional capacity and walking speed, 6-min walking test and 10-m walking test were applied to all patients. **Results:** When functionality was compared, there were no significant differences between the two groups (amputation vs lower extremity salvage) except that the general health status and vitality of the amputation patients were better ($p < 0.032$ and $p < 0.006$, respectively). VAS scores and reoperation rates of the salvage group were statistically higher in the amputation group ($p < 0.004$ and $p < 0.020$, respectively). **Conclusion:** According to our results, amputation seems to be more favorable when compared with salvage for serious lower extremity traumas. Although there was no significant difference concerning functionality; we found that amputated patients had more motivation, better mental status and lower complication rates. Therefore, we propose that amputated patients may return to social life much more faster than those with salvage.

O96

DEVELOPING A 'PROSTHETIC-KNEE-TEST-TRACK' TO ASSESS FUNCTIONING WITH A MICROPROCESSOR-CONTROLLED PROSTHETIC KNEE-DEVICE IN INDIVIDUALS WITH LOWER-LIMB AMPUTATION

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Introduction: In rehabilitation centres, there is need for a simple and reliable test to demonstrate differences in functioning with a microprocessor-controlled prosthetic knee-device (MPK) compared to functioning with a non-micro-processor-controlled prosthetic knee-device (NMPK). Moreover, literature lacks studies focussing on proper assessment of functional performance using prosthetic knee devices. **Aim:** The aim of our study was to develop a Prosthetic-Knee-Test-Track (PKTT) for easy assessment of differences in functioning with MPK versus NMPK. **Patients and Methods:** Nine subjects (8 male, age 39-72 years, mean age 52), with unilateral lower limb amputation (5 transfemoral, 3 knee-exarticulation and 1 hemipelvectomy) were included in the study. All subjects had sustained experience using both NMPK and MPK. They performed several functional tests with both prosthetic knees. In addition to the test track, all subjects completed a mobility questionnaire. Main outcome measures were: Balance variables, Timed-Up-and-Go test, Hill-Assessment-Index score (HAI) and hill ascent and descent time, Stair-Assessment-Index score (SAI) and stairs ascent and descent time; step frequency, zigzag course step length and walking speed, stepping over obstacles performance, soft surfaces negotiating, walking with a tray performance; Self-Selected-Walking-Speed and maximum walking speed. Daily life representation was determined by comparing the Locomotor Capability Index-5 to the other test results. **Results:** Distinct significant differences were found only for negotiating a slope and a stairway (time and HAI for hills descent, time and SAI for stairs descent). The performance on most other test-conditions was somewhat better for subjects using MPK compared to using NMPK, but these differences were not significant due to group variance. **Conclusion:** On basis of these results the PKTT exists of a slope and a stairway only. Other test-conditions were excluded

from the PKTT because they could not discriminate reliably between subject's performance with MPK versus NMPK.

O97

C-LEG® PROSTHESIS FOR TRANSFEMORAL AMPUTEES IN ISRAEL SATISFACTION AND EFFECTIVENESS OF PHYSIOTHERAPY

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Introduction: The use of C-Leg® computerized knee system for transfemoral amputees has begun in 1995. Research has shown several advantages in using C-Leg compared with other hydraulic knees. In Israel, the C-leg was fitted since 2005, to veteran soldiers who were injured during their military service and are using prosthetic knees for over 15 years. In order to make the best out of the innovative knee system, the fitting process was accompanied by close physiotherapy guiding. **Aim:** To evaluate patients' satisfaction of using C-Leg® compared with other hydraulic knees, and the efficiency of physiotherapy guiding during the fitting process in Israel. **Methods:** Self-report questionnaires were sent via e-mail to 45 veterans. All patients were injured during their service, and were trained between 2005–2007. Age of patients was 36–68. 47.6% had their sound leg injured, and 61.9% suffer from other disease. The questions regarded demographic details, advantages and disadvantages of C-leg and personal attitudes. Other questions referred to possible changes in daily functions: walking in different speeds, going downhill, stairs descending, and multi-tasking performance. The patients were also asked to evaluate effectiveness of physiotherapy. **Results:** 68% of the patients indicated safety as the most important advantage of C-Leg. 81% feel safer while walking, and 42.9% reported positive changes in fast walking. All patients reported an improvement in performance of daily activities. The Patients were satisfied by physiotherapy, and pointed its importance. All patients noted the C-leg as their knee of choice. Patients mentioned unique disadvantages: battery charge, avoiding water and delay in fixing faults. **Conclusions:** The advantages of the C-leg system over other knees were examined in veteran amputees. Patients feel safer while walking, and their ability to walk in higher speeds is improved. Disadvantages such as battery charging, inability to work in aquatic areas, and the possible delay in fixing prosthetic faults were noted. Physiotherapy guiding during fitting is recommended.

O98

EFFECTS OF ELECTRONICALLY CONTROLLED PROSTHETIC KNEE HINGES ON PERFORMANCE OF COMMON DAILY ACTIVITIES

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Introduction: To date, much attention in the objective evaluation of electronic leg prostheses usage for patients with a transfemoral amputation is paid to function and impairment rather than on activity and participation. For the patient it is important to know what kind of daily activities (s)he eventually can perform after rehabilitation. **Aim:** To evaluate the added value of three different types of prosthetic knee hinges in performing common daily activities. **Patients and Methods:** 10 transfemoral amputees (7 males, 3 females) with a mean age of 60.6 years (SD 13.0) participated. They performed a specifically designed 'participation circuit' consisting of 11 different common daily activities, using three different types of knee hinges, i.e. a conventional, an electronic stance and swing phase controlled and an electronic stance phase controlled knee hinge. For each activity, performance time was measured. Self-perceived difficulty

was scored using a Visual Analogue Scale (VAS). Also the Hill Assessment Index (HAI) and the Stair Assessment Index (SAI) were administered. **Results:** During common daily activities in which the movement 'reaching high or low' was required (e.g. hanging out laundry, supermarket shopping and kitchen activities) performance time was lower for the electronically controlled prostheses. Differences were ranging from 2% to 15%. SAI data showed that the quality of stairs negotiation was improved with a mean of 4 points in all conditions with the electronically controlled knee hinges relative to the conventional mechanical prosthesis conditions. HAI data did not differ between conditions. **Conclusion:** First results indicate that our participation circuit may differentiate between abilities of individual patients in (not) using the different features of the electronically controlled knee hinges in daily performance. Participation circuit data may provide information additional to standard gait parameters, giving further insight in patients' abilities in daily conditions.

O99

DYNAMIC BALANCE CONTROL IN LOWER LEG AMPUTEES

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Introduction: Balance control in standing is generally expressed in terms of static weight distribution between the legs obtained by Centre of Pressure (CoP) position. In this study the individual (dynamic) stabilizing mechanisms of both legs in response to perturbations is assessed. **Aims:** To determine the dynamic balance control (DBC) of both the prosthesis and intact side. **Patients and Methods:** 6 transfemoral, 8 transtibial amputees and 5 controls were included. Subjects stood on a force platform mounted on a motion platform and were instructed to stand still. The experiment consisted of 1 static trial and 3 perturbation trials with continuous random sagittal platform movements consisting of a multiple sine signal (0.06–2.37 Hz). Weight distribution during the static (SW) and the dynamic perturbation trial (DW) were calculated by dividing the average vertical force below the prosthesis foot by the sum of forces below both feet. The Dynamic Balance control (DBC) represents the ratio between the stabilizing mechanism of the prosthetic leg to the stabilizing mechanism of the non-amputated leg. The stabilizing mechanism is calculated from the corrective ankle torque in response to sway. **Results:** All patients showed an asymmetric weight bearing (SW and DW) in favor of the non-amputated leg. The DBC ratio showed that the contribution of both legs to balance control was even more asymmetric. Moreover, the actual balance contribution of each leg was not tightly coupled to weight bearing in each leg, in comparison to the controls. **Conclusions:** The contribution of the prosthetic leg to balance control is not a mere reflection of the weight distribution. This method could help to evaluate a lower limb amputee's ability to compensate for the loss of a leg and the necessity for (and efficacy of) balance training.

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O100

FIRST EXPERIENCES WITH THE USE OF THE SIGAM-WAP SCORE DURING INPATIENT REHABILITATION AFTER LOWER LIMB AMPUTATION

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Introduction: Approximately 3,000 major lower limb amputations are performed annually in the Netherlands. About 50% of all am-

putee patients receive prostheses. Outcome measurements are of increasing interest for management, patients and insurance companies. Therefore the Dutch Special Interest Group on Amputation Medicine (WAP) used the SIGAM-WAP1 score (SIGAM score2 Dutch translation) to assess mobility of amputee patients. The score gathers information about mobility of lower limb amputee patients. *Aim:* To investigate the feasibility to use the SIGAM-WAP score to assess outcome of inpatient rehabilitation after lower limb amputation. *Methods:* From 1–12–2006 until 31–5–2007 all inpatients admitted after a major lower limb amputation were included in the study. On admission and at discharge mobility of all amputee patients was measured by the SIGAM-WAP score. The score has 6 classes: A: no prosthetic use towards F: fully mobile with prosthesis without aids in all conditions. A Questionnaire of 21 yes/no items scales the activities. An algorithm reveals distinct mobility classes. Mobility score, duration of treatment and patient characteristics were gathered for evaluation. *Results:* Data were obtained from 112 patients admitted to 9 different Rehabilitation Centres. This was a good sample of the inpatient rehabilitation population in Dutch Rehabilitation Centres. 99 patients completed their inpatient training in the study period. Age: M: 62.0 years (range 25–88 years); Amputation level: HP 2%; TF 25%; KE: 10%; TT: 40%; Bilateral: 23%. Average admission time: 101 days (SD 61 days) SIGAM-WAP scores: Adm./Disch.: Class A: 92/33 ; Class B: 1/9; Class C: 3/29, Class D: 0/23 ; Class E: 3/4; Class F: 0/1. *Conclusion:* After inpatient rehabilitation 68% of the amputee patients walked with prostheses. All patients were discharged home after inpatient rehabilitation. The SIGAM-WAP score is easy to apply. Use of the SIGAM-WAP score facilitates multi-centre pooling of information about prosthetic mobility after rehabilitation treatment.

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O101

THE INFLUENCE OF INDUCED PAIN ON LUMBAR MUSCLE RECRUITMENT DURING TRUNK EXTENSION, EVALUATED BY FUNCTIONAL MRI

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Introduction: Numerous studies have demonstrated changes in structure and activity of the trunk muscles in low back pain patients. Still, the mechanisms of these changes are poorly understood. Experimental pain studies can help to elucidate motor control mechanisms which are affected by pain. Muscle-functional-MRI is an innovative technique that enables to investigate the activity pattern of muscles by quantifying shifts in signal intensity. *Aim:* The aim of this study is to investigate lumbar trunk muscle activation after trunk extension, with and without muscle pain. *Patients and Methods:* 15 healthy subjects underwent three MRI's: 1) after rest 2) after exercise and 3) after exercise with muscle pain. Subjects performed a trunk extension exercise, in a standardized and controlled manner. Acute muscle pain was elicited by injection of hypertonic saline in the right longissimus muscle. The signal intensity of the lumbar erector spinae, lumbar multifidus and psoas muscles was analysed. *Results:* After the trunk extension, there was a significant increase in signal intensity for the erector spinae and the multifidus muscle, indicating muscle activity. For the psoas muscle, there was no significant change in signal intensity. After the same exercise, performed with deep muscle pain, a difference in signal intensity was found for all the investigated muscles. The results demonstrate a decrease in activity of the lumbar erector

spinae, lumbar multifidus and psoas muscles, at the left and right side, due to unilateral muscle pain.

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O102

PATIENT PREFERENCE DISABILITY QUESTIONNAIRE IN CHRONIC LOW BACK PAIN: A CROSS-SECTIONAL SURVEY

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Objective: To assess patient priorities in disability in chronic low back pain (CLBP). *Patients and Methods:* One hundred and fifty CLBP patients (61 males) fulfilling the inclusion criteria for CLBP were evaluated by the McMaster-Toronto Arthritis Patient Preference Disability Questionnaire (MACTAR), the Quebec Back Pain Questionnaire (QUEBEC), Hospital Anxiety and Depression scale (HAD), the Fear-Avoidance Beliefs Questionnaire (FABQ), the Coping Strategies Questionnaire (CSQ) and the pain and handicap visual analogue scale (VAS). Correlations between scores were analyzed by the Spearman coefficient. *Results:* Of the patients investigated, 65 (43.3%) had more than one diagnosis; 56 (37.3%) had lumbar disc disease, 39 (26%) central spinal stenosis or lumbar spinal stenosis, 61 (40.7%) spondylo osteoarthritis, 39 (26%) disc herniation, 19 (12.7%) spondylo listhesis, 15 (10%) others diagnosis. The three disability domains, classified by the International Classification of Functioning, Disability and Health (ICF), most often cited were community, social and civic life ($n=137$ activities, 31.5%), mobility ($n=118$, 27.1%) and domestic life ($n=112$, 25.7%). The MACTAR score correlated moderately with VAS handicap ($r=0.52$), fairly with the QUEBEC ($r=0.40$) but only weakly with FABQ score for physical activities ($r=0.28$) and had no correlation with HAD, FABQ, and CSQ scores. *Conclusions:* For assessing CLBP patient priorities in disability, the MACTAR has acceptable construct validity. The weak correlation between QUEBEC and MACTAR scores suggests that the MACTAR adds important information on patient's disability.

O103

MULTIDIMENSIONAL ASSESSMENT IN CHRONIC LOW BACK PAIN: MINNESOTA MULTIPHASIC PERSONALITY INVENTORY 2 AND MCGILL PAIN QUESTIONNAIRE

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Introduction: Chronic low back pain (LBP) is defined as a pain that persists greater than more three months or longer than expected time period for healing. In the USA, back pain is the most common cause of activity limitation in people younger than 45 years, the second most frequent reason for visits to the physician, the fifth-ranking cause of admission to hospital, and the third most common cause of surgical procedures. *Aim:* To evaluate qualitative and quantitative characteristics of chronic LBP obtained from VAS and MPQ with personality clusters obtained from MMPI-2. *Patients and Methods:* 91 patients (34 M, 57 F) with mean age of 52.8 (range 32–70) were

examined. The evaluation scales administered were VAS and the McGill Pain Questionnaire for LBP while MMPI-2 to study the psychological profile. Statistical analysis was executed: descriptive statistics and T-student distribution were performed to analyse the patients' distribution according to sex. **Results:** Demonstrated statistically significant outcomes for MPQ (PRIA, PRIM, PTOT) and for MMPI-2* considering the subscales L*, PD*, PA* e SC* between male and female. Statistically significant outcomes were obtained by MPQ and MMPI-2* for PRIS with PA*, PT* and SC*, for PRIA with PA* and PT*, for PRIM with PD* and SC, for PTOT with PD*, PA*, SC* e PT*, for PRIS with FB*,FRS*,DEP*,HEA*, WRK*, for PRIA with ANX*, FRS* and HEA*, for PTOT with FB*,HEA* and FRS*. **Conclusion:** Patients showed personality profile that suggest a chronic low back pain, especially with an increase in hypochondria and depression scale.

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O104

RELATIVE IMPORTANCE OF PAIN RELATED DISABILITIES AMONG LOW BACK PAIN PATIENTS

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Introduction: Oswestry Disability Index (ODI) is widely used in research as well as in clinical practice for measuring functional status of low back pain (LBP) patients. All ten functions are given equal weight when computing the overall ODI score. However, all functions may not be of equal importance in a patient's daily life. **Aim:** The aim of this study was to evaluate the relative importance of the ten functions assessed by patients to produce the ODI score among a sample of Finnish LBP patients in South-Western Finland. **Patients and Methods:** The first 58 adult LBP patients drawn systematically from the referrals to the Turku University Central Hospital, department of Physical and Rehabilitation Medicine, formed the sample of this preliminary study. The relative importance of each item was determined by using 10 cm long double-anchored horizontal Visual Analogue Scales (VAS), with endpoints from extremely unimportant (0) to extremely important (100). **Results:** Overall, the relative importance of the functions assessed varied considerably, women giving generally slightly higher scores than men. Both sexes assessed the highest importance to the ability to sleep, men (87.3), women (87.5) and the least important function was the ability to travel, men (65.4), and women (71.7). However, these differences between sexes were statistically non-significant. Age correlated negatively ($r=-0.277$) with the importance of sex life ($p<0.05$). This was pronounced among men ($r=-0.371$). Among men also age and importance of social life were significantly ($p<0.05$) correlated ($r=-0.435$). Pain intensity measured with VAS did not correlate with the importance of any of the ten determined functional abilities. **Conclusions:** The findings indicate that the ten functions included in ODI have varying importance to LBP patients and this should be taken into account when estimating overall functional status.

Reference:

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O105

CHRONIC LOW BACK PAIN AND FUNCTION

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Background: Chronic Low Back Pain (LBP) is a highly prevalent disorder (1, 2), interfering with the functional level and social activities (3–5). It represents a significant economic burden to the

patient, family and community. It is also a therapeutic challenge for Physical and Rehabilitation Medicine. **Methods:** Thirty-two patients (25 female and 7 males) living in the Central Region of Portugal, aged 40–80 years with LBP for more than 12 weeks were included in this study. The Visual Analogical Scale (VAS) and Oswestry Disability Index (ODI) were used to assess the patients at the end of their rehabilitation program (which consisted of 15–45 sessions with physical agents and kinesiotherapy). Statistical analysis was done using SPSS software version 15.0. **Results:** The average age of the patients was 59.25±9.26 years. They had pain for 7.6±8.74 years. The VAS average score was 48.7 mm±18.77 and the total average ODI score was 19.6 (representing a moderate disability of 39.2%); the sub score averages of this index were the following: 'pain intensity' 2.88±1.01, 'personal care' 1.22±1.05, 'lifting' 2.78±1.07, 'walking' 1.44±1.08, 'sitting' 2.16±1.0, 'standing' 2.09±1.3, 'sleeping' 1.50±1.2, 'sexual life' 1.87±1.66, 'social life' 2.19±1.12 and 'travelling' 1.91±1.17. Statistical analysis showed a positive correlation between 'walking' and 'personal care' ($r=0.455$, $p=0.01$), 'lifting' ($r=0.562$, $p=0.01$) and 'sexual life' ($r=0.572$, $p=0.01$); there was also a positive correlation between 'personal care' and 'sexual life' ($r=0.564$, $p=0.01$); 'travelling' and 'social life' ($r=0.456$, $p=0.01$). **Discussion and Conclusion:** Considering the reduced number of subjects included in this pilot study, it is not possible to generalize about the results. At the end of the rehabilitation program, patients reported high levels of perceived pain and disability in Daily Living Activities (DLA). The average ODI score is consistent with moderate to high disability. Impaired functional performance is especially significant in relation between walking and DLA, lifting and sitting. Reformulation of the rehabilitation program is warranted in the following areas: increased analgesic therapy (both drugs and physical agents); more active kinesiotherapy (muscular strength, aerobic conditioning, VO₂max.); and introducing an educational package (posture, lifting and carrying weights).

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O106

MANAGEMENT OF LOW BACK PAIN IN PRIMARY CARE

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Introduction: Chronic low back pain is a major socioeconomic health issue, due to direct and indirect costs and sick-leave payments. **Aim:** To describe the management of patients in primary care, before their referral to a multidisciplinary clinic, and to compare this management with international guidelines. **Patients and Methods:** Descriptive retrospective study based on a questionnaire survey of the general practitioners of 72 chronic low back pain patients. **Results:** Patients were followed for their back pain by their GP since 49 months, with a frequency of 8 appointments per year per patient. 93% had been referred to a rheumatologist and 60% to a surgeon. 98.5% had had lumbar radiographies, 80% a computed tomography and 64% an MRI. The most commonly prescribed medications were classical

analgesics and anti-inflammatory drugs. 30% of patients had already received morphine analgesics, and 50% antidepressants. 32% had had a lumbar surgery. Physical therapy was frequently prescribed, and 6% of patients had had more than 100 sessions. 86% of patients had been once or more on sick leave. The number of days of sick leave reached an average of 8.25 months. *Conclusion:* These results confirm the difficulty in following the international guidelines, which recommend few radiological examinations and an early return to work. The delay before referral to a multidisciplinary clinic is long. Helping GPs to organise this referral earlier is important. Determining predictive factors of chronicisation is also crucial.

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O107

COMPARISON OF FUNCTIONAL RESTORATION WITH 3 HOURS PER WEEK PHYSICAL THERAPY IN CHRONIC LOW BACK PAIN AT TWO YEARS FOLLOW-UP

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Introduction: Functional restoration programs (FRP) are recommended in chronic low back pain, but are only available for a limited number of patients. An ambulatory active individual therapy (AIT) could be an easier option. *Aim:* A prospective randomized controlled study to compare the medium-term outcomes of an AIT with those of a FRP. *Patients and Methods:* One hundred thirty-two adults were treated during five weeks, either in a FRP (150 h in a rehabilitation centre) or in an AIT (15 h supervised by private practice physiotherapists). Evaluation criteria were trunk flexibility, back flexor and extensor endurance (Ito and Sorensen tests), general endurance, pain intensity, Dallas Pain Questionnaire (DPQ) scores (on daily activities (DA), anxiety depression, social interest, and work and leisure activities (WL)), and the number of days of sick leave. *Results:* Fifty-one percent of patients were on sick leave before treatment (mean duration, 180 days in the 2 years before treatment). All outcome measures improved after treatment, except endurance in AIT. At two years follow-up, 15 patients (11.3%) were lost to follow up; all physical criteria (except endurance) were better than before treatment without difference between groups; pain intensity was improved only in FRP; DPQ scores were improved only on DA and WL, with better results on WL in FRP. The number of days of sick leave in the two years after treatment was significantly improved, with no difference between groups (73.5 days in AIT versus 53.5 in FRP, $p=0.45$). *Conclusions:* AIT shows good results and could be sufficient for a large proportion of patients, but further studies are necessary to precise orientation criteria between the two therapies.

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O108

WALKING INDEX FOR SPINAL CORD INJURY – WISCI

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Introduction: Walking function is the first goal of the comprehensive rehabilitation after Spinal Cord Injury. Last years a new

instrument – WISCI – more detailed and more sensitive than former – for estimation of recovery of walking in SCI has been described. *Aim:* To estimate the functional capacity of tetraplegic and paraplegic persons as the result of the comprehensive rehabilitation after Spinal Cord Injury. *Material and Methods:* 40 consecutive Spinal Cord Injury patients has been involved in this study. Some of them were tetraplegic (tetraparetic), some were paraplegic (paraparetic) persons. All patients received early (average 1 month after injury) comprehensive rehabilitation in the specialized rehab centre. Patient's walking function was evaluated using standardized measures for functional capacity: ASIA scale, Barthel Index, Functional Independence Measure (FIM) and a new one: Walking Index for Spinal Cord Injury. WISCI was published for the first time by John F. Ditunno jr. in 2000 and validated in multi-centre study in 2005. The WISCI is more detailed and more sensitive for estimating of walking recovery than the other scales. It consists of 21 levels in which the less is level 00 (patient is unable to stand and/or participate in assisted walking) and the highest level is 20 (ambulates 10 meters with no devices, no braces and physical assistance). *Results:* At discharge, after two month of comprehensive rehabilitation, the most frequent WISCI levels were: 13 (ambulates 10 m with walker, no braces and no physical assistance), 16 (ambulates 10 m with two crutches, no braces and no physical assistance) and 20. *Conclusions:* Walking Index for Spinal Cord Injury – WISCI – seems to be very simple, detailed and sensitive instrument for estimating of walking function after Spinal Cord Injury.

O109

GAIT PERFORMANCE AFTER SPINAL CORD INJURY

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Introduction and Aim: Due to the variability in injury level, degree of spasticity and muscle weakness, a variety of gait patterns in spinal cord injured (SCI) can be expected. The aim of the study was to objectively document the characteristic gait patterns in patients with SCI. *Patients and Methods:* Twenty-one patients (43.8 years±10.7) and 12 control subjects were included. All subjects underwent a 3D gait analysis including kinematics, kinetics, and surface EMG, resulting in 54 gait parameters. We use a student t-test for comparison with the normal reference data ($p<0.01$), and ANOVA analysis to examine the differences between observed gait patterns. *Results:* Considerable inter-subject variations were recognized across the patients. About 50% of the patients (N=10/21) presented with an asymmetric pattern. Of the patients who walked symmetrically, about 43% (9/21) were characterized with crouch, of which 6 patients presented with fixed crouch, and 3 patients with a dynamic crouch. Two patients showed bilateral knee hyperextension in stance. The more involved side of the asymmetric gait was characterized by ankle plantar flexion at initial contact, reduced ankle dorsiflexion and knee hyperextension in stance, lack of ankle dorsiflexion and reduced knee flexion in swing, and pelvic retraction ($p<0.01$). The contra-lateral, less involved side showed knee flexion at initial contact, increased ankle dorsiflexion in loading response and pelvic protraction ($p<0.01$). Patients with fixed crouch walked with small steps, slow velocity and reduced ROM in flexed position at the hip, knee, ankle ($p<0.01$). Dynamic crouch showed excessive ankle dorsiflexion, knee flexion and lack of hip extension, but a better ROM compared to the fixed crouch. Patients with knee hyper-extension also showed a lack of ankle dorsiflexion in stance and swing as well as increased internal hip rotation. *Conclusion:* Gait analysis data indicated that these patients presented with a variety of patterns at different levels, which were not related to the injury level, amount of spasticity or muscle weakness.

O110

NORMAL GAIT ANALYSIS

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Introduction: The human gait has traditionally been studied subjectively through visual observations. By combining advanced measurement technology and biomechanical modeling, human gait can now be objectively done. **Methods:** We study a group of 40 patients (25 women and 15 men) who were following an ambulatory treatment for different diseases in the Ambulatory of the IIIrd Rehabilitation Clinic from Bucharest between October 1 and December 31, 2007. We included in the study group only patients with normal gait and normal cardiovascular parameters. The analyzing strap we used for this study is a prototype designed by Romanian researchers: AGILE – GAIT 95 System. We chose to take into account few parameters from the total pressure curve, forward gait curve and laterality analyzing curve: number of steps, gait speed, laterality, and average footsteps pressure, tossing and weight center variation. **Results:** We tried to identify parameters for normal gait analysis: 4 steps on the strap, average gait speed 4.23 sec±0.07, average laterality: 21.3±0.5 cm, average footsteps pressure 67.5±0.8 kgf, tossing: 5±0.5 cm, weight center variation: 3.9±0.9 cm. **Discussion:** We need to continue analyzing more patients to obtain statistical significant values for gait analysis parameters and to enlarge the number of these parameters in order to be able to analyze pathological gait for different types of pathology from a rehabilitation point of view: neurological/ aftertrauma/ rheumatological before and after spine surgery/non surgical spine pathology. **Conclusions:** It is our first time to present to an international forum our data obtained during our first study in the domain of gait analysis using a Romanian gait analyzing strap in the Ambulatory of the IIIrd Rehabilitation Clinic in Bucharest.

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O111

TASK-ORIENTED CLIENT-CENTRED MODULAR TRAINING PROGRAM TO IMPROVE ARM-HAND-SKILLED PERFORMANCE IN CERVICAL SPINAL CORD INJURED PERSONS

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Introduction: In persons with a cervical spinal cord injury (C-SCI) arm and hand play a major role in the rehabilitation (1). Patients are mostly offered a comprehensive package of therapy including, among others, arm hand skilled performance (AHSP). However, current theories on motor learning indicate that individual goal setting and a more individualised multi-disciplinary rehabilitation program tailored to the patient's self-selected goals may enlarge patient's motivation and may improve rehabilitation outcome (2, 3). Additionally, there is a growing need to offer modular therapy programs because of a tendency to condense current rehabilitation programs and an increasing demand by patients for training specific skills. **Aim:** to develop and evaluate a specific task-oriented client-centred modular training program aimed at improving AHSP in persons with C-SCI. **Patients and Methods:** In this longitudinal clinical intervention study, persons with a C-SCI with problems concerning AHSP either during ($n=10$) or after rehabilitation ($n=10$) participate. Three individually chosen tasks are trained 3 days/week, in 3 sessions of 30 min/day for 8 weeks. The training program was centred on the individual patient's needs, taking into account personal possibilities and restrictions and combining prin-

cles of motor learning with principles of medical training therapy. Measures of the goal attainment scale (GAS)(4) and the Canadian Occupational Performance Measure (COPM)(satisfaction and performance) (5) are used to evaluate outcome directly after training and at follow-up (3 months post training). **Results:** Preliminary results show an improvement in the individual tasks as measured by the COPM on level of patients satisfaction (89%) and on level of performance (100%) and by the GAS score (89% obtained the set goal or better). At follow-up, training results, as measured by the COPM and the GAS, generally remain present. **Conclusion:** Although this study has not completed yet, results indicate that a client-centred task-oriented modular training program does lead to further improvement in AHSP in persons with C-SCI.

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O112

THE NEW SWEDISH POST-CONCUSSION SYMPTOMS QUESTIONNAIRE (PCSQ): A MEASURE OF SYMPTOMS AFTER MILD TRAUMATIC BRAIN INJURY

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Introduction: Patients between 16–60 years of age were referred to the Rehabilitation Centre at Södra Älvsborg Hospital, Borås, Sweden after a Mild Traumatic Brain Injury (MTBI) (1). The patients presented Post-Concussion Symptoms (PCS) such as headache, tiredness, irritability and dizziness. In a literature review in 1991, no valid Swedish checklist for measuring PCS after MTBI was found. **Aim:** To study the concurrent validity and the inter-rater reliability of the new Post-Concussion Symptoms Questionnaire (PCSQ) (2). **Patients and Methods:** The approach was to study the concurrent validity of the PCSQ when used as an interview questionnaire compared with a self-report questionnaire administered by the patients. The inter-rater reliability was also studied when two different raters administered the PCSQ interview. Patients with MTBI were consecutively contacted and asked whether they would be willing to participate in a follow-up intervention. The PCSQ was completed by the patients, who answered "Yes" or "No" to the standardized questions. The patients were then interviewed to check the certain "Yes" or "No" answers. The raters filled in their ratings independently. **Results:** The concurrent validity of answers in the self-report questionnaire compared with those in the interview ranged from 82–100 % of agreement. The inter-rater reliability results ranged from 93–100 % of agreement. **Conclusion:** The PCSQ with answers of "Yes" or "No" is a valid instrument. High reliability was found between the raters, which indicate that different team members can handle the PCSQ interview and this is valuable in rehabilitation.

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O113
PERFORMANCE IN POSTURAL CONTROL TESTS IS IMPAIRED IN WOMEN WITH RHEUMATOID ARTHRITIS

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Introduction: Rheumatoid arthritis (RA) is an inflammatory disease, which may destroy joint tissues. Even early RA typically causes stiffness, pain and sometimes fatigue. Decreased physical and functional capacity, pain and inactivity may contribute to a decrease in postural control. Impaired postural control in RA was reported already in 1989 (1). Surprisingly little research has been done on the subject since. Postural control is “a very complex entity that must be measured across different domains and it cannot be reflected by any one single measure” (2). **Aim:** To compare the performance of women with RA to that of control subjects in tests assessing different domains of postural control. An attempt was also made to clarify underlying mechanisms for the performance in the tests. **Patients and Methods:** Ninety-one women with RA and 110 controls. Postural control tests: timed one-leg stance test; timed up and go test; tests on force-plate. Muscle strength: grip, isometric knee extension/flexion. Aerobic capacity: submaximal bicycle ergometer test. Questionnaires: health assessment questionnaire; pain, self-rated general health, and self-rated postural balance (visual analogue scales); psychological distress. Clinical examination: e.g., presence of swollen or tender joints in the lower extremities; erythrocyte sedimentation rate; duration of the disease. **Results:** RA patients performed poorer in most of the postural control tests and they also were more dependent on visual information. RA patients also had worse muscle strength and aerobic capacity; they experienced more pain and psychological distress; and “felt” they have poorer balance and poorer general health than the controls. However, few clinically significant correlations were found between the postural control measures and the other assembled data. **Conclusion:** RA patients seem to experience impaired postural balance, which was also possible to verify by different postural control tests. Further studies are needed to determine the clinical usability of the different tests, and the underlying mechanisms behind the impaired performance in tests evaluating different domains of postural control.

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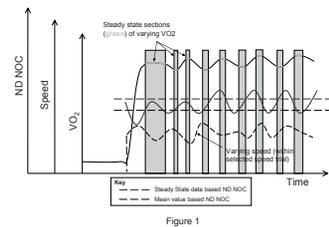
O114
THE ATTAINMENT OF STEADY STATE IN THE ASSESSMENT OF ENERGY COST OF WALKING – IS IT IMPORTANT?

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Introduction: The measurement of the energy cost of walking in children with cerebral palsy is frequently used for baseline and outcome assessment of intervention. Such measurement relies on the establishment of steady state that is deemed to be present when oxygen consumption is stable and is often assumed to occur when walking speed is constant. In practice however, speed and oxygen consumption can and does vary naturally. Whilst constant speed is achievable on a treadmill, this is often impractical in such patients, thus rendering an energy cost test to an element of subjectivity. **Aim:** To present a new objective method for the calculation of the energy cost of walking and compare it with a more subjective and yet commonly used approach. **Patients and Methods:** The new method applies a mathematically defined threshold for steady state within a walk-

ing trial and then strips out all of the non-steady state events within that trial (Fig 1). An average is then computed for the steady state data for each energy cost parameter according to the following formula as illustrated for non-dimensional net oxygen cost (Schwartz et al., 2006) (Equation 1):



The commonly used approach does not remove non-steady state data but rather, uses an average value over a complete walking trial. Both methods were applied to the calculation of several energy cost of walking parameters derived from self-selected walking speed data from a cohort of 50 unimpaired subjects and 50 children with

$$ND\ NOC = \frac{(Walking\ O_2 - Resting\ O_2)}{Walking\ Speed} \times \frac{1}{Body\ Mass \times Gravity} \text{ [non dimensional]}$$

a spectrum of cerebral palsy (1). **Results:** The results revealed that both methods were strongly correlated for each parameter but showed systematic significant differences ($p \leq 0.05$), in the form of outliers in a series of Bland-Altman plots of agreement when allowing for potentially varying self selected speed. **Conclusion:** The differences between the methodologies result from the rejection of non-steady state data caused by inherent (non-treadmill) speed variation that would otherwise have compromised the precise calculation of the true steady state derived energy cost of walking indices.

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O115
ISOKINETIC GRIP EVALUATION OF THE HAND – NORMAL VALUE AT HEALTHY POPULATION

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Introduction: The grip test is usually included in common protocols of functional evaluation. Till today a dynamometer Jamar was used to evaluate Maximum Isometric Strength. At this moment we use isokinetic dynamometers to analyse grip strength in isokinetic way. As a few bibliographic references for these evaluation techniques we have designed a study at healthy population to obtain the normal values of grip strength and the influence of individual factors, like sex, age and side-dominance. **Material and Methods:** A 321 healthy hands serial was included. The average age was 37.2 years old (ranged 17-63). Mostly of them were men (211 cases, 65.7%). 150 are side-dominant cases (46.7%). All of them has been evaluated by Dexter Hand Evaluation. Two speeds 30°/s and 60°/s was used in the study. And the extent used was 4.3 cm. Five trials was done in each velocity. We acquired Maximum Isokinetic Strength and Work. **Results:** The values was shown in the next table:

	Strength (kg)	Work (kg-cm)
30°/s	38.4	98.5
60°/s	35.0	86.7

The side-dominant hand are stronger than non-dominant ones (10.3% in 30°/s, $p < 0.001$; 11.9% in 60°/s, $p < 0.001$). Women had less strength than men (37% in both speeds, $p < 0.001$). The age has less important as isokinetic strength values are more or less the same till 39 years old. After that there is a slow drop of the strength in aged cases. At last we show tables of normal values at healthy population. The influence of sex and side-dominant are shown as a percentile distribution. **Conclusions:** The isokinetic strength evaluation of hand grip is a very value method in the functional evaluation of the hand. This study gives normal values in healthy hands and the influence of sex, age and side-dominance.

O116

FUNCTIONAL EVOLUTION OF DISTAL RADIUS FRACTURES DURING FIRST YEAR AFTER INJURY – ISOKINETIC TECHNOLOGY APPLICATION

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Introduction: The analysis of treatment of radius distal fracture results have to be sustained in objective and quantitative methods. As we use functional evaluation and dynamometric studies we can evaluate the evolution and final result of treatment. Also we can assess the evolution between the start of rehabilitation till first year after injury. It was especially important the use of isokinetic studies at wrist. **Patients and Methods:** 45 patients collaborate in a prospective and observational study for high energy fractures of distal radius fracture. The average age of patients was 41 years old. The treatments used were: orthopaedic (16 cases), reduction under anesthesia and stabilisation with Kirschner needles with Karpandji technique (15 cases), stabilization with plate (8 cases) and external fixation (10 cases). Patients were evaluated three times: at 3 months, 6 months and a final evaluation at the year of the injury. Each evaluation included: DASH, Fernandez's scale, grip strength with electric dynamometry Jamar, isokinetic evaluation of grip with Dexter at 30°/s and 60°/s speeds and isokinetic study of wrist flexo-extension at 45°/s. **Results:** At Fernandez's scale the score was: 14.1, 16.7 and 17.9. The DASH punctuation was: 33, 18, 12 consecutively. The isometric evaluation of grip strength shows that 3 months after injury the hand involved have a deficit of 43%, at 6 months 27% and at 12 months 18%. At isokinetic grip test the hand was 34% slow velocity and 32% slower in mean velocity. At 6 months 16% and 17% respectively. With a year of evolution the value was 10% and 11% respectively. The maximum isokinetic strength at 3 month was 37% for dorsal flexion of the wrist and 32% for volar flexion. At 6 months it reduced at 22% and 18% respectively, and finally at 12 months it arrives 16% and 11%. **Conclusions:** At the moment of return to work, the patients keep up deficits of function of hand and wrist. After a long period of evaluation, the period when the function increased is between 3 to 6 months after injury; when the patient start common activity. By the way, we can quantify the functional benefit that occupational activities have faraway the rehabilitation time.

O117

GAIT CHARACTERISTICS OF SUBJECTS WITH CHRONIC FATIGUE SYNDROME (CFS) AND CONTROLS AT SELF-SELECTED AND MATCHED SPEEDS

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Introduction: A slower gait has been reported in CFS patients in comparison to healthy controls (1, 2). No studies have investigated whether this is due to differences in specific gait parameters or a reflection of the slower gait. **Aim:** To compare the over-ground gait of those with CFS and controls at self-selected and matched speeds. **Patients and Methods:** Twelve CFS subjects and matched controls participated. Each subject walked at their preferred walking speed (PWS). The CFS subjects then walked at the pace of their matched control. A motion analysis system was used to investigate the gait including; temporal and spatial parameters and sagittal plane range of motion (ROM) of lower limb joints. **Results:** At PWS there were significant differences for all the temporal and spatial parameters measured, notably gait speed (0.99 ms⁻¹ – CFS and 1.32 ms⁻¹

– controls ($p=0.002$)). Only the ankle joint ROM during swing showed a reduction for CFS subjects. The CFS subjects managed to match the PWS of the controls (1.31 ms⁻¹) ($p=0.781$). There were no statistical differences for the temporal and spatial parameters but again a reduced ROM at both ankles during swing in CFS subjects. **Conclusions:** These results would support that there is a reduction in gait speed in subjects with CFS. However with the exception of ankle ROM during swing all subsequent changes can be attributed to the slower speed of CFS subjects.

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O118

PHYSIOLOGICAL COST OF WALKING IN THOSE WITH CHRONIC FATIGUE SYNDROME (CFS)

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Introduction: Chronic fatigue syndrome (CFS) is a debilitating condition of unknown aetiology and disputed pathophysiology with an estimated prevalence of between 0.2–0.4%. Factors such as lipid peroxidation and immune dysregulation, can be involved in the development or maintenance of the illness. CFS presents with an array of clinical features and can result in significant and lasting functional impairment (1). **Aim:** To examine the physiological cost when walking in subjects with CFS and a matched control group, walking at their preferred and matched walking speeds. **Patients and Methods:** Seventeen people with CFS and 17 matched controls participated. Each subject walked over-ground for five minutes at their preferred walking speed (PWS). Controls then walked for five minutes at the same pace of their matched CFS subject. Gait speed and oxygen uptake were measured and oxygen uptake per unit distance calculated. CFS-APQ scores were recorded for the CFS population. **Results:** The PWS of the CFS subjects was significantly slower than controls ($p<0.001$). CFS subjects had significantly lower oxygen uptake than controls at PWS ($p=0.023$). At matched speeds controls had significantly lower oxygen uptake than the CFS patient ($p=0.008$). Oxygen uptake per unit distance was significantly lower for controls at matched and PWS ($p=0.048$ and $p<0.001$, respectively). CFS-APQ scores demonstrated limitations in daily activity for CFS participants. **Conclusion:** CFS subjects adopt a PWS that reduces their oxygen uptake but increases the energy cost of walking as measured by oxygen uptake per unit distance. This maybe explained by a desire to conserve energy and prevent fatigue but has the opposite effect (increase oxygen uptake per unit distance). The reasons for these higher energy demands have yet to be fully elucidated however they appear to adversely affect the sufferers functional abilities.

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O119

PREVALENCE OF TEMPOROMANDIBULAR DISORDERS IN PREGNANCY

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Introduction: Temporomandibular disorder (TMD) is a collective term that embraces a number of clinical conditions that involve the

masticatory musculature or temporomandibular joints (TMJ) and associated structures. As the levels of relaxin and estrogen increases throughout pregnancy, laxity of the temporomandibular joint may increase and there may be a tendency to TMD. *Aim:* To determine if the prevalence of systemic joint hypermobility and TMD is higher during pregnancy or not and also to confirm a correlation between systemic joint hypermobility and TMD. *Patients and Methods:* 70 pregnant and 40 age-matched non pregnant women were enrolled in the study. 30% of the pregnant women were in the first trimester of gestation, 34.3% of them were in the second, and 35.7% of them were in the third trimester. All of the subjects completed a self-administered questionnaire, and underwent a standardized clinical examination using the Research Diagnostic Criteria for TMD (RDC/TMD). Hypermobility was determined according to the criteria of Beighton et al. *Results:* 7.1% of the pregnant women and 7.5% of the non-pregnant women received an RDC/TMD Axis I diagnosis ($p>0.05$). 31.4% of the pregnant women and 40% of the non-pregnant women had systemic joint hypermobility ($p>0.05$). Among all subjects who received a RDC/TMD Axis I diagnosis, 35.3% had systemic joint hypermobility and among all subjects who did not meet criteria to receive a RDC/TMD Axis I diagnosis, 25% had systemic joint hypermobility ($p>0.05$). *Conclusion:* The prevalence of systemic joint hypermobility and TMD were not high among pregnant women compared to age matched non-pregnant women. And we were not able to confirm a correlation between systemic joint hypermobility and TMD.

O120

TYPES OF GAIT DYSFUNCTIONS AFTER CEREBROVASCULAR ACCIDENT – PRELIMINARY RESULTS OF THREE-DIMENSIONAL KINEMATIC ANALYSIS, GROUND REACTION FORCES MEASUREMENT AND FUNCTIONAL EMG STUDY

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Clinical evaluation of stroke patients is very seldom to comprise all problems because of vast range and variability of motor disorders occurring after cerebral vascular incident (CVA). Pathological patterns of gait disable independence and high quality of life of stroke survivors. The most precise information about that phenomenon is necessary for suitable individual physiotherapy planning. The goal of this study was to define gait patterns of stroke patients using objective laboratory diagnostics. *Method:* Twelve patients (first ischemic stroke, from 1 month to 3 years after the onset) were evaluated before and after physiotherapy. Clinical evaluation consisted of Rivermead motor assessment (motor deficit) and Barthel Index (functional status). During additional measurement evaluation of gait was carried out. Temporo-spatial, kinematic (lower extremities and spine joints) and EMG (16 muscles groups) parameters were measured. Vicon System 460 and Helen Hayes model were used. Polygon software was used to elaborate data results. *Results:* In all patients distinct changes from normal gait pattern were observed. Their motor performance differed in all temporo-spatial parameters (step length, increase of cadence, shortening of double support, symmetry), kinematic (in all joints) and emg (gluteus maximus and medius, hamstrings, long head of rectus femoris, gastrocnemius, tibialis anterior, soleus, extensors of spine). Many pathological changes were also related to the sound side of the body. Gait patterns were reflecting status of clinically assessed motor deficit. *Conclusions:* This analysis made possible to define primary dysfunctions in gait of stroke patients and to separate them from compensatory mechanism. These findings might help to address easier and focus physiotherapy on primary dysfunction. Measurement of motor abilities progress based only on observation often simplifies distinct changes and it does not distinguish subtle differences. Further study on this subject is necessary.

O121

GAIT TRAINING AFTER STROKE: TO RESTORE FUNCTION OR TO HELP THE PERSON COMPENSATE?

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Introduction: Stroke patients use different strategies to achieve the goal of walking. Well controlled intra-limb and inter-limb coordination is replaced by mass limb movement patterns (synergies) on the paretic side requiring compensatory adjustments of the pelvis and non-paretic side. Although to some authors these compensatory movements are necessary for independent ambulation, some others suggest that they produce abnormal displacement of the centre of gravity, resulting in an inefficient and abnormal gait pattern. Stroke rehabilitation is an intensive, time-consuming process whose outcome is frequently dissatisfying. Most of these programs focus on the normalization of movement patterns after stroke. On the other hand a cause-effect relationship between impairments of stroke and gait pattern cannot be determined yet in order to guide training programs. *Aim:* The objectives of this study were two-fold: (1) to determine a reference standard in gait for persons with stroke; (2) to discuss the goal of the treatment to restore function or to help the person compensate. *Patients and Methods:* Spatio-temporal and kinematic characteristics of gait in total of 100 patients (37 female, 63 male) with hemiparesis after stroke were retrospectively evaluated. The mean \pm SD age was 57.9 ± 12.1 (range 18–80) years and time since stroke was 5.75 ± 5.9 (range 1–36) months. Patients were grouped according to their FIM ambulation subscore (Group 1: ≤ 4 (dependent ambulation); Group 2: > 5 (independent ambulation)) Three-dimensional gait data were collected with the Vicon 370 system and processed by the Vicon Clinical Manager software. Groups were compared in terms of selected gait characteristics by using Mann-Whitney U test. *Results:* Independent ambulatory group had faster velocity ($p=0.018$), higher joint rotation angle of pelvis in frontal ($p=0.036$) and transverse ($p=0.041$) planes than dependent group. *Conclusion:* Our findings could not define a reference standard gait for persons after stroke. Even patients with functional ambulation displayed very different gait patterns compared with able-bodied persons as well as marked variation across stroke patients. Independent ambulatory stroke patients were the ones who use compensatory strategies utmost.

O122

EARLY QUANTIFICATION OF MOTOR RECOVERY AFTER STROKE USING KINEMATIC MEASUREMENT AND CLINICAL FUGL-MEYER ASSESSMENT SCALE

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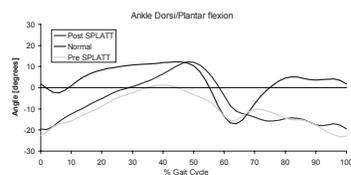
Early and intensive stroke rehabilitation enhances long term upper limb motor recovery, which is generally measured using clinical scales. Such scales are simple and easy to use, but they are known to have a floor effect, especially in severely affected patients. In the present report, we checked whether 3D kinematic measurement could be used to reach a more objective and accurate quantification of upper limb motor recovery in severely affected patients. Eight acute hemiplegic patients ongoing six weeks of upper limb task-oriented training volunteered to participate. All patients had a severe upper-limb motor impairment when entering the study. We repeatedly measured motor impairment with the Upper-Limb Fugl-Meyer Assessment scale (FM) and with a kinematic index (KI) designed to capture movement efficiency in a pointing task. During the six weeks of treatment, the median overall improvement was 18% for the FM and 39% for the KI. This is because the KI is more sensitive to small changes in upper-limb motricity than the FM, and this

was particularly visible in patients with the most severe motor arm impairment. Taking each patient separately, we found that motor ability could improve or not on the FM scale and KI, and that the two measurements did not systematically correlate. This is because the KI is more specific for the proximal part of the upper-limb voluntary motricity than the FM, which include reflexes or involuntary movements. Follow-up at six months post-treatment (nine months post-stroke) revealed that some patients continue to recover, and that this late recovery correlated better with KI than with FM. We conclude that measurement of arm movement efficiency by KI is simple and useful to reach a better quantification of rehabilitation progress, especially in case of severe upper arm motor impairment.

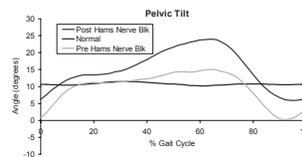
O123
A PRESENTATION OF SELECTED USES OF GAIT ANALYSIS IN THE MANAGEMENT OF AN ADULT PATIENT WITH LOWER LIMB SPASTICITY: A CASE REPORT

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Aim: To demonstrate the value of gait analysis in the evaluation of treatment intervention in the management of spasticity. **Methods:** The patient presented with a dense right hemiplegia following a fat embolism post road traffic accident. One year after the accident she had a surgical correction of a spastic equinovarus but has since continued to present with gait problems caused by severe spasticity that primarily reducing hip and knee flexion. A series of 6 full 3D gait analyses have been performed over a 3 year period to monitor the patient’s gait problems. Some of the major outcomes from the following interventions are presented. **Results:**



•TA lengthening and a split tibialis anterior transfer (SPLATT). The TA lengthening improved peak dorsiflexion but the transfer has not improved dorsiflexion in swing.



•Nerve Block on selected muscle groups. Pelvic tilt increased with hamstring nerve block but blocking rectus femoris enabled increased knee flexion in swing and whilst this improves cadence (Table I) it is the nerve block to adductors that appears to produce the largest impact on speed.

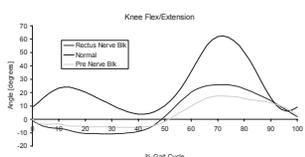
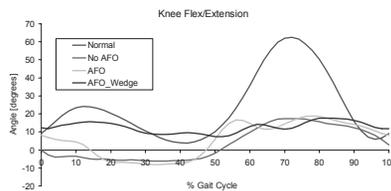


Table I.

	Walking Speed (m/s)	Cadence (steps/min)	Stride Length (m)	Step Width (m)
Rec Fem Nerve Block	0.44±0.025	59.8±1.85	0.88±0.041	0.14±0.018
Adductors Nerve Block	0.47±0.030	57.7±2.67	0.99±0.042	0.13±0.026
Vastus Nerve Block	0.42±0.020	55.3±1.50	0.90±0.045	0.13±0.026
Hams Nerve Block	0.40±0.035	54.0±1.55	0.89±0.062	0.15±0.037
Pre Visit 2	0.38±0.024	54.5±1.94	0.85±0.022	0.13±0.022
Pre Visit 1	0.36±0.023	49.9±3.26	0.87±0.030	0.13±0.016



•Ankle Foot Orthosis & Heel wedge. The AFO removed the swing phase drop foot but the knee hyperextension remained. This was removed with heel wedging which acted to optimise the effect of the AFO and thereby facilitate movement pattern re-training.

Conclusion: Gait analysis enables the derivation of quantitative outcome measures that can provide the clinician with valuable evidence of treatment intervention.

O124
WALKING FUNCTION, PAIN AND FATIGUE IN ADULTS WITH CEREBRAL PALSY – A SEVEN YEAR FOLLOW-UP STUDY

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Introduction: Many persons with cerebral palsy (CP) are experiencing a deterioration of walking function, and this is most frequently seen in bilateral CP. This occurs earlier than expected due to normal aging. **Aim:** Investigate the changes in walking function and possible explanatory variables over a 7 year period in adults with unilateral and bilateral spastic CP. **Participants and Methods:** A multi-dimensional questionnaire was mailed to 230 persons, who had participated in a study in 1999. It contained the same questions regarding walking function, pain and fatigue. In total 149 persons were included. There were 49% females, mean age 40 years, unilateral (55%) and bilateral (45%) CP. Severity of CP according to Gross Motor Function Classification System scores: level I: 46%, II: 25%, III: 13%, IV: 14% and V: 2%. **Results:** In total, 52% reported deterioration of walking, an increase from 39%. In bilateral CP 71%, and in unilateral CP 37% reported this. In the whole group, pain intensity (VAS scale, 48.7 mm), the proportion of chronic pain (0.24) and the number of pain sites were unchanged, while pain frequency and the impact of bodily pain on daily life were significantly increased. Fatigue scores were unchanged. Pain frequency and intensity, number of pain sites, impact of pain, and physical fatigue were higher among those with deteriorated walking. **Conclusion:** More than 50% were experiencing deteriorated walking. This was associated with bilateral CP, increased pain and physical fatigue.

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O125
EFFECTS OF UPPER EXTREMITY MOTOR RECOVERY ON GAIT PATTERN LATE AFTER STROKE

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Introduction: Forces and moments are generated at the upper extremity due to the weight and dynamics of the arm segments. These forces

and moments support standing and sitting posture as well as balance and walking. A paretic arm after stroke may deteriorate these postural reactions and impair gait pattern. Previous studies have shown that some persons who were injected Botulinum toxin into the arm to improve arm function reported changes in their gait. *Aim:* The aim of this study was to investigate the effects of upper extremity motor recovery stage on gait pattern late after stroke. *Patients and Methods:* Spatio-temporal, kinematic and kinetic characteristics of gait in total of 52 patients (mean (SD) age of 60.9 (12.1) years, 30 men, median time since stroke 6 months, 31 with left side paresis) with hemiparesis after stroke were retrospectively evaluated. Upper extremity motor recovery was evaluated by Brunnstrom Motor Recovery Stage (BMRS) as it reflects underlying motor control based on clinical assessment of movement quality. *Results:* Median BMRS of the group was 3 (2–5). Upper extremity motor recovery stage was significantly correlated with walking velocity ($\rho=0.41$), pelvic excursions in sagittal ($\rho=-0.49$), frontal ($\rho=-0.62$) and transverse ($\rho=-0.42$) planes as well as hip flexion in swing ($\rho=0.45$), ankle plantar flexor moment ($\rho=0.38$) and first peak of vertical ground reaction force ($\rho=0.48$). *Conclusion:* Better motor recovery at the paretic upper extremity after stroke was associated with faster walking velocity, more hip flexion in swing, symmetry in weight-bearing, better push-off and less necessity to compensatory pelvic movements. In addition to lower extremity, gait training programmes for hemiparetic patients should also focus on recovering upper extremity motor functions.

O126

MINIMAL STROKE ASSESSMENT FOR INPATIENT REHABILITATION SETTINGS

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Introduction: Common care pathways in stroke rehabilitation are important to improve the organization and efficiency of care and to reduce cost. According to this aim, the Italian Medicine Rehabilitation Society has proposed a protocol, the ‘Minimal Stroke Assessment’ (MSA), as a standardized, simple and sufficient tool to evaluate stroke patients in different rehabilitation settings (acute, inpatient or outpatient or home-based rehabilitation). *Aim:* To investigate whether the MSA is a useful tool to describe the outcomes of an inpatient rehabilitation program by evaluating many measures. *Patients and Methods:* Sample: 59 patients affected by first stroke. Intervention: a multidimensional rehabilitation. Setting: inpatient rehabilitation. Measurement: “minimal stroke assessment” composed of a set of social-demographic and clinical data and standardised rating scales (Barthel Index (BI), Canadian Neurological Scale (CNS), Trunk Control Test (TCT), Ashworth scale (AS), Motricity index side score (MIss), Nine Hole Peg Test (NHPT), Mini Mental State Examination (MMSE), Modified Rankin Scale (MRS), Visual Analogue Scale (VAS) for the mood tone). A pre-post evaluation (T0–T1) was carried out. A significant *p*-value was fixed at level $p<0.05$ to examine the changing of four standardised predictive rating scales: MI, BI, AS, TCT. Statistical analysis was performed using Wilcoxon Signed Ranks Test. ($p\leq 0.05$). *Results:* By comparing T1-T0 results, a significant mean increase was shown in the following measures: AS muscle tone, in particular in shoulder and wrist joints ($p<0.001$); CNS total score and no comprehension deficit subitem score ($p<0.001$), TCT ($p<0.001$), MIss ($p<0.001$), BI, $p<0.001$ and MMSE ($p<0.02$). *Conclusion:* Within this selected group of patient and rehabilitation setting, we found that MSA application proved to be useful to enhance the effects of inpatient rehabilitation treatment. We noticed a remarkable improvement in the motor and functional status and in the disability. The mental improvement was less evident. The increased muscle tone was in accordance with natural stroke evolution. Our studies suggest that the contribution of MSA may be to add a complete observation of stroke patients in a prognostic evaluation of stroke recovery.

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O127

CAN BRIEF VALIDATED NEUROPSYCHOLOGICAL SCREENING BE USEFUL FOR THE EVALUATION OF INSTRUMENTAL ACTIVITIES OF DAILY LIVING IN CHRONIC RIGHT-SIDED STROKE PATIENTS?

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Background: Underdiagnosis of right-brain stroke is now recognized from research. Although these patients could be severely disabled by cognitive deficits, neuropsychological screening is not performed in chronic stroke patients on a routine basis. *Objective:* To determine the nature and extent of neuropsychological deficits through an Italian brief validated cognitive examination and to measure the severity of disabilities through observed Instrumental Activities of Daily Living (IADL) tasks. *Methods:* We prospectively evaluated 42 chronic stroke patients (six months after stroke) living in the community. The National Institutes of Health Stroke Scale total score was 7 (SD±4). Lesion side was right parietal in 32 patients and frontoparietal in 10 patients. The brief neuropsychological examination (ENB)2 was performed before direct observation of tasks scored with the Nottingham EADL scale3 (total score ranged from 0 to 60). *Results:* Thirty-eight of the 42 patients (mean age 59±18) showed more than three severe neuropsychological deficits highly correlated with IADL disabilities ($r=0.55, p<0.001$). Executive and visuospatial dysfunctions were more significantly altered compared to the normal Italian group ($p<0.001$). Forty of the 42 patients had multiple and clinically relevant IADL disabilities (M=13, SD±13). *Conclusion:* Instrumental activities of daily living require multiple neuropsychological skills which should be evaluated by a clinical neuropsychologist in every right-brain stroke patient. Results from cognitive screening coupled with direct observation of IADLs may be very useful for physiatrists.

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O128

FUNCTION OF THE UPPER EXTREMITY IN YOUNG ADULTS WITH CEREBRAL PALSY: INTERRELATIONSHIPS AND IMPORTANCE FOR PARTICIPATION

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Introduction: In patients with cerebral palsy (CP) impaired functions persist into adulthood and may even deteriorate at later age. A substantial number of adult patients present both medical and social problems and restrictions in participation. Gross motor function is known to be a strong predictor of limitations in functional activities, such as mobility, self-care, and social function and restrictions in participation of young adults with CP with age and learning disabilities as significant contributing factors. The additional role of impaired functions of the upper extremity for these limitations is unclear. *Aim:* To assess function and functional activities of the

upper extremity of young adults with CP and their correlations with participation. *Methods:* In a cohort of 103 young adults with CP without severe learning difficulties, functional activities of the upper extremity were assessed with the Melbourne assessment and the Abilhand Questionnaire and participation with the Life Habits Questionnaire. Participant characteristics were recorded. In a subgroup of 26 young adults with unilateral CP maximal grip strength, muscle coordination and muscle endurance was measured in both hands. Relations were studied by means of correlation coefficients (Spearman's) and linear regression analysis. *Results:* In addition to gross motor function and level of education, functional activities of the upper extremity, measured with the Abilhand Questionnaire, were an important determinant for participation. Limitations in functional activities of the upper extremity were related to the limb distribution of the spastic paresis. In persons with unilateral CP maximal grip strength, muscle coordination and muscle endurance were not only reduced in the involved hand, but also in the uninvolved hand. Correlations between grip strength parameters and limitations in functional activities were relatively weak and not linear. *Conclusion:* Limitations in functional activities of the upper extremity are an important determinant for restrictions in participation in young adults with CP. Performance of activities is not directly related to grip strength parameters.

O129

MILD TRAUMATIC BRAIN INJURIES: THE IMPACT OF EARLY INTERVENTION ON LATE SEQUELAE – A RANDOMIZED CONTROLLED TRIAL

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Introduction: Positive results from early clinical intervention of mild traumatic brain injury (MTBI) patients by rehabilitation specialists have been reported. Various treatments have been used, but few controlled studies are published. *Aim:* To test the hypothesis that early rehabilitation of selected MTBI patients would reduce long term sequelae (1). *Patients and Methods:* A randomized controlled trial with one year follow-up. Among 1719 consecutive patients with MTBI, 395 individuals, 16–60 years of age, met the MTBI definition. Exclusion criteria were: previous clinically significant brain disorders and/or a history of substance abuse. The control group ($n=131$) received regular care. The intervention group ($n=264$) was examined by a rehabilitation specialist. 78 patients were mainly referred to an occupational therapist. The problems were identified in daily activities and in terms of post-concussion symptoms (PCS), an individualized, tailored treatment was given. Primary endpoint was change in rate of PCS and in life satisfaction at one-year follow-up between the groups. *Results:* No statistical differences were found between the intervention and control groups. Patients who experienced few PCS two to eight weeks after the injury and declined rehabilitation recovered and returned to their pre-injury status. Patients who suffered several PCS and accepted rehabilitation did not recover after one year. *Conclusion:* In this particular MTBI sample, early active rehabilitation did not change the outcome to a statistically-significant degree. Patients who claimed that they have been restored to previous health two to eight weeks (median 3 weeks) after the MTBI recovered within a year, but patients who had several PCS two to eighth weeks (median 3 weeks) after the MTBI run a risk of developing late sequelae. Further studies should focus on patients with several complaints during the first 1–3 months and test various types of interventions.

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O130

INFORMATION TRANSFER BETWEEN ACUTE HOSPITAL AND REHABILITATION CENTRE SHOWS IMPORTANT DEFICITS

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Introduction: Timely and complete medical information transfer between physicians and between institutions is very important. In the Netherlands, most patients needing inpatient clinical rehabilitation are sent from an acute hospital to a rehabilitation centre. *Aim:* To investigate the quality of the patient discharge summary during patient transfer from an acute hospital to a rehabilitation centre. *Patients and Methods:* The discharge summaries of all new patients admitted to the Rehabilitation Centre Amsterdam (RCA) from November 1, 2006–November 1, 2007 were studied, using three quality indicators: 1) the direct presence of a medical discharge summary when the patient arrives at the centre; 2) the presence of a statement of the actual amount of weight bearing in case of lower extremity fractures; 3) differences between multiple medication tables and their potential consequences. *Results:* The records of 322 newly admitted inpatients were investigated. Of these 56 (17.4%) did not have any medical discharge summary. All frequently transferring hospitals and all frequently transferring medical disciplines were responsible for this lack of information (range 4–33%). Twenty-seven patients had a fracture of the pelvis or lower extremities. In 52% data were missing to what extent weight bearing was allowed. In 177 cases more than one medication table was available. In 61% of these tables there was one or more essential differences. In 13% of these differences ($n=14$), this would potentially lead to serious harm with probable re-transfer to the hospital. *Conclusion:* When transferring a patient from an acute hospital to a rehabilitation centre essential medical data are often missing, incomplete or confusing. Communication between these institutions needs further improvement.

O131

INTERRATER AGREEMENT OF FUNCTIONAL STATUS SCORES FOR PATIENTS TRANSFERRED FROM ONE REHABILITATION SETTING TO ANOTHER

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Background: Outcome measurements are being increasingly utilized in classification and funding systems for rehabilitation patients. *Aim:* The aim of this paper is to determine and analyse the concordance and agreement in Functional Independence Measure (FIM) scores in a clinical test-retest situation. *Method:* This study is set in two rehabilitation units, the 'Sub-acute Unit', and the 'Rehabilitation Unit'. Patients who begin their rehabilitation in the Sub-acute Unit and complete it in the Rehabilitation Unit are the subjects of this study. They have a discharge FIM scored by the Sub-acute Unit and within a few days an admission FIM scored in the Rehabilitation Unit, making significant functional change unlikely. The clinicians working on the two units were unaware of the study and were thus 'blinded', continuing their usual practice of FIM scoring. The FIM scores were analysed for difference and systematic bias. *Results:* 143 sets of scores were identified. There were considerable differences between the two FIM totals, (range –32 to +50), motor subscales (range –22 to 43) and cognitive subscales (range –14 to 22). Only a few FIM totals were perfectly matched with 101 patients having

a difference of 5 or more points. The intra-class correlation coefficients were 0.872 for the FIM total, 0.854 for the motor, and 0.830 for the cognitive subscales. Kendall's W (Coefficient of concordance) was 0.001 for FIM total, 0.011 for motor and 0.021 for cognitive subscales. *Discussion:* There was no systematic bias evident such as scoring high on discharge and low on admission. While the intra-class correlation coefficients were high, this is not a good test for agreement in this situation as it is heavily influenced by the large number of possible scores. A better statistic to review the agreement is Kendall's coefficient of concordance. This demonstrated poor agreement of the paired FIM totals as well as the motor and cognitive scores. Possible contributing factors to the discrepancies include the level of training, experience, and staff discipline using the FIM instrument. These findings have implications on the use of the FIM as the basis for benchmarking and funding of rehabilitation units and warrant further investigation.

O132

CORRELATIONS OF FIM ITEM SCORES IN PATIENTS TRANSFERRED FROM ONE REHABILITATION SETTING TO ANOTHER

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Background: A previous study demonstrated considerable variation in FIM total scores for patients transferred between our two rehabilitation units. This study explores the individual FIM item scores. The study is set in two rehabilitation units located in close proximity in one health service. FIM scoring occurs on admission and discharge as part of routine patient care at both units. *Aim:* Determine and analyse FIM item scores carried out in routine clinical practice in a setting of patients transferred from one unit to another and determine the interrater reliability as measured by the Kappa. *Study Type:* Test-retest reliability of FIM item scores. *Method:* Between August 2006 and October 2007, FIM scores for patients who began their rehabilitation in the Sub-acute Unit and completed it in the Rehabilitation Unit were collected onto an Access database. These patients have a discharge FIM scored by the Sub-acute Unit and an admission FIM scored by the Rehabilitation Unit within a few days, making significant functional change unlikely. The clinicians on the two units were unaware of the study and were thus 'blinded', continuing their usual practice of FIM scoring. The individual FIM item scores were analysed for interrater agreement with Cohen's kappa coefficients using SPSS 15.0 for windows. *Results:* 143 paired results were included in the review. There was considerable difference between the two scores for each FIM item. Kappa values varied between 0.063 (dressing upper limb) and 0.235 (expression) for the items. *Discussion:* There was poor correlation between the FIM item scores in this study. Contributing factors may include: incomplete FIM training of all staff involved, insufficient care to score the patients correctly, actual clinical changes or some underlying structural properties of the FIM scale. However, as this is from a clinical unit reflecting average practice in NSW we feel further investigation is required to clarify the limitations and benefits of functional assessment with the FIM in a say to day clinical setting.

O133

ACQUIRED BRAIN INJURY IN TUSCANY, ITALY, 2003–2006: ESTIMATING THE SIZE OF THE PROBLEM BY COMBINING DIFFERENT SOURCES OF DATA

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Introduction: Acquired Brain Injuries (ABI) are a crucial issue for healthcare and social services. In 2000 and 2005 two Consensus Conferences in Italy produced a set of recommendations to improve healthcare for patients and support to caregivers, including better epidemiological knowledge based on available current sources. *Aim:* Three objectives were defined: to estimate the burden of ABI in Tuscany, Italy (3.5 million inhabitants); to trace the post-hospital experience of surviving patients; to identify a cohort of people with ABI to be included in a mid-term surveillance. *Patients and Methods:* The study was based on administrative databases and targeted to 'all new cases' discharged from hospital from Jan 1st 2003 to Dec 31st 2006, resident in Tuscany, with ICD-9CM discharge codes of traumatic, hemorrhagic or ischemic brain injury and at least one transit in intensive care or neurosurgery units. Crude and standardized hospitalization rates were obtained as 'proxy' of incidence. Mortality was measured as in-hospital, 30-days and 365-days rate. Post-hospital 1-year follow-up was traced for surviving cases in terms of recurrent hospital admissions and access to rehabilitation. *Results:* A crude hospitalization rate of 605.3 per 1 000,000 resident population was observed. About 80% percent of patients were discharged alive from hospital, 73% had a length-of-stay (LOS) >5 days. Observed in-hospital and 1-year mortality rates were 19.7% and 26.4%, respectively. Only 55.7% of surviving resident patients were re-hospitalized within one year, 62.8% of them being admitted within one day. Access to rehabilitation within 1 year was observed for 31.2% of cases. *Conclusions:* Our estimates are consistent with other published data. Although administrative databases are not suitable to provide functional information such as severity of the injury and consequent disability, they are a convenient tool in firstly describing the general burden of ABI in a defined geographical area. They also seem appropriate in selecting cohorts of patients to be followed using combined administrative and clinical sources.

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O134

PREVALENCE OF YOUNG ADULTS WITH ACQUIRED BRAIN INJURY (ABI) IN NURSING HOMES IN BELGIUM

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Introduction: Belgium lacks information on needs of young adults with ABI for long term (residential) nursing care. A comprehensive survey of all nursing care facilities in Belgium aimed to determine the number and profile of young adult residents with ABI. *Patients and Methods:* A questionnaire survey of all nursing homes for elderly and young disabled aimed at identifying the number of residents with ABI between 18 and 65 years. In a follow-up survey information was gathered on the characteristics of these young ABI residents. *Results:* For about 11 million inhabitants, Belgium has a total of 45,817 nursing beds for the elderly (1,013 facilities) and 12,546 nursing beds for young disabled (268 facilities). An overall response rate of 40% was obtained. The total number of young ABI residents in Belgium was estimated 889 in aged care and 506 in disability care, respectively 2% and 5% of the total population of these facilities. The prevalence rate of young ABI-adults in aged care facilities was estimated at 9/100,000. In aged care, the aetiology of ABI was stroke in 46% of cases. In disability care the majority of cases (43%) had a traumatic brain injury. In aged care, ABI residents were older, had sustained ABI more recently, and required higher levels of care compared to residents in disability care. In aged care, ABI residents showed more behavioural (41%) and emotional (49%) problems than in disability care (24% and 21%, respectively). Aged care facilities also report more difficulties in providing care to ABI residents. A need for more appropriate accommodation was reported

in 40% of the ABI residents in aged care and in 10% of cases in disability care. *Conclusions:* In Belgium there is a clear need for more appropriate long-term accommodation for young adults with ABI. Aged care facilities are often the only option for young ABI adults, while these facilities can not sufficiently meet the complex care needs. A government policy aiming at an adequate planning and development of specialised ABI services is recommended in order to meet the long-term accommodation needs of this group.

O135

DELAYED EPISODIC PAIN REACTIONS DUE TO PERCEIVED PSYCHOGENIC STRESS IN PATIENTS WITH FIBROMYALGIA SYNDROME: CASE SERIES

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Introduction: Fibromyalgia syndrome (FS) frequently produces seemingly random pain intensity flares. Numerous hypotheses for pain flares have been offered, including stress reactivity (1). Stress was observed triggering pain flares delayed by ten days due to latent activity of stress-related thyroxine in patients with complex regional pain syndrome (2). This mechanism is hypothesized to be a factor in FS pain increases (1). *Aim:* This study's aim was to determine the effect of stress on timing, intensity, and topography of increased pain episodes in patients with FS. *Patients and Methods:* Single-case design using multiple subjects. Patients included four females and one male (age 42–67 years) with FS diagnosis duration from 3–17 years. For 70 consecutive days patients completed visual analog stress, pain, and pain-related function scales, and the McGill pain questionnaire. Daily pain topography was quantified using modified rule-of-nines formula on pain-body diagrams. Daily stress scores were correlated with pain measures using serial lag correlations, for the same day as well as each consecutive day's pain scores up to a fourteen-day lag. *Results:* Correlations between stress and pain for the same day were low ($r=0.09-0.13$). Stress was associated with notable increases in pain intensity, topography, and decreased pain-related function occurring ten ($r=0.50-0.65$) days following peak stress episodes. *Conclusions:* These findings suggest psychogenic stress may be a factor in delayed pain flares occurring ten days after the stressful episodes in patients with FS. This may provide patients with insight into previously unexplained pain increases and allow pain flare-up prediction. These findings may assist therapists with timing of treatment for FS patients and facilitate discrimination between pain flares due to therapeutic activity versus those triggered by stress.

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O136

FROM ACUTE MUSCULOSKELETAL PAIN TO CHRONIC WIDESPREAD PAIN AND FIBROMYALGIA: REHABILITATION ADDRESSING COGNITIVE EMOTIONAL SENSITISATION AND BEYOND

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Introduction: During the past decade, scientific research has provided new insight into the development from an acute, localized

musculoskeletal disorder (e.g. a whiplash trauma) towards chronic widespread pain and fibromyalgia (FM). *Aim:* By applying science to practice, it is explained that rehabilitation should be able to influence the process of chronicity in 3 different ways. *Patients and Methods:* An in-depth review of basic and clinical research resulted in a clear understanding of the processes involved in the development from an acute, localized musculoskeletal pain problem towards chronic widespread pain and FM. Both peripheral and central causes of ongoing pain complaints have been identified, and provide a solid base for designing a theoretical framework for rehabilitation in these patients. Finally, the theoretical framework was confronted with evidence from randomized controlled clinical trials. *Results:* Chronic widespread pain and FM are characterised by sensitisation of central pain pathways. Inappropriate cognitions and personality traits have a negative impact on the descending pain-inhibitory mechanisms (cognitive emotional sensitisation). In order to prevent chronicity in acute or subacute musculoskeletal disorders, it seems crucial to limit the time course of afferent stimulation of peripheral nociceptors. In case of chronic widespread pain and established sensitisation of central pain pathways, relatively minor injuries/trauma at any location are likely to sustain the process of central sensitisation and should be treated appropriately with rehabilitation accounting for the decreased sensory threshold. In addition, the role of rehabilitation in such patients encompasses improving pain beliefs (e.g. pain neurophysiology education) and exercise interventions, which should account for the process of central sensitisation by using low to moderate intensity, aerobic exercises using multiple recovery periods and if available hydrotherapy in warm water. However, rehabilitation specialists unaware of, or ignoring the processes involved in the development and sustaining of chronic widespread pain and FM, may cause more harm than benefit to the patient by triggering or sustaining central sensitisation. *Conclusion:* Rehabilitation, when applied successfully to acute musculoskeletal disorders, might have the capacity to prevent chronicity. Rehabilitation has its place in the comprehensive management of those with chronic widespread pain and FM.

O137

EVIDENCE FOR GENERALIZED HYPERALGESIA IN CHRONIC FATIGUE SYNDROME: A CASE CONTROL STUDY

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Introduction: Several studies provided evidence for generalized hyperalgesia in fibromyalgia or Whiplash Associated Disorders 1,2,3. In Chronic Fatigue syndrome (CFS) however, pain is a frequently reported complaint, but up to now evidence for generalized hyperalgesia is lacking. *Objective:* The aim of this study is to examine whether the pressure pain thresholds (PPTs) at both symptomatic and asymptomatic sites differ in CFS patients with chronic pain, compared to healthy controls. *Patients and Methods:* Therefore thirty CFS patients with chronic pain and thirty age and gender matched healthy controls indicated on a Margolis Pain Diagram where they felt pain lasting longer than 24 h in the past 4 weeks. After completing a test battery of questionnaires evaluating pain cognitions, functional status and symptomatology, a blinded researcher assessed PPTs bilaterally at 7 non-specific sites on both trunk and extremities. PPTs were compared for the two complete groups. In addition, PPTs of patients and controls who did not report pain in a respective zone were compared. *Results:* PPTs of the patients were significant lower ($p<0.001$) compared to these of the control group, also when pain free samples per zone were compared ($p<0.001$). The mean PPT in all CFS patients was 3.30 kg/cm² and 8.09 kg/cm² in the controls. No confounding factors responsible for the observed differences, as e.g. catastrophising and depression, could be revealed. *Conclusion:* These findings provide evidence for the existence of hyperalgesia even in asymptomatic areas (generalized secondary hyperalgesia).

The generalized hyperalgesia may represent the involvement of a sensitized central nervous system.

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O138

EFFECT OF PAIN EDUCATION ON COPING, CATASTROPHISING, KINESIOPHOBIA AND PAIN IN PATIENTS WITH CHRONIC FATIGUE SYNDROME: A CONTROLLED EXPERIMENT

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Introduction: In patients with chronic low back pain the efficacy of pain neurophysiology education has already been shown. The education aims at reconceptualising ‘pain’ by providing correct information on the function and mechanism of pain (1). Up to now, there is no evidence for the efficacy of such education in CFS patients with chronic musculoskeletal pain. *Aim:* The present study aimed at investigating whether an education session on the neurophysiology of pain is capable of reducing pain catastrophising, kinesiophobia, passive coping and pain in patients with the Chronic Fatigue Syndrome (CFS), suffering from chronic widespread pain. *Patients and Methods:* Forty-eight CFS patients with chronic widespread pain were subjected to a pain threshold measurement and filled out a list of Dutch questionnaires evaluating their knowledge on pain neurophysiology, coping strategies, kinesiophobia and pain catastrophising. Afterwards patients were randomly assigned to the experimental group or the control group. The experimental group ($n=24$) received a 30 min-lasting individual information session about the neurophysiology of pain: the mechanism, the function and the modulation of pain. The control group ($n=24$) had an individual lesson of 30 min on self-management pacing techniques. Finally the second blind researchers repeated the pain threshold measurements and patients completed the questionnaires for the second time. *Results:* After the intervention, the experimental group presented a significant better knowledge on the neurophysiology of pain, a significant reduction in the passive coping strategies ‘worrying’ and in the subscale ‘ruminating’ of the Pain Catastrophising Scale, and a significant increase in the active coping strategy ‘distraction’, compared to the control group. Pain thresholds of the treatment group increased after the education session, but compared to the control group it was not a significant therapy effect. *Conclusions:* The present study revealed interesting therapy effects of an individual education session on the neurophysiology of pain for CFS patients experiencing chronic pain. Despite frequently reported concentration problems, CFS patients are able to understand and learn the neurophysiology of pain, and this knowledge has immediate effects on pain behaviour. Reconceptualisation of pain by educating pain neurophysiology influences pain catastrophising and pain coping.

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O139

DIFFUSE NOXIOUS INHIBITORY CONTROL IS DELAYED IN CHRONIC FATIGUE SYNDROME: AN EXPERIMENTAL STUDY

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Introduction: Deficient endogenous pain inhibition, e.g. Diffuse Noxious Inhibitory Controls (DNIC), or hormonal abnormalities like hypocortisolism, could be responsible for chronic widespread pain in Chronic Fatigue Syndrome (CFS). *Aim:* The present study aimed at evaluating the efficacy of the central inhibitory mechanism DNIC by spatially summing noxious stimuli in CFS patients with chronic pain, compared to healthy subjects. *Patient and Methods:* Thirty-one CFS patients with chronic pain and 31 healthy controls were subjected to spatial summation of thermal noxious stimuli by gradual immersion (ascending or descending) of the arm in warm water (46°C). They rated pain intensity every 15 sec. Every immersion took 2 min, alternated with 5 min rest. Before and after immersion salivary cortisol was assessed. *Results:* Overall pain ratings were higher in CFS patients, but the evolution was not different between patients and controls, both during ascending and descending immersion. Pain intensity and immersed surface were only correlated during the descending session in both patients ($r=0.334$) and controls ($r=0.346$). When comparing the first and the last 15 sec of every immersion it was found that pain inhibition starts slower for CFS patients in comparison to healthy subjects. Both pre- or post-values and cortisol response did not differ between controls and patients. The drop in cortisol was significantly correlated to pain intensity in CFS (r between 0.357 and 0.402). *Conclusion:* In addition to the hyperalgesia in CFS, DNIC react slower to spatial summation of thermal noxious stimuli. We found no evidence for hypocortisolism in CFS, and the cortisol response to nociception was not different in CFS compared to healthy subjects. In conclusion, delayed pain inhibition may play a role in chronic widespread pain in CFS but further research is required.

O140

THE MULTIDISCIPLINARY PAIN MANAGEMENT OF THE COMMUNICATING OR NOT COMMUNICATING PATIENT IN A UNIT OF LOCOMOTIVE REHABILITATION WITH THE CHR CITADELLE

Bex, Bredhol, Tilkin, Lejeune, Montagner, Nicolay, Bonhomme, Ennafla and all the persons having contributed to the success of this project

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Objectives: Estimate the pain of the patient or passive movement; Bring to light a pain limiting the movement; Adapt medicinal and not medicinal treatment; Facilitate a fast return towards a maximal autonomy while respecting the comfort of the patient; Integrate all the valuations and concretise the objectives of care in multidisciplinary. *Target Public:* The nurses of unit, the physiotherapists, the occupational therapists, the doctor physiotherapist. *The Progress of the Project:* In 2006, the unit of locomotive rehabilitation wishes to create a project of improvement of the pain management of the communicating and not communicating patient. With the support of the nursing department a project of accompaniment is elaborated: it plans the accompaniment of each nurse by the person in charge of acute pain of the institution and this during the care administrated to the patient. During this accompaniment the validated tools are presented and used. The transmission of the knowledge, know-how and knowledge-being is realized during this same interval of time. An individual evaluation and an exchange are realized at the end of each morning of accompaniment. *Advantages for the Patient:* His pain is systematically estimated by means of validated tools, The patient who has pain feels heard and understood, He benefits from an adaptation of his treatment in report to the intensity of his pain, His level of comfort improves. *Advantages for the Nurse:* Standardization of the pain management by means of validated tools; Elaborate a strategy of improvement of the comfort of the patient (medicinal or not); Use of a common language allowing a clarification of the demand of intervention with the consultant physician; Satisfac-

tion in the realization of analgesic care and the achievement of the objective comfort of the patient; Improvement of the quality of the care, «A comfort in the administered care».

O141

COMPUTER AIDED SURFACE ESTIMATION OF PAIN DRAWINGS – INTRA AND INTERRATER RELIABILITY

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Introduction: Pain drawings are often utilised in the diagnosis and documentation of chronic pain conditions. They vary in design, but are based on the same principle: a human figure line drawing viewed anteriorly, posteriorly, and sometimes in a lateral aspect. Patients use a pencil to mark with symbols, or shade in their painful body areas. However, manual methods of rating pain drawings are time consuming. Different computer software programs have been developed to improve sensitivity and to save time with evaluations. **Aim:** To investigate the reliability of area measurements performed on scanned pain drawings using the computer program Quantify One® (KLOK; <http://www.klonk.biz>). **Patients and Methods:** 48 Patients with chronic non-malignant pain marked their type of pain on a pain drawing with different symbols. The pain areas were shaded in on a new template that was scanned and displayed on a 17 inch computer screen. Two examiners systematically encircled the shaded-in areas with a computer mouse, twice a day on two separate days. The total surface area (mm²) was calculated for each patient. Intraclass correlation coefficients (ICCs), 95% confidence intervals (CI), intra- and interrater absolute mean differences ±SD in mm², and Student's *t*-test were used in the statistical analyses. **Results:** Each examiner measured about 1,250 areas in total. The number of areas measured varied up to 3% in the four measurements of the two examiners. The intrarater reliability was high: ICC 0.992 for Examiner A; and 0.998 for Examiner B. The intra-individual absolute differences were small within patients. The correlation between the two examiners' measurements of each drawing (4x48) was very high ($r=0.994$; $p<0.0001$). However, significant differences (mean: 10%) in the absolute mean areas were seen between the two examiners at 3/4 sessions. **Conclusion:** Our results show that Quantify One is a reliable instrument to calculate shaded in areas on pain drawings. It is recommended that the same examiner performs all measurements in before-after analyses.

O142

TREATMENT ON MYOFASCIAL PAIN SYNDROMES: LOCAL SELECTIVE ACOUSTIC VIBRATION VS LIDOCAINE INJECTION

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Introduction: Myofascial pain syndromes are determined by the presence of myofascial trigger points [TrPs] in the muscles or in their stripe. **Aim:** This report compares two different therapies: local acoustic vibration [MiTh] and lidocaine injection. **Patients and Methods:** 40 patients suffering from trapezius muscle myofascial syndromes were divided into two homogeneous groups. Group A [Gmi]: treated with a local vibratory therapy (MiTh, Visscom, Italy) at 90 Hz for 3 min on TrPs for 4 subsequent sittings. Group B [Glid]: treated by lidocaine injection (1cc at 2%) for 4 days. The frequency was chosen according to previous studies that were effectuated (but not published) by the authors. In all subjects we reported: 1) point-thresholds [PaTh] subsequent to pressure with Fischer algometer on TrPs; 2) maximum pain intensity [VAS] measured by Scott-Huskingson visual analog scale; 3) muscle parameters [BiM] measured by biometry (Myoton, Diagnostic Support, Italy). Tests were effectuated before the beginning of the therapy and after 1, 2, 3, 7, 10,

20, 30, days. **Results:** VAS decreased in Gmi (8.5 ± 0.7 to 4.5 ± 0.4 , $p<0.01$) and in Glid (8.2 ± 0.9 to 5.2 ± 0.6 , $p<0.05$) and lasted for 20 days from the beginning of the therapy. A reduction of PaTh was registered in Gmi after every sitting (2.1 ± 0.4 to 3.1 ± 0.5 kg/cm²). A reduction at the end of the treatment was registered in Glid (1.9 ± 0.6 to 3.3 ± 0.2 kg/cm²). BiM has shown a reduction in muscular tone in Gmi (31.4 ± 3.3 to 22.9 ± 4.5 Hz, $p<0.05$), an increment in muscular elasticity (1.73 ± 0.47 to 1.06 ± 0.23 , $p<0.05$), a reduction in muscular stiffness (657 ± 121 to 445 ± 103 N/m, $p<0.01$). A significant reduction only of the muscular stiffness has been registered in Glid (597 ± 158 to 461 ± 203 N/m, $p<0.05$). **Conclusions:** The pain-thresholds progressively increased both in Gmi and in Glid. MiTh. This shows long term muscular tone and muscular elasticity improvement.

O143

SPONTANEOUS PAIN WITH AND WITHOUT EVOKED PAIN – DIFFERENT SPINAL MECHANISMS?

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Introduction: About 40 % of patients with syringomyelia complain about neuropathic pain in the dermatomes involved by the syrinx. These pains are reported as spontaneous, with or without evoked pain (allodynia/hyperalgesia). **Aim:** The present study aimed at characterizing these two types of clinical presentations of central neuropathic pain, using psychophysical and electrophysiological tests. **Patients and Methods:** Twenty-seven patients (46±13 years) with MRI-diagnosed cervical syringomyelia and with neuropathic pain in dermatomes concerned by the level of the syrinx, were included: eleven with spontaneous pain (SP) and sixteen with spontaneous pain accompanied by evoked pain (SPEP). All underwent an extensive clinical sensory examination, quantitative sensory testing (QST: thermal, tactile, vibration) and brain evoked potentials (non-nociceptive electrically-evoked potentials – SEPs and nociceptive laser-evoked potentials – LEPs) of the hands and shoulders. Data were analysed using univariate ANOVA (SP vs. SPEP). **Results:** Patients with SP had more severe (ANOVA $F_{1,25}=18.046$, $p<0.001$) and more asymmetrical (ANOVA $F_{1,25}=5.123$, $p=0.03$) thermal sensory deficits at clinical examination than patients with SPEP. QST showed that thermal thresholds and pain thresholds of SP patients were significantly increased compared to those of patients with SPEP. At electrophysiological testing, amplitudes of the N2–P2 complex of nociceptive LEPs were decreased: both in painful and non-painful areas of SP patients, but only in the painful areas of SPEP patients ($F_{1,62}=6.253$, $p=0.01$). Amplitudes of the N2–P2 complex of non-nociceptive SEPs were slightly lower in SP patients than in SPEP patients (ANOVA: $F_{1,40}=5.958$, $p=0.02$). **Conclusions:** These results suggest that the spinothalamic and lemniscal pathways are affected differently in SP as compared to SPEP patients. Overall, patients with SPEP display a lower degree of sensory dysfunction as assessed by the psychophysical and electrophysiological tests.

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O144

OBESITY AND LOW BACK PAIN: A KINEMATIC APPROACH

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Introduction: Despite common clinical reports, only few studies seem to support a correlation between obesity and functional impairment of the spine. Given the dearth of quantitative information of spinal mobility in obese subjects with and without low back pain (LBP), the aim of our study was to quantify the functional mobility of the spine during flexion, rotation, and lateral bending in those subjects. **Patients:** 13 obese subjects (OG), 13 obese subjects with non-specific chronic LBP (nLBP), and 11 age-matched healthy subjects (NG). **Methods:** Forward flexion, rotation and lateral bending movements of the spine were analyzed with an optoelectronic system. Passive markers were applied on the spine (D1,D6,L1,L3,S1). Kinematics and clinically relevant angles were analyzed using custom biomechanical model. **Results:** The angles during bending and flexion (ROM) showed statistically significant differences in both LBP and OG as compared to NG. Lumbar lordosis was increased in LBP. Dorsal movement was reduced in LBP, and to a lesser extent in OG, as compared to NG.

Table I.

ROM	NG (mean SD)	OG (mean SD)	nLBPG (mean SD)	
Sagittal Plane flexion [deg]	118.2 (9.3)	107.1 (7.5)	99.8 (14.6)	(*,**)
Frontal Plane bending [deg]	77.8 (13.7)	80.7 (8.0)	60.7 (21.3)	(**,***)
Transversal Plane rotation [deg]	63.5 (25.3)	50.2 (16.0)	41.1 (19.8)	NS

Differences ($p < 0.05$) between: *NG and OG; **NG and nLBPG; ***OG and nLBPG.

Conclusion: Due to the dorsal stiffness, forward flexion appears to be performed mainly by the lumbar spine in LBP and OG. Obesity seems to primarily affect the dorsal spine and secondary, due to overload on the lumbosacral spine, to favour the onset of low back pain. Exercises for the dorsal spine might prevent the onset of LBP. Bending could be a useful tool for monitoring the functional consequences of obesity in the clinical practice. Kinematic analysis represents a promising approach for measuring outcome in rehabilitation programs of the spine.

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O145

SAGITTAL ALIGNMENT OF SPINE AND PELVIS REGULATED BY PELVIC INCIDENCE: STANDARD VALUES AND PREDICTION OF LORDOSIS

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Introduction: Pelvis and spinal curves were studied with an angular parameter typical of pelvis morphology: pelvic incidence. A significant chain of correlations between positional pelvic and spinal parameters and incidence is known. **Aim:** This study investigated standards of incidence and a predictive equation of lordosis from selective pelvic and spinal individual parameters. **Patients and Methods:** One hundred and forty-nine (78 men, 71 women) healthy adults, aged 19–50 years, with no spinal disorders were included and had a full-spine lateral X-ray in a standardised upright position. Computerised technology was used for the measurement of angular parameters. Mean-deviation section of each parameter and Pearson correlation test were calculated. A multivariate selection algorithm was running with the lordosis (predicted variable) and the other spinal and pelvic parameters (predictor variables), to determine the best sets of

predictors to include in the model. **Results:** A low incidence ($< 44^\circ$) decreased sacral-slope and the lordosis is flattened. A high incidence ($> 62^\circ$) increased sacral-slope and the lordosis is more pronounced. Lordosis predictive equation is based on incidence, kyphosis, sacral-slope and $\pm T9$ tilt. The confidence limits and the residuals (the difference between measured and predicted lordosis) assessed the predicted lordosis accuracy of the model: respectively $\pm 1.65^\circ$ and 2.41° with the 4-item model; $\pm 1.73^\circ$ and 3.62 with the 3-item model. **Conclusion:** The ability of the functional spine-pelvis unit to search for a sagittal balance depended both on the incidence and on the variation section of the other positional parameters. Incidence gave an adaptation potential at 2 levels of positional compensation: overlying state (kyphosis, T9 tilt), underlying state (sacral slope, pelvic tilt). The biomechanical and clinical conditions of the standing posture (as in scoliosis, low back pain, spondylolisthesis, spine surgery, obesity and postural impairments) can be studied by comparing the measured lordosis with the predicted lordosis.

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O146

THE EFFECT OF A PRAGMATIC MANUAL THERAPY APPROACH ON PAIN, DAILY FUNCTIONING AND TRUNK MUSCLE FUNCTION IN LUMBAR DISCECTOMY PATIENTS WITH PERSISTENT COMPLAINTS

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Introduction: It is unclear which physiotherapeutic modalities should be applied in patients with persistent pain after lumbar discectomy. **Aim:** To determine the efficacy of a pragmatic manual therapy program including stabilization training – as applied in daily practice – in lumbar discectomy patients with persistent pain and functional limitations. **Patients and Methods:** Seventeen patients with persistent pain that started shortly after lumbar discectomy and was present for at least one year, participated in a manual therapy program. Pain inhibiting techniques, postural correction, proprioception training and basic stabilization training were performed in correspondence to the patient's individual need, with a maximum of 18 sessions of half an hour, the maximum number of reimbursed physiotherapy sessions in the Belgian health insurance system. Before and after manual therapy, a Visual Analogue Scale for Pain (VAS), the Quebec Back Pain Disability Scale (QBPDs) and the Multidimensional Pain Inventory (MPI) were filled in by the patients. Trunk muscle function was evaluated using surface EMG recording and isokinetic trunk force measurement. **Results:** After manual therapy, patients improved as regards pain (VAS -2.32 ; $p < 0.001$) and daily functioning (QBPDs -10.27 ; $p = 0.008$, MPI interference with daily activities due to pain $p = 0.002$, MPI life control $p = 0.018$, MPI affective distress $p = 0.03$), isokinetic muscle strength (peak torque of trunk flexors $+29\%$; $p < 0.001$; trunk extensors $+49\%$; $p = 0.003$). No significant improvements were seen for the EMG parameters. **Conclusion:** A pragmatic manual therapy approach with a maximum of 18 sessions has a positive effect on trunk muscle force, on daily functioning and on the way patients cope with pain in their daily lives. It seems however insufficient to induce significant changes in muscle recruitment during stabilization tasks.

O147

TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION FOR PATIENTS WITH LOW-BACK PAIN: A PILOT RANDOMIZED CONTROLLED CLINICAL TRIAL

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Transcutaneous electrical nerve stimulation (TENS) is a modality known for 30 years as an additional way of management of low back pain (LBP), but randomized controlled clinical trials (RCT) are still lacking (A. Khadilkar et al, 2005). One of the most frequently used devices for TENS in Russia is 'DiaDENS-PKM'. The aim of our study is to determine pain reduction after TENS in patients with LBP. The study was supported by DENAS MC Corporation (Russia). *Methods:* We used 'DiaDENS-PKM' (DENS) and placebo device made by manufacturer as an additional modality to standard protocol. LBP in these patients was non-specific; disc herniations, tumors and other known causes were excluded before inviting patients for the study. Randomization was made by an independent expert using computer software. During 7 months we performed screening for non-specific LBP in 1,566 in-patients with all types of non-surgical disorders in our University hospital. It was suggested to participate in this study to 48 patients who fulfilled inclusion criteria and we obtained informed consent confirming their willingness to participate from 30 patients. They were randomized into DENS group (15 patients) and placebo group (15 patients). Each patient got 7–10 procedures 20 min each. For DENS we used 77 Hz (5 min), 20 Hz (5 min) and 77–10 Hz (10 min). The study was single blind – patients were not informed which group they belong to. Six patients from each group left the study for different reason not related to their health or effects of the trial. Visual analogue scale (VAS) and Oswestry disability index (ODI) were used for assessment of pain and disability. *Results:* All patients had reduction of their pain during the study but VAS in DENS patients was significantly lower beginning with day 7 ($p < 0.05$). ODI was calculated in both groups before and after the study. In DENS group it was 37.6 ± 4.7 and 26.8 ± 4.8 accordingly ($p < 0.01$), in placebo group – 42.4 ± 6.0 and 36.4 ± 8.4 ($p > 0.05$). No side effects were registered. *Conclusion:* The first results of our pilot RCT show TENS as a promising adjunct in management of LBP. The study has to be continued and to include more patients.

O148

EVALUATION OF THE EFFECT OF DENS-THERAPY IN PATIENTS WITH CHRONIC NECK PAIN IN AN ORTHOPAEDIC REHABILITATION CLINIC AND A CLINIC FOR MOTHERS AND CHILDREN

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Introduction: Chronic unspecific neck pain is a very frequent disease and an important diagnosis in rehabilitation. *Aim:* To evaluate the effect of therapy with DENS (dynamic-electro-neuro-adaptive-stimulation, DENAS MS Corp., Jekaterinburg, Russia) in in-patients with unspecific chronic neck pain during a three weeks' stay in two different rehabilitation clinics. *Patients and Methods:* In-patients of an orthopaedic rehabilitation clinic (clinic 1) and a rehabilitation clinic for mother and children (clinic 2) (m/f, 25–70 years) were included in the controlled study. The patients were treated with a standard treatment + DENS (SD) or with standard treatment only (S). Chronic unspecific neck pain was the main or concomitant diagnosis. Patients with an initial VAS between 3–10 (10 point scale) were included. Additionally the Pain Perception Score (PPS: sensory and affective subdivision) was applied (1). Immediately before discharge VAS and SES were repeated. Patients received 5

treatments with DENS during their stay. *Results:* 85 patients were included in the study. In clinic 1 24 patients were treated with SD, 24 with S, in clinic 2 26 patients were treated with SD and 11 with S. In clinic 1 standard treatment was more than twice as intense as in clinic 2. VAS was significantly ($p < 0.001$) reduced in all groups except in the S group of clinic 2. Sensory and affective SES were significantly reduced in all groups ($p < 0.03$ – 0.001). DENS treatment was very well tolerated, only 4 patients had unspecific side effects. *Conclusion:* DENS therapy is effective and well-tolerated in the setting of stationary rehabilitation. It can be used to substitute other time-consuming or personnel-intensive treatments.

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O149

MODULATED MIDFREQUENCY ELECTROTHERAPY, CONVENTIONAL WESTERN MASSAGE AND MANUAL THERAPY AS TREATMENT MODALITY OF ACUTE LOW BACK PAIN

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Introduction: Different kinds of therapeutic procedures are used in the therapy of acute low back pain (LBP). Therapy modalities like massage and hot pack (M), mobilisation techniques (MT) and modulated midfrequency electrotherapy (MET) are not sufficiently evidence based examined. *Aims:* Our goal was to investigate what therapeutic effect could be achieved by MET in comparison to MT or M. *Patients and Methods:* In this pilot study 60 subjects (mean age 53.18 ± 14.95) with acute LBP were randomly divided into three treatment groups. One group received MET, the second M and the third MT for twenty minutes for three days in a row. Subjective sensation of LBP was measured by a visual analogue scale (VAS) with a range from 0 to 100 before treatment, immediately after treatment and each hour afterwards. Additionally the brief pain inventory short form was used in order to evaluate changes in life quality (LQ). The data was analysed using t-test. Inclusion criterion was acute LBP for at least 48 hours. Exclusion criteria included pregnancy, neuro-muscular disorders, muscle atrophy, leg pain, a history of back pain and pacemaker. *Results:* Directly after treatment there was a 63.09% reduction of VAS in the MET-group ($p < 0.0001$), 17.17% in the MT-group ($p < 0.05$) and 20.48% in the M-group ($p = 0.024$) in comparison to the prestimulation value. After 3 days of treatment we could observe a 67.8% ($p < 0.001$) reduction of pain in the MET, 49.07% in the MT and 39.81% in the M group. Life Quality evaluation concerning enjoyment of life showed a reduction from 4.24 ± 3.17 to 1.35 ± 1.66 ($p < 0.001$) in the MET-group, 4.44 ± 3.09 to 1.94 ± 1.83 ($p < 0.01$) in the MT-group and 4.83 ± 2.92 to 2.44 ± 2.31 ($p < 0.0001$) in the M-group. *Conclusion:* All three treatment modalities had an immediate pain relieving effect while MET showed the best reduction of VAS-score in the first 3 h after treatment. So MET could be a good first line treatment modality on patients with acute LBP. Due to the positive results after three days it should be discussed if a combination of these treatment modalities should be used in order to achieve better results. LQ could be satisfactorily elevated in all treatment groups.

O150

LOW LEVEL LASER THERAPY IN TREATMENT OF ACUTE LOW BACK PAIN

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Introduction: Some studies have shown analgesic and anti-inflammatory effects of low-level laser therapy (LLLT) in acute conditions (1).

Aim of the study was to investigate clinical effects of LLLT proposed as extension of conventional therapy, in relation with applied dose in patients with acute low back pain (LBP). *Patients and Methods:* The prospective study concluded 60 patients with acute LBP with sciatica caused by lumbar disk syndrome. The patients were selected by a single blind controlled trial and classified at three groups. The first group ($n=20$) were treated with conventional and simultaneously with LLLT therapy with following parameters: wavelength 780nm, 300Hz, with effective power 10mW, impulse length 1.7 ms at dose 3J per point; at whole dose at 24J. The second group ($n=20$) were treated as the first group, at dose 2J per point, at whole dose to 16J. The third control group ($n=20$) were treated with conventional drugs NSAIDs inhibit COX-2 (nimesulid 200 mg per day). The LLLT was applied to 8 correspondent spinal level. Patients were treated for a total of 15 treatments. Pain was measured by Scott Huskisson visual analogue scale, lumbar mobility by Schober measurement, quality of life with Oswestry disability questionnaire (2) and 12-item short form health survey (SF-12) (3). Subjects were evaluated before and after the treatment. Data were analyzed descriptive and analytic statistical methods. *Conclusions:* Significantly positive analgesic effects with significant functional improvement in all groups but better in first group support effectiveness of LLLT in acute LBP.

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O151

TREATMENT OF CHRONIC CERVICAL AND LOW BACK PAIN BY SEGMENTAL NEUROMYOTHERAPY APPROACH

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Background: Recent advances in pain neurosciences allow new treatment alternatives to provide pain relief in different conditions. Spinal segmental sensitization (SSS) is a consistent phenomenon present in patients with chronic pain. Segmental neuromyotherapy represents specific therapeutic modalities including paraspinal block (PSB), which alleviates pain by reversing the SSS to normal sensitivity. *Objectives:* To evaluate the effectiveness of PSB to reduce pain in patients with chronic neck and low back pain who failed to respond to conventional therapies. *Material and Methods:* 50 patients, 32 male and 18 female patients, aged 5 to 65 years with chronic neck and back pain not responding to conventional physiotherapy modalities and medications were selected from OPD- Phys. Med. & Rehab. hospital. Causes of pain included spondylosis, degenerative disc disease, mechanical pain, lumbar canal stenosis. They were evaluated and treated by A.A. Fisher's segmental neuromyotherapy. VAS, skin sensitivity, pressure algometry, sensitivity of subcutaneous tissue, muscle tone and trophoedema were evaluated. SSS has been diagnosed in all the patients. Treatment consisted of PSB and needling and infiltration of taut bands followed by superficial heat, electrical stimulation, relaxation and stretching exercises. *Results:* There was significant improvement of pain immediately after paraspinal block and one week later documented by Student *t*-test. *Conclusion:* SNMT is effective for pain relief in patients with neck and low back pain.

O152

THERAPEUTIC OUTCOMES OF INTEGRATIVE CARE PACKAGE FOR DISC HERNIATION

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The goal of this prospective observational cohort study was to investigate therapeutic outcomes of the integrative care package for back pain with disc herniation. We selected 150 consecutive low back pain patients (20 to 60 years old) with lateral radicular pain to lower extremities diagnosed as lumbar disc herniation (prolapse-extrusion) confirmed by MRI since November 2006. The visual analogue scale of radicular pain was 5 or higher. Care package comprises Korean medicine, Chuna (a Korean style systemic manipulative therapy), acupuncture, bee venom acupuncture (subcutaneous, or intramuscular). Treatment schedule for a total of 24 weeks involves weekly clinic visits during which relevant therapies are carried out and the medicine for the following week is given. Outcome measures are Visual analogue scale (VAS) of radicular pain, Oswestry Disability Index (Korean Version) and SF-36, which are assessed at baseline, 2, 4, 8, 12 and 24 weeks. Clinical data were obtained at baseline from physician questionnaire and examination. This study is completed on September 2007. Of 150 patients, 128 (85.3%) remain in the 24 week care plan and 78 of them (60.93%) have been recommended for surgical management at other hospitals, but sought after a non-surgical alternative. The mean scores of VAS, ODI and SF-36 at baseline were 7.436, 41.47 and 35.4, respectively. At week 24, they were 1.067, 11.84, and 66.48, respectively. The results were closely connected with duration of treatment. Pain and functional disability decreases as the patients get more treatments. While this observational study has no control group, we are certain that it is feasible to carry out such a prospective observational study to investigate the outcome of integrative multi-care package. Therefore, we urge more hospitals and clinics to begin feasible systematic investigations.

O153

CHRONIC LUMBAGO: COMPARISON BETWEEN THE EFFICACY OF THE TREATMENT WITH MESOTHERAPY ON TRIGGER POINTS VERSUS MESOTHERAPY ON ACUPUNCTURE POINTS

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Introduction: Chronic lumbar pain is a pathology that effects modern society with increasing frequency. Approximately 70-80% of the population of industrialized countries suffers of "low back pain" at least once in life (1). *Aim:* To evaluate the efficacy of the mesotherapy treatment on the trigger points compared to mesotherapy treatment with the inoculation of the drug on acupuncture points in chronic lumbago. *Patients and Methods:* 110 subjects with chronic lumbago were examined. 62 subjects were randomly separated into 2 groups; group A (34 subjects) treated by means of injection of the drug according to the mesotherapy method on trigger points and group B (28 patients) treated by means of an injection on acupuncture points. The evaluation scales administered were: VAS, VRS, McGill Pain Questionnaire Short Form, Roland Morris Disabilities Questionnaire, Oswestry LBP Disability Questionnaire. Drug used was lidocaina cloridrate 2% in a quantity of 2cc. 18 acupuncture points were stimulated in both groups in a cycle of 3 weekly sessions and a follow up session was carried out 4 weeks after the last application. Statistical analysis was executed with SPSS software package. *Results:* Group A demonstrated statistically, significant outcomes, for the McGill, Roland Morris and Oswestry scales and not for the VAS and VRS. Group B demonstrated a statistically, significant outcome when comparing the values collected of all the evaluation scales at the end of the treatment and at the follow-up. *Conclusions:* Mesotherapy on acupuncture points (2, 3) was effective for chronic lumbago alleviating pain and improving the functionality of the vertebral column. The compliance of the patient to the treatment is relevant to solving the pain component. Mesotherapy demonstrated no side effects, apart from the discomfort reported by the patient during the inoculation of the drug itself.

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O154

CLINICAL EFFICACY OF DIFFERENT THERAPY REGIMES OF LOW POWER LASERS IN THE TREATMENT OF ACUTE LOW BACK PAIN

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Introduction: Sixty to eighty per cent of people suffer from low back pain at some time in their lives. The past fifteen years have seen an intensive research effort to identify effective treatments and management strategies for low back pain. Low power laser therapy (LPLT) has been used in the treatment of musculoskeletal disorders such as back pain, but there is no consensus regarding therapy protocol and dose. The aim of this study was to evaluate the efficacy of Gallium–Arsenide LPLT (904nm) in relation to three different therapy regimes in treatment of acute low back pain (ALBP). **Patients and Methods:** The study included sixty-six patients, mean age of 45±8.88 years with ALBP. They were randomly assigned to three equal groups treated with different doses (energy densities) of laser light (Group A (n=22), dose=0.1J/cm² per point; Group B (n=22), dose=1J/cm² per point; Group C (n=22), dose=4J/cm² per point). In all groups the chosen modulation was 3000 Hz with average power output of 10 mW. LPLT was applied daily for two weeks except weekends. Visual analogue scale (VAS), Schober test, measurement of the lumbar spine flexion, manual muscle testing (MMT), straight leg raise test and NA Spine Society Low Back Pain outcome instrument were used in clinical and functional evaluations before and after therapy. **Results:** Highly significant improvements (p<0.01) were noted in all treatment groups after LPLT with respect to all investigated parameters. All of three LPLT doses reduced pain and improved the functional ability of patients with ALBP without statistically significant difference (p>0.05) between groups. All doses of LPLT improved the quality of life (QOL) with statistically significant better improvements in the group C (p<0.05). **Conclusions:** Three different regimes of LPLT were equally effective methods in reducing pain and functional disability in patients with ALBP. According to our study, the dose of 4 J/cm² seemed to be more effective in improving QOL and lumbar mobility.

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O155

CLINICAL EFFECTIVENESS OF AQUATIC EXERCISE TO TREAT LOW BACK PAIN: A RANDOMIZED CONTROLLED TRIAL

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Introduction: Land based exercise and physiotherapy are the main treatment tools used for low back pain. Clinical experience

indicates that aquatic exercise may have advantages for patients with low back pain. **Aim:** To compare the effectiveness of aquatic-exercise interventions with land based exercises in the treatment of low back pain. **Patients and Methods:** A total of 65 patients with low back pain were included in this study. Patients were randomly assigned to receive daily aquatic exercise or land based exercise treatment protocol. The first group (n=32) (aquatic exercise group) received aquatic exercises including mobility, aerobic, strengthening, and relaxation exercises for 1 h once a day for 20 days during a period of 4 weeks. The second group (n=33) had daily land based exercise treatment protocol for 1 h once a day for 20 days during a period of 4 weeks. Parameters were measured at baseline and after 4 week. All patients were evaluated with respect to pain (at rest, movement, and night) and assessed by visual analog scale, measurement of active range of motion using an inclinometer and a goniometer, Short Form 36 Health Survey (SF-36) and Oswestry low back pain disability questionnaire. **Results:** In both groups, statistically significant improvements were detected in all outcome measures compared with baseline (p<0.05). However improvement in Oswestry low back pain disability questionnaire and physical function and role limitations due to physical functioning subpart of SF-36 were better in aquatic exercise group (p<0.05). **Conclusion:** It is concluded that a water-based exercises produced better improvement in disability and quality of life of the patients with low back pain than land based exercise.

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O156

FUNCTIONAL ELECTRICAL STIMULATION IN LOW BACK PAIN WITH ‘STIMBELT’ EXERCISE GARMENT

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Introduction: Clinical results have shown importance of core stabilization exercise in low back pain (LBP) (1). Aim of this study is evaluation of functional electrical stimulation (FES) therapy with the STIMBELT exercise garment, in subjects with LBP. **Patients and Methods:** Prospective, randomized study that included 120 subjects with subacute and chronic LBP, which were selected in the experimental and control group. In addition to conventional physical therapy the experimental group received functional electrical stimulation of trunk muscles: lumbosacral paravertebral mm. obliquus et transversus abdominis and lower portions of m. rectus abdominis. For stimulation we used the STIMBELT exercise garment with an UNA-FET 8-channel stimulator in standing position or lying on their back. Stimulation parameters: 50 Hz, 500 microsec, 10 sec stimulation ‘on’ (the first 5 sec gradual increase of intensity) + 5 sec stimulation ‘off’. The intensity was adjusted individually at the level that created muscle contraction. All subjects had to learn to put the STIMBELT on and to take it off and to modulate intensity. Subjects were stimulated 30 min. daily for three weeks. Parameters evaluated before and after the three week therapy and contains: Quality of pain in the last 24 hours measured with Visual analogue scale (VAS), Manual muscle test (MMT) of trunk muscles; Range of motion of the lumbar spine; The Oswestry Low Back Pain Disability Questionnaire; The Short Form 12 Health Survey (SF-12) (2). Data were analyzed for differences between mean values in the groups using Student’s *t*-test and with analytic statistical methods. **Results and Conclusions:** Conventional physical therapy combined with STIMBELT Functional Electrical Therapy, is more efficient in the treatment of subjects with subacute and chronic low back pain than conventional physical therapy alone.

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O157**LOW BACK PAIN AND BACK SCHOOL: THE IMPORTANCE OF PSYCHOLOGICAL FACTORS**

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Introduction: The annual prevalence of low back pain has a range from 15% to 45%. Factors such as depression, anxiety and distress have an impact on back pain disability. Back schools can be defined as an intervention consisting of group education, training, and exercises that may be part of a multidisciplinary rehabilitation program. **Aim:** To evaluate the impact of Back School treatment on pain, quality of life and to investigate personality clusters that may condition the functional outcomes. **Patients and Methods:** This study is part of a research actually working that includes 60 patients and a control group: these are the preliminary data. Seventeen patients (4 M, 13 F) were enrolled with mean age 62 and diagnosis of LBP. A rehabilitative training of Back school (10 sessions) was made three times a week. McGill Pain Questionnaire, Minnesota Multifasic Personality Inventory, Short form 36 Health status Survey, Visual Analog Scale, Waddell disability Index, Oswestry Disability Index were adopted. Timing of questionnaires was: immediately before treatment (T0), immediately after treatment (T1) and one month after treatment (T2). Statistical analysis was executed with descriptive statistics and ANOVA. **Results:** MPQ results were statistically significantly different (no for PRIE). For VAS, WI and ODI all data was significantly different. For SF-36 there is an improvement for every domain (no for limitations in physical activities, limitations in usual role activities). For MMPI-2, 71% had a psychological deviation: elevation of score for depression (47%) and mania (24%). **Conclusion:** BS treatment shows good effects on LBP. Outcomes and compliance to treatment are negatively influenced by depression.

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O158**QUALITY OF LIFE IN SURGICALLY TREATED LUMBAR SPINAL STENOSIS**

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Aims: Quality of life assessment in patients with degenerative lumbar spinal stenosis after attending both a surgical and a rehabilitation treatment. **Material and Methods:** The study evaluated 50 patients (age between 50 and 72 years) suffering from moderate or severe degenerative lumbar spinal stenosis. All the patients needed a surgical treatment. 20 patients followed decompressive surgery, namely large decompressive lumbar laminectomy and/or laminoplasty, foraminotomy or discectomy. 30 patients needed fusion with instrumentation (a postero-lateral single or multilevel fusion) in terms of lumbar spine instability. All of the patients were included in an early postoperative rehabilitation program. The ODI (Oswestry Disability Index) scale was used preoperatively and 1, 2

and 4 weeks postoperatively. At the preoperative assessment, all of the ten ODI sections were applied. At 1 and 2 weeks assessment, only seven of ODI sections could be applied. Sections 8, 9 and 10 were excluded from the questionnaire at the intermediate assessments by using a correction index. The disability degree was: total score/5×(number of given answers)×100. **Results:** At the preoperative assessment, patients had scores that included them in severe disability or infirmity degree (with an average total score of 74%). At 1 week postoperatively, the average ODI score was 50%, at 2 weeks, ODI score was 37% and at 4 weeks, it was 14%. **Conclusions:** Surgical treatment of degenerative lumbar spinal stenosis, associated with an early postoperative rehabilitation program lead to an increase in the patients' quality of life. An improvement of disability score was noticed, especially in the sections that concern pain intensity, personal care, quality of sleep and social life.

O159**VALIDITY OF MUSCLE FUNCTION TESTS IN THE REHABILITATION MANAGEMENT OF CHRONIC LBP**

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Background: Dynamometric trunk muscle strength and endurance tests are widely performed within the rehabilitation management of chronic low back pain (cLBP). This is, however, done regardless of the sparse and conflicting evidence on the reliability of these measures in cLBP. Moreover, no data seem available on the accuracy of these measurements. **Aim:** This study sought to examine the accuracy of trunk muscle strength and endurance measurements in cLBP and to test their long term reliability with optimized test protocols that are clinically feasible in rehabilitation settings. **Methods:** A total of 32 cLBP and 19 healthy controls, matched in age, sex and body mass index (13 matched pairs according to a 2: 1 ratio and further 6 pairs according to a 1:1 ratio) were recruited in this cross sectional study. After familiarization with the dynamometer, both patients and healthy controls performed all, four repetitive isokinetic trunk extensor and flexor tests at 90°/s, and three isometric trunk extensor and flexor measurements at 20°, 60°, and 100° per s on a Biodex 2000 dynamometer. Tests were repeated, if the variability of measurements exceeded 15%. The Biering Sørensen test served to examine back muscle endurance. Borg-Category Ratio Scales CR-10 about exertion, tension, fear of harm and (re)/injury rated participants' body experience immediately before and after the testing. Patients who received no therapy repeated the protocol after three weeks. **Results:** Among dynamometric tests, sex adjusted isokinetic back extension and flexion measurements revealed the best ROC curves with AUC values of 0.86 and 0.89, respectively. Reliability testing demonstrated highly significant learning effects for both the isometric and isokinetic measurements (tolerance intervals between ~40 to ~150% of initial value). Borg-Category Ratio Scale ratings were not associated with the observed changes in the mean. The Biering Sørensen test demonstrated excellent accuracy (AUC=0.93) and good to moderate reliability (ICC=0.59). **Conclusion:** In cLBP, dynamometric muscle strength measurements are limited to muscle functional diagnostics and for treatment planning purpose. Monitoring the treatment outcome with these measures is problematic. We recommend the Biering Sørensen test over dynamometric measurements for assessing trunk muscle function in the rehabilitation management of cLBP patients. **Acknowledgement:** We thank Monika Knötig, now at the Department Internal Medicine II at the Medical University of Vienna for her assistance with the conduction of this study. This study was supported by a grant from the Lorenz Böhler Forschungsfonds awarded to Gerold Ebenbichler.

O160

INTERRATER REPEATABILITY OF MOTOR NERVE CONDUCTION VELOCITY OF THE ULNAR NERVE

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Introduction: There are no data on the reproducibility of the motor nerve conduction velocity of the ulnar nerve. **Aim:** To determine the interexaminer repeatability of the motor nerve conduction velocity of the ulnar nerve. **Patients and Methods:** Twenty-four healthy subjects (14 females, 10 males, mean age 38±13 years) were examined in consecutive order. The motor nerve conduction of the ulnar nerve was determined for the below-elbow to wrist (BE-to-W), above elbow to below elbow (AE-to-BE), and axilla to above elbow (AX-to-AE) segments. Based on a randomization list of various combinations and sequences from 2 of total of 3 examiners the measurement was repeated within half an hour by a second examiner who was blind to the results of the first examination. The results of the first and second examination were presented descriptively. The coefficient of repeatability (CR) was determined for BE-to-W, AE-to-BE and AX-to-AE segments. **Results:** For the BE-to-W segment the average nerve conduction velocity for the first measurement was 58.9±3.1 m/s and for the second measurement 58.8±4.2 m/s. The CR was 8.0 m/s. For the AE-to-BE segment the average nerve conduction velocity for the first measurement was 55.2±5.9 m/s and for the second measurement 54.7±5.9 m/s. The CR was 11.6 m/s. For the AX-to-AE segment the average nerve conduction velocity for the first measurement was 60.2±4.7 m/s and for the second measurement 60.7±5.8 m/s. The CR was 10.2 m/s. **Conclusion:** The interrater reproducibility of the motor nerve conduction velocity of the ulnar nerve is for the various segments within the same range. Compared with the sensory antidromic nerve conduction velocity the reproducibility is higher.

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O161

MUSCULOSKELETAL SONOGRAPHY USE IN PHYSIATRY: SINGLE CENTER ONE YEAR COST-EFFECTIVITY ANALYSIS

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Introduction: The use of musculoskeletal sonography (MSUS) has gained an intriguing concern in the last two decades, especially after clinicians had started to perform MSUS themselves. Although it is well known that MSUS being convenient as well as inexpensive, noninvasive, repeatable and accurate, to our best notice, a cost-effectivity analysis has not been done in the pertinent literature. **Aim:** To report about the spectrum of patients for whom MSUS was used in a physiatry clinic and to analyze whether MSUS had played a beneficial role in the diagnostic algorithm concerning time, cost and radiation exposure. **Patients and Methods:** All patients who were evaluated by MSUS (5–10 MHz and 8–16 MHz linear probes, Diasus Dynamic Imaging Ltd., Scotland, UK) in the Department of Physical Medicine and Rehabilitation at Hacettepe University Medical School, between January and December 2007 were included in the analysis. Each and every patient was considered on individual basis and the answers to the following three questions were recorded in case the patient had not been evaluated by MSUS; how long would the patient have waited (i.e. for further radiological appointments), what would the extra cost have been and how much radiation exposure would have been concerned? **Results:** Overall, 318 patients with a mean age of 41.11±19.74 years (range 1–81) were assessed

by MSUS in 2007. The spectrum of departments from which subjects were referred encompassed Physical Medicine and Rehabilitation (53.8%), Pediatric Rheumatology (17.9%), Oncology (18.2%), Sports Medicine (5.0%), Plastic Surgery (2.8%) and Orthopedics (2.2%). The cumulative benefit of MSUS use was found to be 7,650 days in terms of waiting period and 9,418 Euro in terms of cost. Only in 10 patients, X-ray examination had been necessary. **Conclusion:** In the light of this first and preliminary results pertaining to 318 patients, it is possible to conclude that MSUS provides significant amount of gain both with regard to time and cost in physiatry clinics. We call attention of physiatrists to this issue and imply that increasing the use of MSUS in the realm of Physical Medicine and Rehabilitation seems to be noteworthy.

O162

EVOLUTION OF THE ISOKINETIC SHOULDER STRENGTH BEFORE AND AFTER STABILIZATION BY THE LатарJET TECHNIQUE

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Introduction: The agonist/antagonist ratio is particularly informative in pathological conditions. Muscular imbalance and/or muscular deficit of the shoulder internal (IR) and external (ER) rotators would intervene in mechanisms of the shoulder instability. After shoulder stabilization surgery, there would be a strength deficit of IR and/or ER. **Aim:** To evaluate prospectively isokinetic shoulder muscle strength before and after shoulder stabilization by Latarjet technique. **Patients and Methods:** Among the thirty-eight patients included, 12 patients, 31±7 years old, with unilateral anterior unidirectional recurrent shoulder dislocation, underwent isokinetic evaluation before surgery, 3 months and 6 months after shoulder stabilization by the Latarjet technique. IR and ER peak torque (PT) were performed with a CON-TREX® dynamometer in concentric at 180°.s⁻¹, 120°.s⁻¹ and 60°.s⁻¹ for both shoulders. Evaluation was carried out in the seated 45° abducted test position in the scapular plane (Davies position). **Results:** Before surgery, IR and ER operated shoulder's strength side were similar to that of the healthy shoulder side. After surgery, for the operated shoulder side, IR and RE strength were significantly lower three months after surgery than before surgery (30% and 20%, respectively); and lower than for the healthy shoulder side. Six months after surgery, for the operated shoulder side, IR and RE strength were similar to that before surgery. IR and ER strength of the healthy shoulder side did not differ before and after surgery. **Conclusions:** Three months after shoulder stabilization by the Latarjet technique, the IR and ER isokinetic strength of the operated shoulder side, was decreased, mainly on the IR. This strength deficit is certainly associated with the opening and stitching of the sub-scapular muscle and the shoulder immobilization time. Six months after surgery, the isokinetic rotators strength would be recovered.

O163

DISABILITY AND QUALITY OF LIFE OF PATIENTS WITH KNEE OR HIP OSTEO-ARTHRITIS IN THE PRIMARY CARE SETTING AND FACTORS ASSOCIATED WITH GENERAL PRACTITIONERS' INDICATION FOR PROSTHETIC REPLACEMENT WITHIN ONE YEAR

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Objective: To assess disability and HRQoL of patients with knee or hip OA in primary care and to determine factors associated with GPs' opinion that their patients will need prosthetic replacement within one year after the consultation. **Methods:** Design: A

cross-sectional national survey; Setting: Primary care in France; *Participants*: 1,471 GPs and 4,183 patients with hip or knee OA. Measures: Pain on a 11-point numeric scale (0–10), disability on the Western Ontario and MacMaster Universities Osteoarthritis Index (WOMAC) (1–100) and Lequesne index (0–24), and quality of life on the Medical Outcomes Study 36-item Short Form (MOS SF-36; 0–100). *Results*: We analyzed records of 4,121 patients (2,540 knee, 1,581 hip OA). Patients with knee or hip OA exhibited high and similar levels of pain (5.2 ± 2.1 and 5.3 ± 2.3) and disability (Lequesne score 12.0 ± 4.2 and 11.8 ± 4.3 ; WOMAC score 45.7 ± 19.3 and 45.2 ± 17.3). The decrease in HRQoL was similar for patients with either location of the disease. GPs more often considered that their patients with hip OA would need prosthetic replacement within one year (28.1%) than those with knee OA (15.8%). Most factors associated with GPs' opinion were identified for both locations of disease and were related to disability and pain levels. *Conclusions*: In the primary care setting, patients with knee or hip OA have similar, high disability levels and substantially low HRQoL. Patients' disability seems to play a central role in GPs' opinion of the need for their patients with either type of OA to undergo prosthetic replacement within one year.

O164

FUNCTIONAL ASSESSMENT AFTER KNEE ACL RECONSTRUCTION (KACLIR TEST)

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Introduction: Evaluation of neuromuscular behaviour is of extreme relevance and interest in the field of Rehabilitation in case of injuries or surgery. This should be used as clinical basic data for assisting and programming rehabilitation exercises. Furthermore it should be performed periodically for monitoring the effects of rehabilitation on neuromuscular functions and specific performances. *Objective*: The aim of the present research is to introduce a new procedure (KACLIR test) to determine the amount of functional recovery after knee joint surgery. *Materials and Methods*: Ten patients with unilateral Knee ACL Reconstruction, within 4 months from operation, with implantation of semitendineous muscle portion, were recruited from the DH of PRM in Tor Vergata University General Hospital in 2007. The Knee ACL Reconstruction test (KACLIR test) is a four steps neuromuscular evaluation. An Isoinertial s-EMG diagnostic technique consisting on monitoring the muscles EMG activity during free load leg extension and jumps was applied for identify strength and imbalance deficit of the operated (OL) and non operated (NOL) leg. This evaluation consisted of: Leg extension LE, Squat jump SJ, Counter movement jump CMJ, WBV sEMG. *Results*: During LE test mechanical velocity ($p < 0.002$), leg displacement ($p < 0.004$) and sEMG activity of vastus lateralis and vastus medialis muscles ($p < 0.003$) in the non operated leg (NOL) were higher than those in the contralateral one (OL). During the vibration period higher EMG activity was noted a remarkable enhancement of the sEMG in the post operated leg compared to the healthy one ($p < 0.02$). *Conclusion*: Results of our study suggest that the KACLIR test, a combination of an isoinertial evaluation and vibration stimulation, both associated with sEMG recordings, may allow for detection of impairment of neuromuscular functional as well as for monitoring progress of the Rehabilitation programs in Knee ACL Reconstruction.

O165

MUSCLE STRENGTH ASSESSMENT AFTER ACL RECONSTRUCTION: INFLUENCE OF THE ISOKINETIC TESTING MODALITIES

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Introduction: When using a resistance placed at the distal tibia, the contraction of the quadriceps tends to force the proximal end of the

tibia anteriorly with respect to the distal femur. This mechanism could damage the graft after an anterior cruciate ligament (ACL) surgical repair, for instance through isokinetic intervention in rehabilitation. Therefore, it is frequently recommended to use either a proximal placement of the isokinetic resistance pad or an anti-shear device. Nevertheless, the influence of the resistance pad position on muscle torque development and estimation of strength deficit remains poorly investigated. *Aim*: To study, after ACL reconstruction, the influence of the resistance pad positioning on (1) torque development and electromyographic (EMG) activity pattern of the hamstring and quadriceps muscles, (2) muscle strength deficit estimated from a comparison with controlateral healthy knee performances. *Patients and Methods*: Twenty male subjects (26 ± 6 years old) with unilateral ACL reconstruction using a patellar tendon graft were studied. Six months after surgery, they performed a pain free bilateral isokinetic assessment of hamstrings and quadriceps in concentric at $60^\circ/s$ and $240^\circ/s$. Two different positions of the resistance pad on the tibia, either distal or proximal, were successively used (order randomly assigned). Surface EMG activity was measured on quadriceps and hamstrings. The average root mean square (RMS) represented muscle activity. *Results*: The isokinetic strength deficit of the quadriceps through a bilateral comparison was significantly increased when the test was performed in a distal position of the resistance pad compared to a proximal position: respectively $35 \pm 13\%$ and $17\% \pm 12\%$ at $60^\circ/s$ ($p < 0.05$). The activation pattern during isokinetic knee extension at maximal intensity was also modified by the resistance pad position on the tibia. At low velocity ($60^\circ/s$), the proximal/distal EMG activity ratio on quadriceps was significantly increased on the operated leg compared to the controlateral healthy side. By contrast, parameters related to the hamstring muscles did not show significant difference between both positions. *Conclusion*: The resistance pad position on the tibia during maximal isokinetic knee extension after ACL reconstruction significantly influences quadriceps activation and torque production. That could entail questionable interpretation of an isokinetic testing.

O166

JOINT REPLACEMENT REHABILITATION OUTCOMES UPON DISCHARGE FROM SKILLED NURSING FACILITIES AND INPATIENT REHABILITATION FACILITIES: FINDINGS FROM THE JOINTS I STUDY

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Objective: Compare the rehabilitation outcomes of patients who had a hip or knee replacement. *Design*: Prospective observational cohort study. *Setting*: Some 11 inpatient rehabilitation facilities (IRFs) 8 skilled nursing facilities (SNFs), and 1 hybrid facility (HBF) from across the U.S. *Participants*: 2,152 consecutively enrolled patients; 1,401 knee replacement patients and 751 hip replacement patients. Paper excludes those who had a hip fracture prior to their hip replacement. *Interventions*: No new interventions; examination of existing practice patterns. *Main Outcome Measures*: Functional Independence Measure (FIM) motor score, discharge to community. *Results*: Typical joint replacement patient was a woman in her early 70s; average body mass index (BMI) in the low 30s (BMI 30=obese). IRF patients presented a somewhat more severe medical and functional profile upon admission compared to SNF patients. SNF and IRF patients presented similar rates of diabetes, hypertension, and ischemic heart disease. The average length of stay for SNF patients, hip and knee combined, was 14.1 days; for HBF patients 8.8 days; and for IRF patients about 9–10 days. SNF and IRF patients received similar types and amounts of physical and occupational therapy; IRF patients received more intensive therapy, i.e., more hours per day. Controlling

for patient differences, IRF patients achieved somewhat higher FIM gains and achieved them in a shorter period of time – the largest spread was 3.6 FIM points between medium-volume IRFs and low-volume SNFs. *Conclusions:* While IRF patients had somewhat better outcomes than did SNF patients, there are other important factors that also shape outcome. Earlier and more intense rehabilitation is associated with better outcomes. The volume of joint replacement patients seen by a facility also plays a part: Medium volume facilities among both SNF and IRFs had better outcomes.

O167

RELIABILITY OF PLANTAR PRESSURE MEASUREMENT SYSTEM IN RHEUMATOID ARTHRITIS PATIENTS

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Introduction: Foot involvement occurs in 85–100% of people with rheumatoid arthritis (RA), which causes bony deformities and soft tissue atrophy of the foot, thus changing normal plantar pressure distribution. Increased pressure under forefoot results in pain. Plantar pressure measurement is an important diagnostic tool in assessing foot problems and effectiveness of therapeutic intervention. F-Scan plantar pressure measurement system (Tekscan Inc.) is used at our Institute in clinical practice and for research. Its reliability has already been proved in diabetic patients and healthy subjects, but not in RA patients. *Aim:* To evaluate reliability of the F-Scan system (V5.0) for plantar pressure measurement in RA patients. *Patients and Methods:* Twelve RA patients (11 female; age 51–80, mean 65) were included in the study. Recording was performed while patients walked along an open corridor at normal walking speed. At least 5 left and right steps were recorded during one walk; 6 separate measurements were performed for each patient. F-Scan's Timing Analysis Module (TAM) was used to analyse average peak pressures on seven predetermined spots of each foot (hallux, metatarsal head I, II, III-IV, V, midfoot and heel). The first and the last step were excluded from the analysis; average peak pressures were computed from the remaining steps for each measurement. Measurement reliability was assessed with intra-class correlation (ICC; two-way random model) for each spot and median within-subject coefficient of variation (CV) across subjects. Repeated-measures ANOVA and Hotelling's T2 test were used to test the equality of mean measurement over subjects across the measurements. *Results:* ICC values, which were all statistically significant at $p < 0.0001$, ranged from 0.897 to 0.999, whereby average-measure ICC were even higher than single-measure (median 0.996 vs. 0.979). Within-subject variation was small (median within-subject CV 0.046-0.167, overall median 0.072). Pronounced variability was observed at midfoot (for the remaining spots, all average-measure ICC were over 0.99 and all median CV below 0.10). No statistically significant differences in average values were found between the six measurements. *Conclusions:* High reliability of the F-Scan system has been proven for plantar pressure measurement in RA patients. Taking average of several measurements is recommended.

O168

THE IMPACT OF ANKLE FOOT ORTHOSES ON STANDING BALANCE IN CEREBRAL PALSY

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Introduction: Ankle foot orthoses are an essential clinical tool in the management of children with cerebral palsy. The assessment of orthotic success is however, often limited to the subjective observation of a more normal walking pattern together with perceived improved stability. *Aim:* To objectively assess the effect of AFOs on standing balance in a group of children with mild cerebral palsy (gross motor

function classification – GMFCS <2). *Patients and Methods:* An instrumented Romberg test (1) was used to assess balance in children with cerebral palsy (CP) when barefoot and when wearing ankle foot orthoses (AFOs). A force platform was used to measure the centre of pressure excursion during a 20 sec trial. The postural sway parameter – swept area or sway area (SA) was calculated according to the method of Hufschmidt et al. (2). All subjects performed a random series of trials whilst barefoot; eyes open (EO) and with eyes closed (EC). This series was repeated with CP subjects wearing their regular AFOs and shoes. Parametric statistical analysis was performed to ascertain the influence of AFOs on the size of sway area in the two stance conditions of EO and EC. *Results:* A significant increase was found in barefoot SA between EO and EC tests in the CP group ($p \leq 0.05$). Adding the AFOs in the CP group did not significantly reduce postural sway with the EO. However, the increase in SA from the EO to the EC test was significantly less when AFOs were worn. *Conclusions:* Ankle foot orthoses appear to improve standing balance in cerebral palsy. The force plate derived centre of pressure trajectory (CoP) may offer a tool for the assessment of the effectiveness of AFO prescription for improving standing balance.

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O169

PATIENT PREFERENCE DISABILITY QUESTIONNAIRE IN SYSTEMIC SCLEROSIS: A CROSS-SECTIONAL SURVEY

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Objective: To assess patient priorities in disability in systemic sclerosis (SSc). *Patients and Methods:* One hundred and fifty SSc patients (22 males) fulfilling the American College of Rheumatology and/or Leroy & Medsger criteria for SSc were evaluated by the McMaster-Toronto Arthritis Patient Preference Disability Questionnaire (MACTAR), Karnofsky performance status (KPS), Cochin hand function scale (CHFS), Health Assessment Questionnaire (HAQ), Hospital Anxiety and Depression scale (HAD), Mouth Handicap in SSc (MHSS) scale, and global perception regarding their health status. Correlations between scores were analyzed by the Spearman coefficient. Logistic regression analysis was used to determine factors associated with patients' global perception of their health. *Results:* Of the patients investigated, 81 (54%) had limited cutaneous SSc, 65 (43.3%) diffuse SSc and 4 (2.7%) limited SSc. The three disability domains most often cited were walking ($n=82$ patients, 54.6%), housekeeping ($n=67$, 44.6%) and sport activities ($n=59$, 39.3%). The MACTAR score correlated fairly with KPS ($r=0.58$) but only weakly with HAQ score ($r=0.38$). In multivariate analysis, 2 factors were associated with patients' negative global perception of their health status: KPS (odds ratio (OR) 1.07, 95% confidence interval (CI) 1.00–1.15) and MHSS score (OR 0.93, 95% CI 0.88–0.99). *Conclusions:* For assessing SSc patient priorities in disability, the MACTAR has acceptable construct validity. Its weak correlation with HAQ suggests that it adds useful information on disability.

O170

REHABILITATION APPROACH TO SCLERODERMIA

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Introduction: Systemic sclerosis (SS) is an autoimmune disorder characterized by early endothelial cell damage followed by the

development of cutaneous as well as visceral fibrosis. Different studies reported substantial modifications in the quality of life, in the working and social activities and in the psychological state of the subjects. These modifications were caused by the clinical manifestations of the scleroderma pathology. *Aim:* The aim of our study was to verify the possibility of improving the quality of life (QOL) of the patients affected by SS through an appropriate rehabilitation program, whose purpose was to reduce the secondary effects of pathology. *Patients and Methods:* Ten subjects (5♂ and 5♀) of 50±10 years old with a diagnosis of SS were randomly assigned to two different rehabilitation programs during 4 weeks: Group A (RhSp) 2 day/week of Hydrokinetic therapy and 1 day/week of microgravity postural training; Group B (RhVi), 2 day/week of Hydrokinetic therapy, 1 day/week of antigravity postural training and 3 day/week high intensity local vibrational program (intensity: 300hz) by VISS (Visscom, Italy). *Results:* 4 months before the beginning of the rehabilitation program (spring) (Pt), firstly before its beginning and then after its end, two tests of the quality of life HAQ-DI, SKINDEX-29 and one on Raynaud pathology perception VAS FR were practiced on all patients. At the same time, stibilometric test, the Isokinetic lower limb force were measured. The Myoton-2 equipment was used to describe the viscoelastic parameters of the skeletal muscles. Our results indicate that each rehabilitation program improves the QOL in 62.5% of patients. All patients report a good compliance of therapy and a reduction of the Raynaud phenomenon. Muscular strength improves in RhVi (4%). All the programs increase stability, reduce the sway area ($p<0.05$) and reduce index of Romberg.. The muscular tension increases in RhSp and decreases in RhVi, the muscular stiffness decreases in RhVi, any significant variation in muscular elasticity is shown. *Conclusion:* Our results suggest that an appropriate rehabilitation program counteracts the secondary effects of SS. Furthermore it is able to improve the QOL of the patients.

O171

ENERGY EXPENDITURE OF WALKING WITH PROSTHESIS: BELOW-KNEE VS PARTIAL FOOT AMPUTATIONS

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Introduction: Amputees are known to spend more energy than able-bodied persons during walking. It is also known that more proximal amputation is associated with more energy need for walking. Technologic advancements in recent years greatly improved the walking of amputees with below-knee prostheses. Partial foot amputations, on the other hand, still remain as a prosthetic challenge. Usually, the walking of partial foot amputees is less symmetrical than the walking of below-knee amputees. They also have more complications like pain and skin breakdown. *Aim:* The purpose of this study was to compare the energy expenditure of below-knee amputees and partial foot amputees during walking. *Patients and Methods:* Seventeen below-knee and 14 partial foot amputees were included. The patients were asked to walk on a treadmill. Four different speed and slope combinations were used: 1.5 km/h and 0° slope, 3 km/h and 0° slope, 1.5 km/h and 5° slope, 3 km/h and 5° slope. Patients walked 5 minutes for each combination with 5-min resting intervals. Average O₂ consumption of the last two minutes of each 5-min session was calculated. *Results:* Our results showed that energy expenditure of below-knee amputees was consistently lower than that of partial foot amputees during walking with four different combinations. Statistical significance, however, could not be obtained, presumably due to small sample size. *Conclusion:* Partial foot amputees seem to expend more energy for walking than below-knee amputees do.

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O172

ENERGY EXPENDITURE OF ABOVE KNEE AND BELOW-KNEE AMPUTEES DURING WALKING

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Introduction: Amputees are known to spend more energy than able-bodied persons during walking. It is also known since the study of Waters et al. that more proximal amputation is associated with more energy need for walking. However, technologic advancements in recent years greatly improved the walking of amputees. *Aim:* The purpose of this study was to compare the energy expenditure of below-knee and above-knee amputees during walking. *Patients and Methods:* Seventeen below-knee and 10 above-knee amputees were included. Similar to Waters study, all those with above-knee amputation used a total contact quadrilateral socket and all with below-knee amputation used a patellar tendon-bearing socket. Thirteen of the below-knee patients used silicone liners with shuttlelock system and four used soft polyethylene liners. The patients were asked to walk on a treadmill. Four different speed and slope combinations were used: 1.5 km/h and 0° slope, 3 km/h and 0° slope, 1.5 km/h and 5° slope, 3 km/h and 5° slope. Patients walked 5 min for each combination with 5-min resting intervals. Average O₂ consumption of the last two min of each 5-min session was calculated. *Results:* Our results showed that energy expenditure of below-knee amputees was consistently lower than that of above-knee amputees during walking with four different combinations. Statistical significance could not be obtained for three combinations except 3 km/h speed and 5° slope. For this combination below-knee amputees spent significantly less energy than above-knee amputees ($p=0.02$). *Conclusion:* Proximal amputations require more energy than distal amputations during gait. The difference in energy need of above-knee and below-knee amputees becomes more prominent as the speed and slope increases. In other words, above-knee amputees spend significantly more energy than below-knee amputees during uphill fast-pace walking.

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O173

CRYOPROBE TREATMENT FOR PAINFUL NEUROMAS IN AMPUTEES

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Introduction: Neuropathic pain commonly occurs following amputation and may interfere with daytime activities or sleep. In a proportion of patients, pain is associated with a clinically or radiologically identifiable neuroma. In such circumstances, usual practice is surgical excision but results are inconsistent. Furthermore, this surgery inevitably causes short-term disruption in the use of a prosthesis and may lead to long-term difficulties such as the development of tethered scarring which in turn renders the stump vulnerable to ulceration. Cryoprobe treatment is successful in ablating neuromas in other circumstances where neuropathic pain has occurred. *Aim:* To explore whether localised cryoprobe treatment represents a safe and effective method of managing painful neuromas in amputation stumps. *Patients:* In an open pilot study, ten consecutive amputees (aged 45 to 87) presenting with troublesome stump pain (median duration 3 years) and clinical features indicative of a neuroma were treated. *Methods:* A 2 mm cryoprobe was applied to the tender area through a percutaneous cannula. The presumed neuroma was located using the in-built sensory nerve stimulator at a stimulation of <0.5V. A 60s freezing lesion was then produced followed by 30s of thaw-

ing and then up to four further freeze/thaw lesions were made until the local tenderness was resolved. A lesion temperature of -50°C was achieved using nitrous oxide gas. Evaluation of effectiveness was performed through telephone follow-up. *Results:* Nine of the 10 patients reported significant pain relief following cryoprobe treatment with a duration of at least 5 months. In three patients the benefit lasted for more than a year. Apart from initial deterioration in pain in one patient, no significant adverse effects were recorded. *Conclusion:* Cryoprobe treatment of painful neuromas in amputees may represent a simple and safe alternative to traditional remedies such surgical excision. Cryoprobe treatment therefore warrants further investigation in this group of patients.

O174

EFFECTS OF TOTAL CONTACT INSOLE WITH HEEL ELEVATION IN PATIENTS WITH RECONSTRUCTED HEEL

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Trauma to the foot might cause various degree of damage to soft tissue and/or bone. With the progression of surgery, limb salvage could be available by proper bone fixation and rehabilitation of soft tissue. Patients will develop planter ulcer and foot pain when they resume ambulation. Yet, few studies have investigated the therapeutic effect of foot orthosis in foot trauma. In this study, 11 cases with foot trauma were recruited. A new total contact insole foot orthosis were used to relief foot pain, to improve walking ability or/and to promote ulcer healing. The results were evaluated by ulcer size, foot pain and walking ability. Meanwhile, EMED in-shoe foot pressure measurement system was used to measure planter pressure distribution in 11 cases before and after wearing the orthosis insole. After three-month implementation of such therapeutic orthotic insoles, grading of pain and walking ability were compared statistically with the initial grading in 11 cases. Significant treatment effect were found for relieving the foot pain and improving walking ability ($p=0.000$). Treatment effect of foot ulcer healing in six patients were also highly significant ($Z=3.91$, $p=0.00009$). In-shoe foot pressure distribution evaluation also showed reduced pressure over the high pressure point and redistributed pressure over the whole foot sole after insole implementation. Peak pressure was reduced significantly over different area of the sole during walking after applying the insole ($p<0.05$). In conclusion, therapeutic insole plays very important role in the management of traumatic foot.

O176

PREVALENCE AND SOCIODEMOGRAPHIC CORRELATIONS OF DEPRESSION AND ANXIETY AFTER LOWER LIMB AMPUTATION

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Introduction: Lower extremity amputations are of a serious problem. Loss of a leg causes often heavy physical injury, and life becomes difficult, as moving and self-servicing is critical. Patients are not only experiencing physical injury, but also violent and long-lasting psycho-emotional and social stress. As a result, the change of appearance and shape of body demands adaptation of the patient and the surrounded environment. *Objective:* This study aimed at assessing the prevalence of depression and anxiety among lower limb amputees and examining the relationship between depression and socio-demographic/clinical characteristics of amputees. *Methods:* Participants were 56 patients with unilateral lower limb amputation. They were recruited from inpatient and outpatient clinics of Jordan University hospital, Royal Farah Rehabilitation Center, and Al-basheer hospital in Amman-Jordan. Participants responded to a questionnaire that included a battery

of questions requesting brief information about socio-demographic variables and characteristics of amputation. The level of depression and anxiety in each participating patient was assessed by using the Hospital Anxiety and Depression Scale (HADS). *Results:* Prevalence of significant depressive symptoms was 20% [HADS, Depression subscale (HADS-D) score ≥ 8]. Prevalence of significant anxiety symptoms was 37% [HADS Anxiety subscale (HADS-A) score ≥ 8]. Factors associated with high prevalence of psychological symptoms include female gender, lack of social support, unemployment and low income, traumatic amputation, shorter time since amputation and below knee level of amputation. *Conclusions:* The findings of the present study highlight the high incidence of psychiatric disability and depression in amputees; it also showed the importance of socio-demographic factors in psychological adjustment to amputation. It is suggested that psychiatric evaluation and adequate rehabilitation should form a part of their overall management.

O177

VOCATIONAL OUTCOMES AFTER AMPUTATION: A CROSS-SECTIONAL STUDY

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Introduction: Participation in work after amputation is dependent on a wide variety of issues including activity limitations and personal factors. Reviews of the literature suggest that re-employment varies from 43.5% to 100% depending on the study methods chosen. In the UK, it is estimated that 30–50% of adults of working age will return to employment after an amputation. *Aim:* 1) To examine the vocational outcome in adults of working age who have an amputation; 2) to evaluate changes in employment to guide service development; 3) to explore the relationship between self-efficacy and change in employment. *Patients and Methods:* A random sample of patients of working age (16–65 years) attending an outpatient amputee rehabilitation centre for more than one year. A postal questionnaire recording current and past employment, experience of pain, and self-efficacy. *Results:* We received 68 valid replies. The median age of respondents was 54 years (IQR 46–60 years) with 47 males. The most common level of amputation was transtibial (33) followed by transfemoral (20). Trauma accounted for 19 amputations; 16 respondents had amputations due to dysvascularity. Forty-six respondents reported phantom limb pain. All respondents had received a prosthesis and had completed an outpatient rehabilitation programme. Thirty-six respondents were in full- or part-time employment prior to their amputation; six were retired and three were unemployed. Eleven respondents returned to the same work after their amputation. Overall, there were fewer people in full-time work (22) and more in part-time work (8) and running the home (6). Fourteen respondents were retired and nine were unemployed. There was shift in the nature of respondents' work from physical work to sedentary jobs. Phantom pain and self-efficacy were not related to re-employment after amputation. *Conclusion:* Amputation has a major impact on some people's ability to work. Targeting individuals with the potential to return to work after amputation could be productive. More focused input in the year after amputation would be beneficial as it appears that this is the time when most respondents felt that they had mastered using a prosthesis and were keen to return to work.

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PROSTHETIC FUNCTIONALITY IN GERIATRIC LOWER LIMB AMPUTEES

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Introduction: The medical literature that deals with the functional impact after an amputation is not very extensive. The publica-

tions studying geriatric amputees are further reduced, and this population on the other hand is the most numerous. Measurement of functional outcome specific to this population is important. In the recent literature there are no measures specifically directed at the functional demands of the geriatric population. We used a self report scale of prosthetic mobility, the Houghton scale. *Aim:* The aim of this study was to evaluate the functional results of geriatric amputees treated in our Service and analyze its relationship with some variables. *Patients and Methods:* The study included individuals with 60 years or older, after transtibial or transfemoral amputation, that joined, over 1 year, our consultation. The variables studied were sex, age, type of amputation, etiology, comorbidity, rehabilitation, causes of prosthetics desertion and functional outcome (Houghton scale). *Results:* The general functional results were satisfactory. We found a relationship between the functional level and the etiology and type of amputation, suggesting that the elderly with tibial unilateral amputation and those without vascular disease were the most independent. Comorbidity, particularly cardiopulmonary disease, did also influence functional outcome in these population. *Conclusion:* Amputees with vascular disease and comorbidity require a more careful multi-disciplinary approach in order to reduce the level and extent of complications that diminish the rehabilitation potential. It is essential in evaluation of prosthetic care of elderly amputees the use of functional scales easy to handle and of quick completion, as the Houghton scale.

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O179

DOES INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH (ICF) GIVE US ADDITIONAL INFORMATION ON FUNCTIONING OF STROKE PATIENTS?

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Introduction: All patients admitted to the hospital, even for rehabilitation have to have an ICD code, which is important for the national health databases. ICD codes do not tell us a lot about functional status, especially about activity limitations and participation restrictions. ICD had only some functional diagnoses. One of the main scopes of International Classification of Functioning, Disability and Health (ICF) is to provide a description of situations with regard to human functioning. *Aim:* The aim of present study was to find out which additional information we get by using ICF in clinical practice on stroke patients. *Patients and Methods:* 102 stroke patients admitted to primary rehabilitation at the Institute for Rehabilitation in Ljubljana have been included into study. In the first week after the admission, their functioning and health were coded by all the relevant ICD and ICF categories. *Results:* The patients were 21 to 82 years old, 37 of them were women, 65 men. They had one to five different ICD codes. The two most common were stroke and hypertension, followed by diabetes. From ICF all of them had at least 11 codes for Body Functions, at least one for Body Structures, at least 11 for Activities and Participation and at least one for Environmental Factors, all together at least 24 additional codes. All three most often used ICD codes do not tell us a lot about functioning of the patient. This has been much better described by using ICF, from which it was much clearly on which areas patient has problems and on which not, what are the main obstacles and facilitators and which assistive product he or she may need to improve the performance. *Conclusion:* ICF gives us valuable additional information on functioning of stroke patients.

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ICF APPLICATION TO A CASE OF SYSTEMIC LUPUS ERYTHEMATOSUS

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Introduction: International Classification of Functioning, Disability and Health (ICF) is an integrative bio-psycho-social model that describes function and disability and thus the impact of disease in people's life. It integrates four major areas, namely body functions, body structures, activities and participation and environmental factors. This is also the rehabilitation medicine perspective. Systemic lupus erythematosus (SLE) is a chronic systemic inflammatory autoimmune disease. The musculoskeletal system is involved most frequently, affecting small and large joints, spine and periarticular tissue, and also due to complications from chronic medication especially steroid use such as osteonecrosis, osteoporosis, and stress fractures. Most common neurologic manifestations are stroke and transient ischemic attack. *Aim:* Illustrate the use of ICF in rehabilitation practice. *Patients, Methods and Results:* We present the case of a 29 year old white woman with SLE diagnosed 7 years ago, with dermatologic manifestations, polyarthritis and a recent history of stroke involving the right median cerebral artery territory complicated by intraparenchymatous hemorrhage after embolectomy. Imaging exams further revealed diffuse osteopenia, multiple lumbar vertebrae collapse, inflammatory hyperfixation in several joints and left knee osteonecrosis (involving femur, tibia and patella); blood tests were for positive antiphospholipid antibodies. At admission to our center, she presented left spastic hemiparesia as well as intense and incapacitating lumbar pain. She was not autonomous in self-care or carrying out daily activities and required a wheelchair to move around. Medical therapy includes corticoids, hydroxychloroquine, warfarine, vitamin D, calcium and alendronate. The integrative rehabilitation program included: analgesia (NSAIDs and electrotherapy); spasticity control (selective muscular injection, in left limbs, with botulinum toxin type A); neuro-motor and functional reeducation; technical aids (wrist-hand orthosis, lumbar support, crutch, wheelchair, Nelson knife), training in activities of daily living (ADL). At the time of discharge she had better muscle tone and power, function and coordination of the left limbs, without complaints of back pain, needing one crutch for walking short distances on regular ground and wheelchair the rest of the time and partially independent for ADL. *Conclusion:* ICF is particularly useful in diseases affecting multiple organs and systems, such as SLE, guiding the therapeutic decisions and timings to maximize patient rehabilitation and integration.

O181

PARTICIPATION AS AN OUTCOME MEASURE IN A REHABILITATION COHORT IN SPINAL CORD INJURY PATIENTS

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Introduction: Much of the rehabilitation practice is based on the presumption that rehabilitation interventions acting at the levels of disease, body structure, and impairments should be reflected in changes in client's participation. Primarily the measurement instruments have been developed to assess a client's participation restriction and do not reflect a client's perception and needs, but are normative and focus on general abilities, tasks and roles. Confirming that community integration or participation has been achieved at the end of the rehabilitation has been impeded by a lack of consensus on definition and measurement on participation. *Aim:* This study aims to understand the concept of participation and to monitor determinants of participation

in a rehabilitation cohort in Spinal Cord Injury (SCI) patients. *Design:* The qualitative approach of grounded theory was used. In-depth, semi structured interviews were conducted with 8 SCI patients from a rehabilitation cohort in their transition period from hospital to home. The interviews were addressing 4 major topics: a) what maximizes the participation of the individual with a disability, b) what is the impact of the disease on a the individual's life, c) how can functional objectives maximize the effect of rehabilitation and d) what exactly determines whether an activity performed by the individual is expressed as satisfactory or important. *Results:* Preliminary results show that there are three different non-hierarchical layers within participation; 1) social participation, 2) occupational participation and 3) socio-occupational participation. Each layers reveals different features that described the determinants for participation; a) the feeling of belonging, b) having a sense of control, c) aiming towards a sense of achievement and d) aiming towards a sense of importance. The results will be discussed in relation to contemporary discourses on occupation and participation. *Conclusion:* There are different non-hierarchical layers within participation. Participation can be seen as a dyad between the individual's social interactions and his specific occupation performed. These results form the basis for further research on monitoring the determinants for participation.

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COMMUNITY INTEGRATION AND PARTICIPATION FOLLOWING SPINAL CORD INJURY: A 2-YEAR FOLLOW-UP

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Introduction: The transition from rehabilitation to home is a critical time for the person with acute spinal cord injury (SCI). A whole of life approach, incorporating individualized support, liaising on behalf of the individual, and planning for the future may enhance community integration/participation (CIP) following resettlement into the community. *Aim:* To evaluate the impact of an independent living coordinator (ILC) on CIP. To explore predictors associated with CIP at 2 years following discharge from rehabilitation. *Patients and Methods:* A prospective controlled study (pre and post introduction of ILC) of 75 people with acute traumatic SCI, recruited consecutively from SCI units in Sydney. Participants were followed for 2 years in the community upon completion of rehabilitation. Outcome measures were collected at 6 weeks, 1 year, and 2 years after discharge. Outcome measures were: Craig Handicap Assessment and Reporting Technique (CHART), Sydney Psychosocial Reintegration Scale (SPRS), Community Integration Measure (CIM), and other measures. Two-way repeated measures analyses were conducted to test the significance of change in CIP between the group receiving support from an ILC and the control group, factored by SCI impairment level high impairment (tetraplegia ASIA A-C) and low impairment (tetraplegia ASIA D or paraplegia). Linear regression was performed to explore early factors associated with CIP at 2 years after discharge from rehabilitation. *Results:* All participants, except for individuals with tetraplegia (ASIA A-C) in the control group, improved in community integration outcomes over two years. A group effect was found among individuals with high impairment SCI for SPRS [F (2.56)=8.2, $p=0.001$], and suggested for CHART [F (2.56)=2.8, $p=0.067$] and CIM [F (2.58)=2.8, $p=0.071$]. In multiple regression analysis, Functional Independence Measure™ scores and pain levels were most commonly associated with CIP. Socio-economic status, readmissions due to secondary complications, age, impairment level, and support from ILC were also significant predictors. *Conclusion:* Individuals with tetraplegia (ASIA A-C) benefited the most from support of an ILC. FIM scores and pain levels were the strongest predictors of CIP at 2 years after discharge. Pain management is a high priority for enhancing CIP.

O183

HOW ARE HEALTHCARE REGULATIONS PERCEIVED BY REHABILITATION PROFESSIONALS IN BELGIUM?

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Introduction and Aim: In Belgium, as in most Western Countries, the practice of health care is increasingly subject to complex regulations resulting from the need to control costs. The present study was undertaken to investigate how these regulations are perceived by rehabilitation professionals in Belgium. Indeed, subjective perception of work conditions will probably determine professional satisfaction, which is known to be correlated with patient satisfaction (1). *Subjects and Methods:* Questionnaires were sent to 237 rehabilitation professionals (MDs, physiotherapists, occupational therapists, psychologists, social workers, nurses) working in different settings (university hospital, general hospital, chronic pain groups, private offices). After two reminders, the overall response rate was 56%. The questionnaires comprised questions about demographic data and the perception of several aspects of Belgian regulations about functional rehabilitation. Other questionnaires assessing stress, burnout and control on work conditions are described in another study. *Results:* Most regulations determining contents of care, time modalities and access to care were described to be reasonably adequate and flexible but too complex. An exception was the INAMI/RIZIV chronic pain convention, which was considered inadequate. The financial coverage of medical consultations, administrative work, multidisciplinary meetings and chronic pain convention was perceived to be insufficient. Lack of time and administrative burden, described as resulting from economic pressure and complex regulations, were pointed out as being highly problematic and hampering quality of care. Although the need for regulations was acknowledged, for financial reasons and to promote quality of care, actual regulations were considered being unable to meet these objectives. Moreover, they were felt to compromise the ethical principles of autonomy, vulnerability, benevolence, dignity and justice. *Conclusion:* According to Belgian rehabilitation professionals, complex regulations and high efficiency demands result in heavy administrative burden and lack of time, which could affect quality of care. This rises several ethical questions.

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O184

DO WORK CONDITIONS INFLUENCE THE MENTAL HEALTH OF REHABILITATION PROFESSIONALS IN BELGIUM?

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Introduction and Aim: Health care is subjected to increasingly complex regulations and a growing pressure for efficiency. The impact of work conditions on the mental health of rehabilitation professionals in Belgium was investigated. *Subjects and Methods:* The following questionnaires were sent to 237 rehabilitation professionals working in different settings (response rate 56%): SPPN (Stress Professionnel Positif et Négatif) (2), WOCCQ (Working Conditions and Control Questionnaire) (2), 'problematic situation' questionnaire (open questions on stressing situations, Hansez 2001) and MBI (Maslach Burnout Inventory) (3). Another questionnaire assessing the perception of Belgian health care regulations in functional rehabilitation is described in another study. *Results:* Most subjects showed moderate scores on SPPN and WOCCQ subscales

(positive and negative stress, control on several dimensions of work: resources, task contents, risks, task planification, time), although 32% had low control on task planification. In the open questions, 68% of the respondents mentioned stress due to lack of time. In the MBI, 24% of subjects had high emotional exhaustion and 34% suffered high depersonalisation, 7% of the subjects showing high scores on both subscales. Personal accomplishment was high for 85% of the subjects. SPPN, WOCCQ and MBI scores were not significantly correlated to gender, profession or professional setting. MBI emotional exhaustion was weakly correlated with time availability. **Conclusion:** Rehabilitation professionals in Belgium keep a reasonably good control over their work conditions. Stress and burnout scores, as compared to other studies (1), are moderate. Personal accomplishment is high. Although the lack of time is problematic, its influence on mental health is small.

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O185

REVIEW OF DATA COLLECTION ON SPINAL CORD INJURIES (SCI) AT GHENT UNIVERSITY REHABILITATION CENTER, BELGIUM

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Introduction/Study Design: Retrospective data collection on all patients with SCI admitted in the Rehabilitation Center at Ghent University for a comprehensive management programme. **Aim:** To get a database of SCI at Ghent University Rehabilitation Center Belgium from 2005–2007. **Setting:** Ghent University Rehabilitation Center. **Patients and Methods:** Systematic data collection on all patients admitted with SCI for management for the last three years. All data were available in an electronic database. We were interested in the total number of patients admitted, the portion of males and females, the age at which the persons got their lesion, the etiology of the lesion, ASIA-score (with immediate information about the completeness of the lesion), and the portion paraplegic versus tetraplegic persons. **Results and Conclusion:** Till now registration of SCI in the Belgian Society is lacking. With this publication we hope that also other Rehabilitation Centers in Belgium will do this investment so we can give more information about epidemiology of SCI in Belgium. Not all patients admitted to the Rehabilitation Center were included. Patients with old lesions and admission for wound care, hand surgery, reconditioning etc were excluded. Also patients from whom registration was not satisfying and/or when the existence of the SCI was unclear (for example progression of multiple sclerosis in time, progressive spinal canal stenosis) were excluded. We succeed to give a nice overview in which a lot of results can be compared with other available European literature.

O186

PHYSICAL ACTIVITY BEHAVIOUR OF PEOPLE WITH MULTIPLE SCLEROSIS

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Aim: To determine the level of physical activity and physical activity behaviour in adults with multiple sclerosis (MS), using the Physical Activity for people with a Disability (PAD) model. This PAD model combines existing models of disability (ICF) and models of determinants of physical activity behaviour. **Patients and Methods:** In a cross-sectional study among 106 MS patients, we determined the independent role of disease characteristics, demographic variables,

stages of behavioural change, attitude, social influences, self-efficacy, barriers and perceived benefits on the level of physical activity. Physical activity was measured by means of the self-reported PASIPD (Physical Activity Scale for Individuals with Physical Disabilities) and the SQUASH (Short Questionnaire to Assess Health-enhancing physical activity). **Results:** The median total level of physical activity of MS patients (mean age 42.8 years, disease duration 6 years) as measured with the PASIPD was 11.6 MET*h/day (IQ: 4.6–22.3). Seventy patients have no work-related physical activities. Fifty-five patients are involved in one or more weekly sports activities. The level of physical activity significantly correlates with the severity of MS as expressed by the Expanded Disability Status Scale (median 3; IQ 2–4). Patients did perceive more personal barriers than environmental barriers, with lack of energy and fatigue as the most important ones. In the near future 60% of the participants expect themselves to be in need of an MS-specific exercise programme. **Conclusion:** Most of the MS patients are less physically active than internationally recommended. According to these recommendations, every adult should accumulate 30 min or more of moderate-intensity exercise on most, preferably all, days of the week. The PAD model shows to be very helpful in understanding the physical activity behaviour of patients with a chronic disease, such as MS. Furthermore, it can be used to develop and promote MS-specific exercise programmes for identified subgroups of patients.

O187

FACTORS INFLUENCING EMPLOYMENT FOR PEOPLE WITH MULTIPLE SCLEROSIS

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Introduction: The multiple sclerosis (MS) is a frequent neurological disease. Disease course is unpredictable, but after a variable period of time, MS patients encounter difficulties in their social life and work life. Few studies have examined the factor influencing work retention. **Aim:** The study first aimed at describing the health and professional status of patients suffering multiple sclerosis in age to work, then at showing the difference between both groups compared to professional status. **Patients and Methods:** It is a case control-study. Cases were unemployed patients ($n=22$), controls were still employed patients ($n=54$). **Results:** Educational level ($p=0.02$), progressive form ($p=0.0001$), motor symptom ($p=0.01$), cerebella symptom ($p=0.02$), cognitive symptom ($p=0.03$), EDSS ($p=0.0001$), job needing force ($p=0.05$), manual precision ($p=0.05$) were found to be negative factors. Public sector job ($p=0.003$), big firms ($p=.03$) were found to be protective factors. The work ability was more important for patients currently employed ($p=0.03$). **Conclusion:** The study suggests some risk factors. Clinical and demographic factors explain some difference between both groups compared to professional status. Early changes could maintain multiple sclerosis patient at work. Further larger prospective study is needed to investigate the factor influencing work retention.

O188

HEALTH CARE UTILIZATION OF PATIENTS WITH MULTIPLE SCLEROSIS IS BASED ON PROFESSIONAL AND PATIENT DEFINED HEALTH NEEDS

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Introduction: Appropriate use of health care facilities and health-related community-services should be predominantly explained by the patient's health status, rather than non-health related factors. **Aim:** To investigate health care utilization and to determine which predisposing, enabling, and health factors are associated with health care use among Dutch patients with multiple sclerosis (MS). **Patients and Methods:** Cross-sectional study in an inception cohort of 121 MS patients, six years after definite diagnosis. Patient-related independent predisposing, enabling and health factors were collected by written questionnaires and a home visit by a well-trained physiotherapist. Multivariate logistic regression was used to explain which patients are using health care facilities. **Results:** Of the 121 patients with MS (mean age 43 years, mean score on the Expanded Disability Status Scale 3.5, disease duration 6 years) 16% were hospitalised in the last year, 62% consulted their general practitioner and 69% their neurologist in the previous 6 months. Other medical specialists were consulted in the 6-month period by 50% of the study population. In a 4-week period preceding the home visit, 41% of the patients were treated by an allied health care professional. Multivariate analyses showed that consulting the general practitioner, the neurologist, other medical specialists, allied health care professionals, and use of equipments/aids by MS patients are primarily related to their health, either perceived by the patients themselves or defined by the professional. Most of the predisposing and enabling factors did not contribute to health care utilization. **Conclusion:** In Dutch MS patients, the use of health care facilities is appropriate, since it can be predominantly explained by health-related factors, and not by predisposing or enabling factors.

O189

STABILOMETRY MAY CONTRIBUTE TO PREDICT GAIT PERFORMANCE IN CHRONIC HEMIPARETIC STROKE PATIENTS

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Aim: In hemiparetic (H) patients, the centre of pressure (CoP) is shifted toward the unaffected limb during quiet stance (1) and this asymmetry persists during gait (2). We have hypothesised that abnormalities of gait are correlated with degree of stance asymmetry and stability during quiet stance. **Patients and Methods:** In 15 patients with H and 17 normal subjects (N), position of CoP and its sway have been recorded during quiet stance with eyes open and closed (EC) on a force platform. Spatial-temporal variables of gait have been measured with baropodometry. **Results:** Medio-lateral (M-L) position of CoP in H was shifted toward the unaffected limb. Body sway was larger in H than N, the more so with EC, irrespectively of the side of lesion. No relationship was found between body sway and M-L CoP position across N or H. Regardless of the side of lesion, cadence and velocity were decreased, while duration of single support on the unaffected limb and duration of double support were increased. Degree of impairment of gait was correlated with M-L CoP position but not with body sway during quiet stance. Weakness of the affected lower limb was correlated with M-L CoP position and reduction of gait velocity. **Conclusion:** Both reduction of muscle force and M-L CoP position affect gait. Conversely, the absence of relationship between body sway and gait performance suggests that postural instability in H is not a limiting factor in gait ability. Stabilometry can help in measuring not only postural asymmetry and instability but also in predicting some variables of gait not otherwise measurable without dedicated devices. These data strongly support the administration of exercises aimed to strengthen lower limb muscles and to increase postural symmetry in H.

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O190

WHEELCHAIR RUGBY TRAINING IMPROVES THE WHEELCHAIR SKILLS TEST MEASURES IN PEOPLE AFTER SPINAL CORD INJURY

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Introduction: Annually 500 new patients after spinal cord injury (SCI) with tetraplegia arise in Poland. The number of non-governmental organizations and sports clubs for disable people assure active sport's training for patients after SCI in Poland (1). Actually 115 persons after SCI (mostly tetraplegic) are Wheelchair Rugby athletes (1, 2). **Aim:** The aim of this work is an evaluation of the influence of long-term sport's training on the functional abilities in subjects with tetraplegia over 5 year after SCI onset. **Patients and Methods:** 20 Wheelchair Rugby athletes (aged 21–54 years), over 5 year after SCI onset, assigned according to the level of neurological impairment to C5 B (2 subjects), C5 C (6 subjects), C6 B (3 subjects), C6 C (2 subjects), C7 B (3 subjects), C7 D (4 subjects), were examined. The level of neurological damage and impairment scale were determined according to the standard of ASIA (4). The Wheelchair Skills Test (WST) Version 2.4 (5) was used for evaluation of the efficiency of sport training in the improvement of the skills required to use the wheelchair. Participants were assessed during 2 years of wheelchair rugby training. **Results:** We observed improvement in the WST during Wheelchair Rugby training. After 2 years, the outcome of the WST measures increased from the initial state of 71.3±5.1 (mean±SD) to 97.6±2.2% ($p<0.05$, Wilcoxon Matched Pairs Test). **Conclusion:** In all subjects studied, the skills to use the wheelchair were improved after Wheelchair Rugby training. Since WST measures namely, reaching, turning, rolling, brakes are integral part of Wheelchair Rugby training, we conclude that this sport's discipline can constitute the continuation and consolidation of rehabilitation treatment in SCI.

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O191

ZARIT BURDEN INVENTORY AMONG CAREGIVERS OF MUSCULAR DYSTROPHY PATIENTS: CONSTRUCT VALIDITY, RELIABILITY, TEST RETEST

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Objective: The Zarit Burden Inventory (ZBI) is an instrument designed to assess burden aspects of informal caregiving situation and is the most widely used instrument for assessing the burden experienced by caregivers. This paper addresses main psychometric qualities of the ZBI in a cross sectional study among caregivers of hereditary muscular dystrophy patients assessed in Reims University Hospital Center. **Materials and Method:** ZBI was administered to a sample of 59 informal caregivers of community-dwelling subjects with muscular dystrophies in a tertiary pluridisciplinary Hospital Center. **Results:** The mean score was 24 out of 88 (SD=14), which is far lower than those reported in

previous studies using this instrument with another illness. No problems in feasibility were observed. Construct validity was supported. Reliability analysis showed that standardized Cronbach's alpha coefficient was 0.89, indicating sufficient internal consistency. Test retest reliability was moderate (ICC=0.67). Following a factor analysis, a 12-item version of the instrument is proposed with 2 factors: personnel strain and role strain. *Conclusion:* The ZBI proves to be a feasible, reliable and valid instrument for assessing burden among caregivers of patients with muscular dystrophies. Studies may help us not only to better understand caregiving impact, but also to find the most effective rehabilitative interventions to improve the quality of life of patients and their caregivers. It is necessary to have valid instrument measure of caregiver burden.

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O192

NERVE BLOCK IN THE MANAGEMENT OF THE UPPER MOTONEURONE SYNDROME

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Aim: The aim of this study has been to show, the different kind of peripheral nerve blocks, that we are doing in our Hospital. The common patterns of clinical motor dysfunction, where the blocks have been used, are the follows: Equinovarus foot; Flexed Knee; Flexed wrist; Clench fist. The blocks have been performed in Median, Ulnar, Tibial and Sciatic Nerve. *Material and Methods:* In cases of central paresis, muscle overactivity is often one cause of the patient's disability. The selective reduction of the increased muscle tone, using peripheral nerve blocks have been used for diagnostic (short-term block) and treatment (long-term block) purposes. When blocking a nerve, it is localized using exploratory stimulation (electric stimulator) technique for more precise localization. After localizing the nerve, the injection is performed with: diagnostic block: 10 ml Bupivacaine 0.50%; long-lasting block: 10 ml phenol. We show in videotape (supported by powerpoint), the technique, and the results of the blocks in our patients (Video taping before and after the block treatment has been done). *Results:* The first question to be addressed by a diagnostic nerve block (short-term) is whether a long-term block (botulinum toxin or phenol) will be useful in the management of the muscle overactivity. In case of diagnostic nerve block, no significant change in range of movement means a static deformity.

O193

MUSCLE STRENGTH AND ENDURANCE PROFILES IN A MILITARY POPULATION: A SUCCESSFUL KEY FOR PREVENTION OF INJURY

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Introduction: In modern armies, soldiers are exposed to very physically demanding tasks. In a previous study, it was shown that a high percentage of soldiers were using a high level of effort to complete standardized army fitness tests. *Aim:* To quantify trunk and lower limb muscle strength and endurance profiles in Canadian Forces (CF) soldiers. *Subjects and Methods:* Forty CF soldiers (mean age; 34.8±7.2) were submitted to a dynamometric testing (Biodex Medical Systems) to obtain the maximal torque of ankle plantar (PF) and dorsiflexors (DF), knee flexors (KF) and extensors (KE), hip flexors (HF) and extensors (HE), and the trunk extensors (TE). The torque, angle and velocity measurements were recorded during concentric isokinetic (peripheral

and isometric (trunk) tests. Two endurance tests for the knee and trunk extensors were also performed to assess the relative muscular endurance. *Results:* The maximal peak torques was higher in men than women. In men, the muscle strength was always higher for the 18-30 group followed by the 31-40 and then the >40 group. In women, there was no such clear trend as, depending on the muscle group, the strength was higher in younger (HF 30°, HE 30°), higher in older (KF 60° and 30°, ankle DF) or very similar between younger and older CF members (KE 30°, ankle PF). The mean holding time of the TE on the Biodex was 64.5 sec±37.7 for men (n=30) and 89.1 sec±41.1 for women (n=10) (p=0.088) while according to the Sorensen endurance test, the women had more trunk extension endurance (207.0 sec±70.2) compared to the men (135.6 sec±8.5) (p=0.011). For the KE, the mean holding time was 85.9 sec±104.7 for men (n=30) and 61.9 sec±19.2 for women (n=10) (p=0.254). *Discussion/Conclusion:* In the CF population, the muscle strength and endurance vary between men and women and amongst age groups. Compared to normative data, the muscle strength of CF soldiers at the lower limb is much higher than in healthy subjects, especially at the hip. When completing demanding tasks such as carrying loads, this would serve as a protective effect to minimize the relative level of effort, decreasing the risk of injury.

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O194

THE COMPARISON BETWEEN PLYOMETRIC EXERCISE AND VIBRATION TRAINING ON VERTICAL JUMP, STATIC STABILITY AND MUSCLE STRENGTHENING

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Introduction: Vibration training (VT) is a neuromuscular training method that has recently been developed and plyometric exercise (PE) is an effective method for enhancing muscle performance. Both of these two methods are recently being used in the rehabilitation of athletes to help in the preparation for a return to sport participation. *Aim:* The aim of this study was to investigate and to compare of an 8 weeks period of VT and PE on vertical jump, maximal isometric strengthening of quadriceps and static stability. *Patients and Methods:* 90 healthy untrained students aged between 19-26 participated in this study. The subjects were randomly divided in 3 experimental groups: 1) VT group 2) PE group 3) VT in addition to PE group. Vertical jump, maximal isometric strengthening of quadriceps and static stability were measured before training, immediately after 8 weeks training and 2 weeks after finishing of training (follow-up). *Results:* Repeated-Measurement indicated that in each 3 groups there was a significant increase between pre-test and post-test measurement in all aforementioned variables and it remained unchanged until 2 weeks following up. ANOVA showed that there was no significant difference between the 3 groups in maximal isometric strengthening of quadriceps and static stability test but in vertical jump test PE group and VT in addition PE group showed an increasing in jumping in comparison with vibration training group. *Conclusion:* The results of the present study suggest that both VT and PE are the effective short-term training methodology for inducing improvements in vertical jump, maximal isometric strengthening of quadriceps and static stability. The identifying feature of plyometric exercise is a lengthening of the muscle-tendon unit followed directly by shortening (stretch-shortening cycle) and the sensitivity of stretch-reflex of muscle spindle may increase after plyometric exercise. The improvements due to vibration training have been attributed to reflex muscle contractions as a result of a tonic vibration reflex. This reflex contraction is caused by an excitation of muscle spindles, leading to enhanced activity of the Ia loop.

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O195

LOW-BACK PROBLEMS IN TENNIS, VOLLEYBALL AND SCUBA DIVING – PREVALENCE AND SPECIFIC RISK FACTORS

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Introduction: Certain sports, by virtue of higher level of demands, have been investigated as a potential contributor to low-back problems (LBP) (1, 2). Particularly, sports involving repetitive hyperextension, axial loading and/or direct contact are at risk of LBP (2). **Aim:** To determine the lifetime and one-year prevalence of LBP and to identify sport-specific risk factors associated with the occurrence of LBP in tennis, volleyball and scuba diving. **Patients and Methods:** A retrospective self-assessment questionnaire was developed to gather the data. A total of 445 tennis players, 210 volleyball players and 181 recreational scuba divers participated in the study. **Results:** Lifetime prevalence of LBP among tennis players, volleyball players and scuba divers is respectively, 34.0%, 59.5% and 55.8%. One-year prevalence of LBP is 41.0% in tennis players, 50.0% in volleyball players and 50.3 % in scuba divers. When considering sport-specific risk factors: no significant differences are found between the group with and without LBP for tennis specific characteristics (i.e. playing surface, ranking and training volume, etc.). Within the group of volleyball players, no significant differences between players with and without LBP are found for level of competition, years of competition, games per month and field position, but volleyball players with LBP train their general physical condition less. Scuba divers with LBP have a significant higher dive certificate ($p=0.007$) and use significantly more weights on their weight belts during indoor training ($p=0.003$) and during outdoor dives with a dry suit ($p=0.044$) in comparison with scuba divers without LBP. **Conclusion:** Sport-specific risk factors for LBP found in this study are not convincing. Further research is required to point out whether or not tennis, volleyball and scuba diving characteristics actually contribute to LBP.

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O196

THE INFLUENCE OF THE PRIMARY SPINAL ANGLE DURING THE STARTING POSITION OF THE SWING ON THE INCIDENCE OF LOW BACK PAIN IN GOLFERS

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Introduction: Low back pain (LBP) has a high prevalence in golfers. The strain on the lower back during the golf swing has been studied

extensively through biomechanical models. An increased primary spinal angle (PSA: angle between a line from C7 to L4 through the spine and a line perpendicular to the floor) has been suggested as a risk factor for LBP in golfers. However, this hypothesis has never been tested. **Aim:** The aim of this study is 1) to compare the mean PSA in golfers with and without LBP and 2) to determine whether a cut-off PSA-value exists at which the prevalence of LBP increases. **Patients and Methods:** Patients were selected at the 2007 Belgian Golf Championship. Out of 83 players, 61 volunteered (informed consent) to join the study. Six players met exclusion criteria, so 55 players were evaluated. Every player completed two questionnaires regarding LBP. Additionally a picture of the starting position of every player was taken and the PSA was measured using the markers placed at C7 and L4. A PSA cut-off value was calculated using a Receiver Operating Characteristic (ROC) analysis. **Results:** Based on the questionnaires 28 and 27 players were categorized as players with and without LBP respectively. The mean PSA for players with LBP (45.47°) was significantly higher than for players without LBP (41.62°) ($p=0.017$). ROC-analysis indicated a PSA of 44° as the best cut-off value. Only 26% of players with a PSA $\geq 44^\circ$ never had LBP, while 69% of golfers with a PSA $< 44^\circ$ never had LBP. **Conclusion:** This study showed that players with LBP had a higher mean PSA than golfers without LBP, and that the prevalence of LBP increases in players with a PSA $\geq 44^\circ$. A PSA of $\geq 44^\circ$ could therefore be seen as a risk factor for LBP in golfers. This knowledge together with further biomechanical evaluation of other LBP-confounders involved in the swing could possibly lead to more focused technical and muscle training, preventing or treating LBP in golfers.

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O197

CONSERVATIVE VERSUS SURGICAL TREATMENT OF GROIN PAIN: STILL A CONTROVERSIAL ISSUE IN SPORTS MEDICINE

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Groin pain remains a difficult condition to treat leading frequently to sports disability. Mainly at a high level competition or in professional athletes these situations stress the need for a quick recovery but in the great majority of the cases this is not advisable. Nevertheless, economic and competitive factors frequently influence the decision towards a surgical option such as it happens in the “sportsman’s hernia” or in other groin pain causes. Based on an exhaustive literature review and on our own experience data we present a critical analysis of this diagnosis criteria as well as an overview of the surgical versus conservative options on this condition. We also present our approach methodology including its rehabilitation program. Finally we show examples of some clinical cases, namely one referring a Portuguese football (soccer) player from the national team, which we consider paradigmatic.

O198

THE EFFECT OF INCREASING THE INSTABILITY OF WEIGHT BEARING SURFACE ON THE ACTIVITY OF THE PERIARTHICULAR SHOULDER MUSCLES DURING CLOSE CHAIN ACTIVITY

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Introduction: The role of proprioceptive mechanisms in the maintenance of joint stability is especially important for the shoulder where stability is sacrificed for a large range of motion. Surface instability is a common addition to traditional rehabilitation and

strength exercises with the aim of increasing muscle activity as well as increasing the proprioceptive balance demands on a patient. *Aim:* The objective of this study is to determine if the addition of surface instability influence mean glenohumeral and scapulothoracic muscle activation levels. *Patients and Methods:* Surface EMG from scapulothoracic and glenohumeral muscles (Table I) were recorded from dominant side of 30 volunteers at six different randomly-ordered positions for 10 sec. In the first three positions the feet were on the ground and the hands were on the ground (position 1), a wobble board (position 2) and on an exercise ball on a wobble board (position 3). In the rest the same order were used including a Swiss ball under the thighs (positions 4–6). *Results:* Although it is expected that imposing an unstable situation to the shoulder complex would increase the activity of the shoulder muscles, the results of the present experiment does not support this idea. In fact at all three positions that Swiss ball was applied to the lower quarter the intensity of muscular activity was lower ($p < 0.01$). *Conclusions:* The instability of the surface used in this study is not a sufficient condition to generate an increase in muscle activity in selected scapulothoracic and glenohumeral muscles. Increasing the amount of load on shoulder seems to have a greater influence on shoulder stabilizing musculature amplitude than increasing the instability of the weight bearing surface.

Table I. The mean EMG activity of shoulder muscles at different positions (expressed as % of position 1).

pos	Sup trapez (%)	Inf trapez (%)	Teres major (%)	Deltoid (%)	Biceps (%)	Ant serratus (%)
1	100	100	100	100	100	100
2	92±8	84±10	74±3	67±5	122±11	112±9
3	79±6	61±7	48±7	26±3	65±8	79±9
4	75±6	64±7	55±5	44±6	54±6	89±5
5	78±9	69±11	42±6	29±5	55±7	61±5
6	94±10	57±7	55±10	12±2	57±7	49±7

pos: position.

P199

PREVENTION OF SPORTS INJURIES DURING COMPETITION IN AN AMERICA’S CUP YACHTING-RACE CREW – EFFECTIVENESS OF A SPECIFIC PROGRAM OF PHYSIOTHERAPY

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Background: The role and effectiveness of physiotherapy programs for prevention of sports injuries in sailing America’s Cup class has not been previously addressed. *Hypothesis:* The application during competition of a preventive physiotherapy program specifically designed for members of an America’s Cup yachting-race team may reduce the number of sport injuries in these athletes. *Study Design:* Crossover study design. *Methods:* A prospective physiotherapy intervention study during competition periods over three seasons was conducted in an America’s Cup Yachting-Race Crew of 30 professional sailors. All injuries suffered by the crew were registered during the eight preparatory acts of the 2007 America’s Cup including the Luis Vuitton Cup. In 2004 season, athletes did not receive any program of preventive physiotherapy. In 2005, preventive intervention (phase I) consisted of stretching exercises prior to the yacht race and application of functional taping. In 2006 season, the physiotherapy program was implemented adding articular mobilization before competition, ice-baths after competition and kinesiotaping (phase II). In the last 2007 season, a recovery program with ‘Performance Stability’ exercises, post-competition stretching and 12-h compressive clothing (phase III). *Results:* In the pre-intervention phase (2004), the rate of injured sailors/com-

petition day was 1.66, decreasing to 1.33 in 2005 (phase I), 1.27 in 2006 (phase II) and 0.60 in 2007 (phase III). The number of athletes with more than one injury was significantly reduced from 53% (8 out of 15) to 6.5% (2 out of 12). In the pre-intervention period, athletes in position of mastman, grinder and bowman showed a rate of 2.88 injuries/competition day. After the phase III of the prevention program this group only suffered 0.5 injuries/competition day. *Conclusions:* The implementation of a program of preventive physiotherapy significantly decreased the risk of injuries suffered during competition by an America’s Cup yacht-race crew.

O200

PERIPHERAL NERVE ENTRAPMENT SYNDROMES IN THE ATHLETE

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Introduction: Different peripheral nerve entrapment syndromes can occur in the athlete because of the specific biomechanics and demands on neural structures. An overview is given with the clinical presentation, aetiology, diagnosis, treatment or rehabilitation necessary for return to sports for various nerve entrapments. *Aim:* Review of the most current peripheral nerve entrapment syndromes in the athlete. *Patients and Methods:* A computerized literature search of pubmed was conducted using ‘nerve entrapment’, in combination with ‘athlete or sport’. Additional references were acquired through standard works on peripheral neuropathy. *Results:* The most common entrapment neuropathies in sports are described: the long thoracic nerve due to a ‘bow-stringing’ phenomenon or entrapment at the scalenus muscle by raising the ipsilateral arm overhead and turning the head, as seen in tennis; the suprascapular nerve due to compression at the suprascapular or spinoglenoid notch due to abduction and external rotation of the shoulder, as seen in volleyball; the axillar nerve due to fibrous bands, hypertrophied muscles or osteophytes, as seen in baseball; the radial nerve by repetitive pronation and supination of the forearm, as seen in tennis; the ulnar nerve at the elbow by valgus stress and at the wrist by compression as seen respectively in baseball and cycling; the pudendal nerve by compression, as seen in cycling; the femoral nerve by an iliacus haematoma, as seen in gymnastics. *Conclusion:* In the athlete there are peripheral nerve entrapment syndromes in the upper and in the lower extremities, related to specific biomechanics and demands on neural structures. Electrodiagnostic examination and imaging are used to determine the site and degree of neurological injury and to predict outcome. Most of these entrapments will respond to conservative treatment; sometimes surgical treatment is necessary.

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O201

TREATMENT OF EXERTIONAL COMPARTMENT SYNDROME LEG WITH BOTULINUM TOXIN A: A FIRST OPEN PILOT STUDY

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The exertional compartment syndrome (ECS) leg results in leg exertional pain, most often during the running. Currently, the only treatment is surgical consisting of a fasciotomy. Botulinum toxin A (BTA) has been successfully used in the treatment of muscle hypertrophy and of myofascial pain, but it has never been used to treat the ECS. The aim is to test the hypothesis that BTA is an effective treatment of ECY to avoid surgery. *Patients and Methods:* The trial

is open and prospective. The ECT among runners is confirmed by a measure of intramuscular pressure (IMP) and after excluding other conditions. The IMP is measured by a pressure Stryker monitor 1 and 5 min after running on treadmill. BTA (Dysport®) is injected into each of the muscles of the pathological compartment(s) by guiding electrical stimulation. The pain and injected muscles strength are assessed. 7 male patients aged 17 to 32 years were included. The ECT was unilateral in 2 patients (lateral anterior ECT). The ECT was bilateral in 5 patients (1 posterior deep ECT, 3 cases of lateral anterior ECT, 1 case concerning 4 leg compartments). **Results:** Before treatment, the exertional pain occurs after 5 to 30 min of running depending on the patients. At the examination in the first month after treatment, pain during the run had disappeared in 5 patients and decreased by more than 50% in two other patients. At follow-up between 3 and 5 months, the exertional pain to running disappeared in all the 7 patients. In 4 patients, it was found in the 2 first months, a slight weakness only of anterior muscles compartment, estimated between 4 and 5 on the scale of 0 to 5 (normal). **Conclusion:** The injection of BTA may be an effective treatment of ECT leg runner in the short and medium term. These first results must be confirmed on a larger number of patients and in long-term because the duration of action of BTA does not exceed 6 months (number of injections?), but in the treatment of muscle hypertrophy, a single injection has been effective permanently.

O202

EXERCISE-INDUCED RHABDOMYOLYSIS AFTER ECCENTRIC TRAINING FOR ACHILLES TENDINOPATHY: A CASE REPORT

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A 35-year-old woman complained of left calf pain, which had started after eccentric exercises for Achilles tendinopathy and a short run. The pain also persisted at night. She sought medical advice after three days. On clinical examination, she was unable to place her heel on the floor. Stretch was extremely painful, as was compression on the medial head of the gastrocnemius muscle. Thrombosis was excluded by doppler. Ultrasound of the muscles was normal. Intracompartmental pressure of the gastrocnemius was 27 mmHg. Creatine kinase levels of 5231,3 U/L led to the diagnosis of rhabdomyolysis, which was confirmed by MRI. Therapy consisted of rest and hydration. Exercise-induced rhabdomyolysis is a rare, sometimes catastrophic condition where muscle fibers breakdown in response to exertion and release their breakdown products into the circulation. The exertion is mostly exhaustive or repetitive, often of the eccentric type, but even non-exhaustive exercises can cause rhabdomyolysis. Damage occurs at the myofibrils and sarcolemma with release of the enzyme creatine kinase and pigmented myoglobin into the serum. Severe muscle soreness and dark urine are the hallmark symptoms. Acute renal failure is the most serious complication. In the management this can be avoided by aggressive fluid replacement to maintain a high urine output. In case of acute renal failure dialysis is necessary.

O203

THE EFFECT OF SUBSTANTIA P ON SUTURED ACHILLES TENDON RUPTURE IN THE RAT

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The aim of different studies was to determine whether the healing process after surgical repair of the rat Achilles tendon could be stimulated by the paratendinous injection of a sensory peptide, substance P (SP). Ninety-six male Sprague-Dawley rats were randomly allocated to four groups: (I) control buffer injections,

(II) injections of SP 10^{-6} mol/kg BW combined with a carrier, (III) injections of SP 10^{-8} mol/kg BW with the carrier, and (IV) injections with the carrier only (thiorphan $1 \mu\text{mol/kg}$ BW and captopril $30 \mu\text{mol/kg}$ BW, both neutral endopeptidase inhibitors). On day 7, 14, 28 and 42, the animals were killed and Achilles tendons were prelevated. In a first study the influence on tissue repair was determined from the histological measurement of fibroblast proliferation, angiogenesis and collagen organisation. The two groups subjected to SP injections showed a significant initial fibroblast proliferation on day 7, which rapidly declined by day 14 to the level of cellular proliferation as observed with the use of thiorphan and captopril. Capillary proliferation showed a similar evolution, except that in the second week angiogenesis in the treated groups was below the level of the control treatment group. Strikingly, collagen orientation increased faster in the groups subjected to SP. This was obvious from the second week already and the difference remained until the completion of the study. In a second study we investigated whether this positive effect was also reflected in the biomechanical properties of the tendons. Stress at maximal load and work to maximal load were enhanced in the SP-treated groups. However, stiffness was not significantly different. In a third study we evaluated the mechanism of action of SP by a qualitative analysis to localize SP, the NK1 receptor and PGP 9.5 (nerve marker). The initially induced fibroblast proliferation and angiogenesis and the subsequent decline which was less pronounced for the fibroblast proliferation than for the angiogenesis, is probably due to autocrine stimulation of SP by fibroblasts causing a booster effect, which was not the case for the endothelial cells. Strikingly, no immunofluorescence staining for PGP 9.5 could be detected. Apparently, SP released by nerves was less crucial to fibroblast proliferation and angiogenesis.

O204

SPORTS PARTICIPATION IN ADOLESCENTS AND YOUNG ADULTS WITH SPINA BIFIDA AND ITS ROLE IN TOTAL PHYSICAL ACTIVITY BEHAVIOUR AND FITNESS

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Introduction: Many adolescents and young adults with spina bifida have inactive lifestyles and low fitness (1). Sports-related activities can easily be provided through rehabilitation services and may improve activity and fitness, which is important for health. **Aim:** To assess sports participation in adolescents and young adults with spina bifida and its association with personal, disease-related, psychosocial factors, physical activity and fitness. **Patients and Methods:** Fifty-one persons (26 males) with spina bifida aged 21.1 ± 4.5 years participated, of which 55% were wheelchair-dependent. We assessed self-reported sports participation, ambulatory status, presence of hydrocephalus, functional independence, social support, perceived competence, exercise enjoyment, objective and self-reported physical activity, peak oxygen uptake (peakVO_2), muscle strength and body fat. Relationships were studied using regression analyses. **Results:** Thirty-five (69%) persons participated in sports. Sports participation was not associated with disease-related characteristics but was associated ($p \leq 0.05$) with social support from family (odds ratio=1.12 to 2.12), perceived athletic competence (odds ratio=1.47) and physical appearance (odds ratio=1.24), and tended to be associated ($0.05 < p \leq 0.10$) with social support from friends (odds ratio=1.17) and global self-worth (odds ratio=1.20). Sport participants had higher levels of self-reported physical activities (regression coefficient=29.6; $p=0.009$), but objective results did not support this. They tended to be less likely to have subnormal muscle strength (odds ratio=0.26; $p=0.08$) and their

average peakVO₂ was 0.19 l/min higher but not statistically significant ($p=0.13$). **Conclusions:** Sports participation seems a choice rather than an inability, it could benefit from improving social support and perceived competence and is associated with higher self-reported physical activity.

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O205

PREVALENCE OF ANEMIA IN IRANIAN ATHLETES PARTICIPATING IN THE CAMPS FOR SELECTING FEMALE NATIONAL TEAMS

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Introduction: Anemia is one of the most prevalent and preventable diseases that is more important (because of higher prevalence) in women. It has some complications on cardiovascular system, lung, brain, kidney and general body function if its diagnosis is delayed. Early diagnosis has prophylactic effect on its complications and increases the physical and psychic abilities. We will determine the prevalence of anemia in female athletes which can show the extent of anemia between them and increase their performance by treatment. Any body knows that prevention is less expensive and more beneficial and have a higher quality than treatment. **Methods and Patients:** A descriptive cross-sectional study on 156 female athletes in camps for selecting national teams in 2001 was done by a census method. According to history, physical examination and paraclinics data, information was recorded by physicians. Descriptive indicators and tests such as t, chi-square, and correlation coefficients by SPSS 10.05 software were used in analysis. Significance was considered if lower than 0.05 in all tests. Helsinki was promised in all stages of the study. **Results:** Mean of age was 20.47 (19.53–21.41) years old. 9.6% of athletes had hemoglobin (Hb) equal to or less than 11.5 g/dl, 17.3% of them had Hb less than 12 g/dl and 57.7% of them had Hb less than 13 g/dl. Percent of anemia and mean of Hb were the same in different athletes groups. 16.7% of them had hematocrit equal or less than 36%. Their red blood cell in 5.1% of them was less than 400000 per ml. 5.8% had microcytosis and 6% had macrocytosis. 4.55 of them had hypochromia and 24.4% had MCHC \leq 32%. **Discussion:** Athletes tend to have lower hemoglobin concentrations than sedentary counterparts (sports anemia). Sports anemia is a pseudo-anemia and a beneficial adaptation to aerobic exercise. Athletes, however, can also develop true anemia due to different causes such as iron deficiency, footstrike (exertional) hemolysis, sickle cell, beta thalassemia, bleeding, clotting problems, and nutritional disorders. Iron deficiency anemia (IDA) is the most common cause of true anemia in athletes with the prevalence in female athletes of 5%. Because of the high prevalence of anemia in our study we suggest evaluation for IDA, nutritional disorders, hemoglobinopathies, coagulopathies, and hemolysis for future researches.

O206

THE REHABILITATION PROGRAM IN ELDERLY PATIENTS WITH OSTEOPOROSIS BONES

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The rehabilitation by elderly person must be individual and it depending of other illnesses, They have got osteoporosis bones with pain and limitation of movements. The aim of this study is

to represent our management plan for rehabilitation by them. **Material and method:** We have treated 80 patients, 30 with complications (fracture), 62 female and 12 male with over age of 67 years. The patients with fracture were analyzed in last rehabilitation after verticalisation. The rehabilitation program is consisting of: 1) application of orthoses, 2) medical support 3) physical therapy or with out of it, 4) mobilization, 5) individual medical gymnastic adapted by other illnesses. The pain and mobility were analyzed before and after 2 months. Pain evaluation was initiated with visual analogue (VAS) 10 degree scale (0=no pain, 10=pain by night). Pain was tested during different locomotors functions e.g. bed rest, sitting, standing and walking. **Results:** All 80 patients accepted orthosis, from 30 with fractures, 16 had electro therapy, from the other 60 all had electro therapy, 80 accepted antiresorptive therapy (calcitonin). All 80 had mobilization and self care. By 65 were educated for gymnastic and 15 have only verticalisation and self care because there cardiovascular pathology limited it. Pain were significant reduced $p<0.01$. **Discussion:** Orthoses are integral part of the rehabilitation and we had applied them to immobilize and reduce pain, to help in mobilization. Electrotherapy with analgesic and trophy effects is a no medical treatment of it, if it was not contraindication. The calcitonin (nasal spray) has analgesic and trophy effect on bones and our patients used it. Medical gymnastic was individual applying, by other illnesses, with plane for individual ordinary health of patients. **Conclusion:** pain rating on the VAS, showed that the most patients gradually gained full mobility (81.25%) and self care with less of pain by all after two months of treatment.

O207

COURSE OF LIMITATIONS IN ACTIVITIES IN OSTEOARTHRITIS OF THE HIP OR KNEE - THE INFLUENCE OF PHYSICAL IMPAIRMENTS, COMORBIDITY AND COGNITIVE DYSFUNCTION

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Objectives: (i) To describe the course of limitations in activities in elderly patients with osteoarthritis of the hip or knee, and (ii) to identify age related factors that predict the course of limitations in activities in patients with osteoarthritis of hip or knee. **Methods:** A longitudinal cohort study was conducted. Patients ($n=288$) with hip or knee OA were recruited from rehabilitation centres and hospitals (departments of orthopaedics, rheumatology and rehabilitation). Apart from demographic and clinical data, physical impairments (pain, muscle strength and range of joint motion: ROM), comorbidity, cognitive dysfunction and limitations in activities (both self reported (WOMAC) and observed (timed walking test) were assessed. Statistical analyses included multilevel analysis, univariate regression analysis and multivariate regression analysis. **Results:** Preliminary results showed that in operated patients self reported functioning improved, where as observed functioning remained unchanged. In patients, that had not undergone surgery, limitations in activities did not change. No differences were found between hip and knee OA. The course of self reported limitations in activities was significantly associated with change in ROM hip flexion during the first year of follow-up, change in pain during the first year of follow-up and morbidity count. Furthermore, muscle strength hip abduction, change in muscle strength hip abduction during the first year of follow-up, morbidity count, cognitive function, age and BMI were associated with observed limitations in activities. **Conclusion:** Patients with osteoarthritis of the hip or knee show differences in the course of limitations in activities. Some of the patients improve, where as others show no changes or worsening of limitations in activities. This difference can be partly explained by the fact that some of the patients underwent surgery and others did not. In not operated patients, the course of limitations in activities remained unchanged. Patients that had had surgery reported improvement. Furthermore, protective factors and risk factors for the course of limitations in activities were identified. Pain and morbidity count

were found as risk factors for worsening where as an improvement in ROM could be seen as a protective factor for self reported limitations in activities. Risk factors that were identified for observed limitations in activities were morbidity count and BMI. Protective factors were muscle strength and cognitive functioning.

O208

EFFECTS OF AN ADAPTED PHYSICAL ACTIVITY PROGRAM ON FLEXED POSTURE IN ELDERLY: A RCT STUDY

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Introduction: Flexed posture commonly increases with age and is related to musculoskeletal impairment and reduced physical performance (1, 2). A double-blind, two-arm, randomized 3-month clinical trial was performed to evaluate the effects of an Adapted Physical Activity program for flexed posture on the postural alignment and physical performance of the elderly. **Patient and Methods:** Participants were randomly divided into two groups: one followed an Adapted Physical Activity program for flexed posture inspired to the Sinaki proposal (3) and the other one completed a non-specific physical activity protocol for the elderly. A multidimensional clinical assessment was performed at baseline and at 3 months including anthropometric data, clinical profile, measures of musculoskeletal impairment and disability. The instrumental assessment of posture was realized using a stereophotogrammetric system and a specific biomechanical model designed to describe the reciprocal position of the body segments on the sagittal plane in a upright posture. **Results:** The Adapted Physical Activity program determined a significant improvement in several key parameters of the multidimensional assessment in comparison to the non-specific protocol: decreased occiput-to-wall distance, greater lower limb range of motion, better flexibility of pectoralis, hamstrings and hip flexor muscles, increased spine extensor muscles strength. Stereophotogrammetric analysis revealed a reduction in compensative postural adaptations to flexed posture characterized by reduced protrusion of the head and ankle dorsiflexion in the participants of the specific program. **Conclusions:** The Adapted Physical Activity program for flexed posture significantly improved postural alignment and musculoskeletal impairment of the elderly. The stereophotogrammetric evaluation of posture was useful to measure the global postural alignment and especially to analyze the possible compensatory strategies at the head and lower limbs in flexed posture.

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O209

CAN CYCLING BE USED TO TRAIN MUSCLES FOR STAIR CLIMBING?

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Introduction: Changes in muscle through ageing and disuse compromise an individual's ability to perform rapid powerful movements such as stair climbing (1). Training power is therefore an important aspect of rehabilitation. Typically based on task repetition, training can be labour intensive for staff, fatiguing for patients and may not be performed rapidly enough for power

specificity. A recumbent cycle offers a safe, complementary, alternative for practicing rapid lower limb extension. **Aim:** To explore the potential for recumbent cycling (RC) to be used as a training method for stair climbing by comparing the kinematics and muscle activation patterns between RC and a step-up (SU). **Subjects and Methods:** Following ethical approval 12 healthy subjects (mean age 41 years±9.6, weight 74.2 kg±9.1, height 1.64 m±0.07) performed two tasks: 1) RC at a cadence of 60 rpm, 2) a step-up (SU) onto a 20 cm step. During these tasks four body segments (trunk, thigh, lower leg and foot) were tracked using a 3D motion analysis system. The activity of five lower limb muscles; gluteus maximus (gmax), hamstrings (hams), quadriceps femoris (quads), gastrocnemius (gastroc) and tibialis anterior (tibant) were concurrently recorded using surface electromyography. Only the extension phase of each task was analysed, six repetitions were used for analysis. **Results:** The pattern of lower limb extension at the hip knee and ankle was found to be similar for both tasks in the timing and amount of angular displacement albeit with RC started in a more flexed position at the hip and extension was performed at greater velocities. The amount and pattern of activity at the recorded muscles were also similar for both tasks. **Conclusion:** The data suggests that RC may be similar enough to SU to be used as a training modality and is performed rapidly enough to be specific to power in training. This agreement opens up the possibility for using RC in rehabilitation to train the stair climbing task as well as other movements that included rapid lower limb extension.

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O210

EFFECTS OF HIGH INTENSITY LOCAL ACOUSTIC VIBRATIONAL TRAINING ON STRENGTH, CELLULAR AND MOLECULAR MODIFICATIONS IN AGED HUMAN SKELETAL MUSCLE

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Introduction: Sarcopenia is a scientific term indicating the physiological reduction of skeletal muscle mass and strength in older people. Sarcopenia has a multifactorial origin linked to: oxidative damage of fibers, mitochondrial damage reduced levels of GH, IGF-1, steroids and reduced myogenesis. **Aim:** Regular training programs are a concrete means to prevent and/or reduce functional decline due to aging (1), although the optimum regime specific for older adults remains unclear. **Patients and Methods:** Ten subjects (6♂ and 4♀) of 75±10 years old with a diagnosis of grade 3 Sarcopenia (CDC) were assigned to 3 days/week for 12 weeks, high intensity local acoustic vibrational program (intensity:300hz) by VISS (Visscom, Italy). Before and after the training programs muscle samples were collected by biopsy from the vastus lateralis muscle in order to analyse: (i) the specific tension development of single fibers and the expression of myosin heavy chain proteins; (ii) the transcriptional profile and (iii) the regenerative capacity of satellite cells. At the same time, the Isometric lower limb force was measured by dynamometer. The Myoton-2 equipment was used to describe the viscoelastic parameters of the skeletal muscles. As follows-up the subjects were tested 4 months after protocol end. **Results:** The single fiber strength development does not change after a training protocol. Considering the gene expression profiles, vibrational training shares a stimulation of a specific metabolic pathway; increases the aerobic metabolism and stimulates the creatine metabolism. The training stimulates the expression of sarcomeric and cytoskeletal proteins and in particular stimulates proteins linked to Z-line. We studied also the behavior of satellite stem cells after the training and their contribution to the regeneration process and to fiber trophism. Our results indicate that vibrational training improves muscular strength ($p<0.05$) this result persists after 4 month. The muscular tension increases, cor-

related with muscular strength, the muscular elasticity increases, any significant variation in muscular stiffness is shown. *Conclusion:* In conclusion, our results suggest that vibrational training counteracts Sarcopenia progression and that it is able to stimulate a specific molecular signaling.

O211

A VIEW ABOUT THE PECULIARITIES IN THE REHABILITATION OF OLD SPASTIC PATIENT AFTER DIFFERENT BRAIN INJURIES

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Background: Besides the spasticity, we know the old patient has the handicap of the lower limbs degenerative sufferings, limiting the functional possibilities, and also, discouraging physicians. Our study proves the adequate kinetic programme, physically sustained, improves the activity of the old patient after brain injury, even antecedently with osteoarthritis. *Method:* We studied 40 old spastic patients with motor and co-ordination deficit, prevailing at the lower limb, after different brain injuries. The followed clinical parameters were: active and passive mobility, muscular analytical strength and the capacity of control and co-ordination, valued at the all joints of lower limb. The clinical gesneral score was reported at the quality of the gait. We applied a kinetic programme of all kinetic chain of lower limb, physically sustained, during 18 days. *Results:* We noted the improvement of active and passive mobility between 65–80% at the proximal and intermediar joints, and only between 30–45% at the distal joints. Control and co-ordination and also, the muscular strength significantly improved at the proximal level of the limb (37–52%). Even the results at the distal level of the limb were medium (under 30%), generally the gait improved over 45%, like quality (form of support), distance, speed and condition of action. *Conclusion:* We consider the lower limb rehabilitation is indicated at the old spastic patient, even after different brain injuries, because the real possibilities, similarly with the adult patient, in the same pathological conditions.

O212

ASSOCIATIONS BETWEEN POSITIVE EMOTION AND RECOVERY

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Background and Purpose: Accumulating evidence indicates the beneficial effects of positive emotion on health and general well-being in older age. Less evidence is available on whether positive emotion supports improvement in functional status after an acute medical event such as stroke. This study examined the association between positive emotion at discharge from in-patient medical rehabilitation and functional status three months later in persons with stroke. *Methods:* A longitudinal study using information from the Stroke Recovery in Underserved Patients database. The study included 823 persons aged 55 years or older with stroke and admitted to an in-patient medical rehabilitation facility. Information was collected during in-patient medical rehabilitation stay and approximately 3 months post discharge. *Results:* The mean age of the sample was 72.8 years (SD=9.5), 51.5% were women and 53.8% were married. The sample was mostly non-Hispanic white (79.2%), followed by non-Hispanic black (15.0%) and Hispanic (5.8%). The average length of stay was 20.1 days (SD=10.1). In multivariate regression analyses discharge positive emotion score was significantly associated with higher overall functional status ($b=1.00$, $SE.17$, $p=0.0001$) as well as with higher motor ($b=0.67$, $SE.15$, $p=0.0001$) and cognitive ($b=0.39$, $SE.05$, $p=0.0001$) status at 3 month follow-up after adjustment for relevant risk factors. *Conclusions:* Our results indicate positive emotion is associated

with gains in functional status post-stroke. Findings have implications for stroke recovery programs and suggest the need to include measures of positive emotion in patient assessments.

O213

BURDEN OF DISABILITY AMONG DISABLED ELDERLY

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Introduction and Aims: The impact of disability and functional limitation on quality of life of the aged has been extensively studied. However, there has been far less research focused on the subjective experience of living with functional limitations in late life in the context of the disability cascade (1). This paper investigated both predictors and sequelae of the subjective burden of disability among representative samples of community dwelling aged in the U.S. *Methods:* The sample included 627 old adults residing in Clearwater, Florida. We developed a 9-item scale to measure Burden of Disability. The scale has inter-item (Cronbach alpha) reliability of 0.89 with items loading on a single factor. The burden of disability scale reflects individuals' appraisals of diminished quality of life as well as external attribution of stigma (2). *Results:* Our findings, based on regression analyses, reveal that subjective experience of burden of disability is significantly influenced by functional limitations, particularly in the presence of pain and inability to engage in valued activities, such as driving. Reporting of falls during the prior year also contributed to increased burden of disability. It is also notable that there were significant social influences on burden of disability. Respondents satisfied with their social life indicated significantly less disability burden than did their less socially integrated counterparts. We also observed linkages between burden of disability and depressive symptoms in this sample. *Conclusion:* Findings of our study call attention to the complex factors that contribute to diminished quality of life based on disabling illness in late life. They also support findings of our prior research, documenting the social construction of a disability identity (3). Rehabilitation and therapeutic interventions with disabled elders must address underlying chronic illness, functional limitations, pain, and social functioning in an integrated manner.

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O214

AGE-SPECIFIC VELOCITIES FOR INITIATION OF NEUROGENIC RECIPROCAL ARM SWING DURING NORMAL GAIT: IMPLICATIONS FOR NEUROFACILITATIVE GAIT REHABILITATION

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Introduction: Numerous neurorehabilitation therapies for stroke attempt facilitation of functional movement by assisting patients to perform normal movement patterns. (1) Assisted reciprocal arm swing (RAS) is often utilized to facilitate gait retraining (1). However, stroke patients may initially ambulate at velocities below those normally accompanied by RAS (2). Facilitated RAS at low velocities may encourage a counterproductive abnormal pattern and hinder recovery (2). *Aim:* To determine the normal velocities of initiation for neurogenic reciprocal arm swing, in an age-stratified sample reflective of the age distribution of the CVA patient population in the

United States. *Patients and Methods:* Seventy-three normal adults (age range 28 to 74 years) unaffected by restrictions in extremity mobility, or pathology influencing gait mechanics or walking endurance, walked uncued on a treadmill at speeds from 0.31–1.34 m/s. Motion analysis quantified flexion/extension excursion of the glenohumeral joint and this was plotted against gait velocity. Slope analysis of the resulting "S" curve determined initiating velocity for RAS. *Results:* Findings indicate that a passive arm swing, observed at the elbows, begins at approximately 0.40 m/s due to trunk/pelvis counterrotation. Critical gait velocity for the neurogenic component of RAS showed meaningful correlations with age ($r=+0.52$) and customary walking speed ($r=-0.43$). In the 21–44 year old group critical velocity averaged 0.64 m/s, in 45–64 year olds it averaged 0.80 m/s, and in the 65+ year old group it averaged 1.03 m/s, with an overall mean for the sample of 0.86 m/s. *Conclusions:* Findings revealed a minimum gait velocity for normal neurogenic initiation of RAS that increases with age. Rehabilitation therapists should consider age-specific normal RAS initiation velocity and assess the patient's walking speed prior to introducing assisted RAS in stroke rehabilitation.

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O215

ITALIAN MULTICENTER RETROSPECTIVE DATA COLLECTION ABOUT PATIENTS AFFECTED BY ACQUIRED BRAIN INJURY AND TREATED WITH ITB

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Background: Spasticity is one of the most disabling outcome of acquired severe brain injury. Mobility, use of residual motor function, transfers, sleep, and the overall rehabilitation and functional outcome of these patients could be strong reduction by this condition. Spasticity refractory to oral treatment could be affective managed by ITB therapy. The aim of this retrospective data collection is to describe our Italian experience in the treatment of patients affected by acquired brain injury and treated with ITB therapy. *Patients and Methods:* Study population included 131 patients who underwent implant of SynchroMed pump in 21 Italian centers. 101 males (77%) and 30 females (23%) with a mean age at implant of 36 years underwent implant after a mean period of 2 years from the event. Brain injury aetiology is as following: 63% trauma, 28% cerebral anoxia, 4% infection, 3% neoplasia, 2% other reasons. Patients were assessed by Ashworth and spasm scale. At baseline objectives awaited were recorded and evaluated at a mean follow up of 2.5 years up through a three levels scale: "not reached, partially reached, totally reached". A satisfaction questionnaire was administrated both to care-givers and to collaborative patients. *Results:* The difference between the follow-up and pre implant scores highlighted a significant improvement in both Ashworth upper and (3.8 vs 3.1, $p<0.05$), lower limbs scale (4.2 vs 2.9, $p<0.05$), and in spasm scale (1.5 vs 0.4, $p<0.05$). Through ITB prevention of deformities/contracture was partially/totally obtained in 71% of patients, an improvement of care management in 82%, an improvement in participation to rehabilitation programs in 66%, an improvement in activities of daily living (ADLs) in 70%, a decrease of pain in 67%, an improvement in mobility in 67%, and a decrease of neurovegetative crisis in 50%. 77% of caregivers expressed satisfaction with the procedure, and they would choose it again for the patients. *Conclusion:* These data confirm an improvement in spasticity and spasm. Moreover after implant all objectives expected were satisfactory reached for most

of studied population. Retrospective collection data are not sufficient to investigate results of an early stage treatment with ITB and the impact on functional residual abilities. For these reasons a prospective study has already been designed and it is going to start.

O216

EFFECT OF REHABILITATION ON FATIGUE IN LIVER TRANSPLANT RECIPIENTS

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Introduction: Fatigue is a chronic problem after liver transplantation (LTx) (1). The cause of this fatigue is often unclear. However, there are indications that fatigue after LTx is associated with a low level of daily activity (2) and a low physical fitness (3). *Aim:* To evaluate the effect of a rehabilitation program, which aimed at enhancing levels of daily activity and fitness, on fatigue in LTx recipients. In addition, we explored relationships between effects on fatigue and effects on daily activity and fitness. *Patients and Methods:* Eighteen fatigued LTx recipients, aged 51.0±9.9 years (time since LTx 7.5±4.4 years), participated in a 12-week rehabilitation program. The program consisted of supervised exercise training and counseling on daily activity. Fatigue (Fatigue Severity Scale [FSS]), fitness (cardiorespiratory fitness, neuromuscular fitness, body mass index) and daily activity were assessed before and after the program. *Results:* After the rehabilitation program, patients reported less fatigue than before the program (FSS_{post} 4.70 and FSS_{pre} 5.33, $p=0.01$). Furthermore, cardiorespiratory fitness was increased with 6.4% ($p=0.01$) and neuromuscular fitness with 4.8–16.4% ($p<0.05$). There was no effect on daily activity and body mass index. Effects on fatigue were not associated with effects on fitness or daily activity. *Conclusion:* The rehabilitation program was effective in reducing fatigue and improving fitness in fatigued LTx recipients. However, we found no indication that the reduction in fatigue was caused by improvements in fitness. Future research is needed on the working mechanisms of this decreased fatigue.

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O217

EXERCISE AND EXER-REST: WHAT'S THE DIFFERENCE?

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Introduction: Exercise is recommended in management of most chronic inflammatory diseases. Exercise promotes weight reduction, muscle strength and cardiac efficiency but such benefits do not impact inflammation. During exercise, pulsatile shear stress to the endothelium causes release of nitric oxide (NO), an anti-inflammatory agent, into the circulation. The Exer-Rest® is a bed-like device that incorporates a motion platform which repetitively moves a supine subject in a head to foot direction 140 cycles/min over ~18mm for 45 min. This process induces whole body periodic acceleration (WBPA) that adds pulses to the circulation to increase pulsatile shear stress which in turn elevates NO to the same extent at rest as moderate to strenuous exercise. In an allergic asthmatic sheep model, WBPA affords the same degree of airway protection from antigen challenge as intravenous, high dose corticosteroids. In humans, the degree of NO vasodilatation between WBPA and moderate exercise are comparable. *Aim:* Do WBPA treatments produce beneficial effects in osteoarthritis, chronic neurologi-

cal diseases and fibromyalgia as assessed by a Quality of Life Questionnaire? *Patients and Methods*: WBPA was assessed in 8 patients with osteoarthritis, 8 patients with chronic neurological diseases and 5 patients with fibromyalgia and/or chronic fatigue syndrome. They received 10 to 15, 45-min treatments, 5 days a week and the SF36v2™ health-related quality of life questionnaire was administered at baseline and at treatment end. *Results*: Four of the 8 categories of SF36v2 improved with WBPA treatments e.g., Physical Functioning (PF), Role Physical (RP), Body Pain (BP), and Vitality (VT). For osteoarthritis, the categories included RP ($p < 0.02$), BP ($p < 0.01$), and VT ($p < 0.02$); for chronic neurological diseases, PF ($p < 0.05$), BP ($p < 0.05$) and VT ($p < 0.05$); and for fibromyalgia and/or chronic fatigue syndrome, RP ($p < 0.02$), BP ($p < 0.05$) and VT ($p < 0.05$). *Conclusion*: Increased NO in circulation achieved with WBPA treatments relieves body pain and lack of vitality associated with chronic inflammation. Presumably, this would have also occurred with moderate exercise had these patients been able to exercise 45 min/day.

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O218

CAN EXERCISE LIMITS PREVENT POST-EXERTIONAL MALAISE IN CHRONIC FATIGUE SYNDROME? A CLINICAL TRIAL

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Introduction: There is evidence to support specific exercise therapies as a cornerstone in the comprehensive management of Chronic Fatigue Syndrome (CFS). However, too vigorous exercise frequently triggers post-exertional malaise, a primary characteristic evident in up to 95% of people with CFS. The present study in patients with CFS examined the effect of applying two methods of individually tailored exercise limits in preventing symptom increases and worsening of their health status following an exercise bout. *Patients and Methods*: The sample size estimation indicated that 24 subjects fulfilling the Centre for Disease Control and Prevention criteria for CFS were required. During the first testing day, patients performed a submaximal graded bicycle ergometric test to assess the heart rate and oxygen uptake corresponding to the respiratory exchange ratio=1.0. Two weeks later, the patients underwent a walking exercise with two concurrent exercise limits. Each subject walked at an intensity where the maximum heart rate was determined by heart rate corresponding to the respiratory exchange ratio=1.0 derived from the previous sub-maximal exercise test and for a duration calculated from how long each patient felt they were able to walk. Questionnaires were filled in prior to, immediately and 24 h post-exercise. *Results*: The fatigue increase observed immediately post-exercise ($p=0.006$) returned to pre-exercise levels 24 h post-exercise. The increase in pain observed immediately post-exercise was retained at 24 hours post-exercise ($p=0.03$). Fourteen of 24 subjects experienced a clinically meaningful change in bodily pain (change of SF-36 bodily pain score ≥ 10), and 2 of 24 had a clinically meaningful decrease in vitality (change of SF-36 vitality score ≥ 20). There was no change in activity limitations/participation restrictions. *Conclusion*: It was shown that the use of exercise limits prevents important health status changes following a walking exercise in people with CFS, but was unable to prevent short-term symptom increases. The present approach to exercise may be useful in preventing important changes in health status of people with CFS, but further studying of the ability of other exercise limits to prevent worsening of symptoms and health status in response to exercise in people with CFS is warranted.

O219

SUITABILITY OF ACTION RESEARCH ARM TEST (ARAT) FOR FUNCTIONAL ASSESSMENT AFTER HAND ALLOTRANSPLANTATION

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Introduction: Composite tissue allotransplantation is slowly becoming the clinical part of the complex reconstructive procedures, especially on the upper extremity. Up to now, 26 mostly successful hand and (or) forearm transplantations have been reported. In all these reports, many different tests to assess sensory and motor recovery which allow us only partial evaluation of results, have been performed. *Aim*: The purpose of this presentation is to apply for the first time Action Research Arm Test (ARAT) for functional assessment of transplanted upper extremity. This test is well known in the evaluation of upper limb function in cases which include cortical damage. *Patients and Methods*: In the period from March 2000 until May 2006, three cases of hand (2 cases) and forearm (1 case) transplantation have been performed at the Innsbruck Medical University. The follow-up of the first case of the bilateral hand transplantation took 8 years and in the second case 20 months. The follow-up of the patient with bilateral forearm transplantation has been going on for 5 years. On average, functional examination using accurately defined evaluation tests, is performed every three months. For the application of ARAT on transplanted hand and forearm we adapted the test in order to achieve exact, quick and easy assessment of the precise and gross movement, as well as sensory recovery. ARAT is divided into 4 subtests with a total of 19 items. The maximum score for each extremity is 57 points. *Results*: Our first patient with bilateral hand transplantation shows a score of 47 on the right side and 40 on the left. The second patient shows a score of 31 on the right side and 21 on the left side. The patient with the forearm transplantation shows 31 on the right side and 33 on the left. *Conclusion*: After adaptation of the ARAT for assessment of hand and forearm allotransplantation, we can conclude that this test gives us decisive information concerning recovery of sensory and motor function as well as cortical reorganisation.

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O220

EVALUATION OF EXISTING METHODS FOR LEARNING PHYSICAL MEDICINE AND REHABILITATION

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Objective: To analyze the theoretical training methodology in order to get better results for learning, achieving clinical skills, knowledge and usefulness in clinical practice for the residents in Physical Medicine and Rehabilitation (PMR). *Material and Methods*: We conducted a prospective longitudinal study by evaluating the training program classes for residents of PMR during the period 2006–2007. At the end of each class, an evaluation questionnaire was administered by the residents in PMR to assess the two methods (theoretical or interactive classes). This questionnaire evaluated learning, clinical skills, acquisition of knowledge and usefulness for clinical practice. The working hypothesis was that interactive classes would give better results in those categories than the theoretical method. We used to analyze the results the statistic program SPSS® 15. *Results*: A total of 183 questionnaires were completed for the evaluation of 95 theoretical and 94 interactive classes. We found no association

between learning and class methods. A relationship exists between clinical skills and interactive classes (91.3% disagree vs. 8.7%, 56.1% partially disagree vs. 43.9%, 50.3% agree vs. 61.5%). We found a relationship between knowledge and interactive classes (90.9% disagree vs. 9.1%, 64.4% partially disagree vs. 35.6%, 37.7% agree vs. 62.3%). A relationship exists between useful clinical practice and interactive classes (18.2% disagree vs. 81.8%, 70.9% partially disagree vs. 29.1%, 33.9% agree vs. 66.1%). *Conclusion:* The interactive method gave the best results for the acquisition of clinical skills, knowledge and usefulness for our clinical practice but we found no differences in learning.

O221

PRM RESIDENT FOLLOWING SPINAL CORD INJURY

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Introduction: Being a resident in a spinal cord injury (SCI) ward is a demanding role. Dealing with people that have to face suddenly a radical change in their lives needs something more than “communication skills”. Physical and Rehabilitation medicine residents are usually confronted with difficulties in implementing the evidence-based clinical practice guidelines. They also come across with the responsibility to approach the patient’s psychosocial needs and often asked to deal with ethical dilemmas that are relevant to rehabilitation following a spinal cord injury. *Aim:* This presentation relates to the impact of the implementation of guidelines for predicting outcome following SCI, on the clinical practice of a resident in physical medicine and rehabilitation. It also highlights the significance of the psychosocial approach of spinal cord injured patients and presents some ethical issues that arise in SCI rehabilitation resulting from the direct interaction of a junior doctor with the patients. Finally this presentation describes the possible limitations on implementing SCI guidelines in different European countries according to special national characteristics and the impact of this variability on the provided educational opportunities. *Methods:* Narrative and review of literature. *Conclusion:* Not all European PRM residents have equal opportunities neither to improve their skills, nor to inspire the patients to follow with responsibility and efficiency the rehabilitation plan in order to achieve successful reintegration in the community. There are still European capitals with no appropriate reintegration mechanisms and poor environmental capacity where doctors and patients have no options to give and no options to take respectively.

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O222

AN ATTEMPT TO PRESERVE MUSCLE MASS IN PATIENTS HARMED BY MALNUTRITION BY USING PHYSIOTHERAPY AND NUTRITION

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Objectives: Physical inactivity is increasingly becoming define problem, particularly in elderly. Movement and nutrition play an important role in primary and secondary prevention. Every illness

decreases quality of life. In aging total body protein is diminution. Largely to decline the skeletal muscle mass. Limitation of movement may be the result of basic illness or surgery (1). *Methods:* Characteristic of group: Criterion of study. Patient agreement Hospitalized patients $n=64$ were harmed by malnutrition, immobilization minimal three weeks. Check (controlled) group F36, M28. Evaluation and intervention: Evaluation: Monitoring functional and nutrition parameters (anthropometry, dynamometry, spirometry, indirect calorimetry, biochemical markers (blood, urine) Questionnaires – Quality of life (FIM, Barthel index, MME, etc). *Intervention:* Nutritional – supplement (sipping), physiotherapy – resistance exercises (2, 3). *Results:* Statistically we found differences between gender, age, groups, BMI. Preliminary results that are statistically significant (study is in continuation): Body Mass Index (BMI) to Age: Female (F) $n=36$; 0.01, Male (M) $n=28$; 0.05. Dynamometry to age: Handgrip average right (R)+left (L) sides F $n=32$; 0.001; M $n=21$; 0.001, Controlled F $n=16$; 0.001. Dynamometry to BMI: Handgrip average R+L sides: M $n=20$; 0.01; F $n=32$; 0.001. In each group are similar results. Controlled group: F $n=32$; 0.05. Forced Expiratory Vital Capacity (FVC) to Forced Expiratory Volume in 1 sec (FEV1) to age: M $n=14$; FVC 0.001, FEV1 0.001; F $n=16$; FVC 0.01, FEV1 0.001. FVC+FEV1 to BMI in F $n=16$; FVC 0.01; FEV1 0.001. Resting energy expenditure (REE) to BMI: M $n=11$; REE 0.05; F $n=19$; REE 0.05. Creatinin in urine (U_KRE) to dynamometry (dyn) in women: F $n=15$; dyn P 0.05; dyn L 0.01; average dyn 0.05. U_KRE to REE in women: F $n=9$; 0.01. *Conclusion:* Immobilization in patients harmed by malnutrition is leading to problems of loss of muscle tissue in a situation compounded by increased aging within the general population. Medical and non-medical specialists have an important influence in minimizing this loss of muscle tissue, and regular nutrition and suitable movement and activity should play a fundamental role in quality of life. Dedication: MZO 00179906

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O223

A COMPARATIVE STUDY OF ADMISSION CRITERIA TO STROKE REHABILITATION UNIT IN FOUR EUROPEAN CENTERS

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Introduction and Aim: To explore the clinical and non-clinical factors on decision-making concerning admission to European stroke rehabilitation units (SRUs). *Design:* Observational study on case-mix at intake combined with questionnaires and semi-structured interviews with the medical consultants (MC) of each SRU. *Patients and Methods:* Clinical data gathered on 532 first-ever stroke patients. MCs of six SRUs in four European countries (United Kingdom, Belgium, Germany and Switzerland) *Results:* Case-mix of stroke patients was significantly different between SRUs. Clinical criteria for admission were seldom explicit and were evaluated differently between the SRUs. In the British SRUs, diagnosis of stroke was the only criterion for admission to SRU. In the Belgian, German and Swiss SRUs, pre-morbid conditions were taken into account in admission decisions. The likelihood of discharge home was considered highly important in the Swiss SRU. *Conclusion:* Case-mix differences at intake could be linked to different appraisals of clinical and non-clinical factors of stroke patients. The findings urge to be more explicit about decision-making processes at admission to provide a more comprehensive insight into the interplay between context and process of care.

O224

DISCHARGE DISPOSITION AFTER INPATIENT STROKE REHABILITATION: AN INTERNATIONAL COMPARISON

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Aim: To compare discharge disposition after inpatient rehabilitation following stroke. **Design:** Secondary analyses on the pooled dataset from two prospective cohort studies, one in Europe (Collaborative Evaluation of Rehabilitation In Stroke across Europe, CERISE-study) and one in the United States (Post-Stroke Rehabilitation Outcomes Project, PSROP-study). **Patients:** 1154 patients with first ever-stroke, admitted to an inpatient rehabilitation facilities (IRF) within six weeks post-stroke ($n=532$ from CERISE and $n=622$ from PSROP-study). **Main Outcome Measure(s):** Discharge disposition and Barthel Index at discharge. **Results:** Overall, 81.2% of the patients were discharged home, with no significant differences between the CERISE-group and the PSROP-group (81.71% and 80.54% respectively, $p=0.618$). The Barthel Index (BI) at discharge was significantly different between both groups (median values: 17 (CERISE), 13 (PSROP)). Stepwise regression analysis revealed no significant differences in the likelihood to be discharged home (OR, [95% CI]: 1.11 [0.74–1.66]). **Conclusions:** Discharge disposition was not different between both patient groups. However, functional status at discharge differed significantly. Incorporating contextual information on the organization of health care is needed to improve the comparison of results enabling a better evaluation of rehabilitation programs.

O225

THE STROKE INPATIENT REHABILITATION CARE PATHWAY: PROGRAM DESCRIPTION

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Setting: Tertiary Adult Care Hospital, Inpatient Rehabilitation Unit. **Program:** Stroke Inpatient Rehabilitation Care Pathway. **Program Description:** The Stroke Inpatient Rehabilitation Care Pathway assists health care professionals with clinical decision-making and goal setting, promotes efficient patient care through three timed phases, and organizes patient care for optimal outcomes. **Assessment and Results:** Objective assessments include the Functional Independence Measure (FIM) change, FIM efficiency, discharge locations, and patient satisfaction measures. Follow-up measures at three months post-discharge are also used to evaluate sustained outcomes. **Discussion:** Clinical outcomes are better in stroke rehabilitation units because of greater adherence to process of care. The first phase of the pathway (within 48 h) requires rapid assessment of the patient by all therapists and practitioners involved in care. The second phase (days 2 through 7) includes a multidisciplinary team conference, goal development, identification and training of care providers, and patient training in disease management (hypertension, anticoagulation, diabetes, etc.). The last phase (days 8 and 9, or until discharge) addresses discharge criteria including bowel and bladder management, identifying community support, obtaining needed supportive, assistive, and adaptive equipment, caregiver and family education, determining ongoing medical care, and continuing any further rehabilitation services into a home setting. **Conclusions:** The Stroke Inpatient Rehabilitation Care Pathway assists in efficient utilization of multiple medical rehabilitation services for the sustained benefit of stroke survivors.

O226

PREDICTION OF MOTOR OUTCOME SIX MONTHS AFTER A STROKE

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Background: The main objective is to develop a very early prediction model of motor function six months after a stroke taking into account Trunk Control Test (TCT) and other valid predictors evaluated in the first and second week after suffering a stroke. **Methods:** Seventy-five consecutive patients with first stroke who were admitted to a rehabilitation hospital were studied. Sex, age, the stroke type, urinary incontinence, National Institutes of Health Stroke Scales (NIHSS) and TCT scores (first and second week post-stroke) as independent variables. Motor function outcome six months after the stroke is defined by Rankin score, motor Functional Independence Measure (FIM) and Berg Balance Score (BBS). **Results:** A multiple regression revealed that only age and TCT (14th day after stroke) accounted for the 61.1% of the variance in the motor FIM score (six months after the stroke). When TCT is registered in the first week after the stroke, age and TCT accounted for the 51.7% of the motor FIM variance. A cluster analysis identifies 12 patients with low motor scores: Rankin 4–5, motor FIM <59 and BBS <5. Logistic regression was used to predict achieving in this group with low motor scores. TCT in day 14 after the stroke under or equal 50 predicts bad motor outcomes (Sensitivity 83.3%, Specificity 85.7%). TCT fourteen days after stroke under or equal 50 is a significant predictor of a bad motor outcome at six months after stroke (OR=30.0, 95% CI 4.7–247.3). TCT seven days after stroke under or equal 24 is a significant predictor of bad motor outcomes (OR=16.7, 95% CI 3.2–97.5). **Conclusion:** Early TCT predicts motor outcome at six months after stroke. Best prediction values are reached when TCT is registered at 14 days after the stroke, comparing with the 7th day TCT.

O227

FALLS, FRACTURES AND OSTEOPOROSIS IN THE STROKE PATIENT

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Objectives: Prevention of falls and fractures must be included in the stroke patient rehabilitation care. **Methods:** Falls are among the most common and serious complication after stroke. They occur while walking, turning, and during sit-to-stand activities. Hemi-osteoporosis, i.e., bone mineral loss in the affected extremities relative to the intact contra-lateral side has been demonstrated, mainly in the first year. The combination of the high frequency of falls with hemi-osteoporosis, make stroke patients particularly prone to suffer fractures, mostly hip fracture. This is a serious drawback in rehabilitation. **Results:** According to the literature, 40% of people fall within the first year of a stroke and are up to 4 times more likely to sustain a hip fracture. Falls in inpatients range from 14% to 64.5%; in community-dwelling stroke patients the incidence of 1-time falls varies from 23% to 73%, and multiple falls from 12% to 47%. Falls risk factors are balance problems, gait impaired cognition, reduced lower limb strength, reduced arm function, lower ADL ability, sedative medication, visual impairments, posterior stroke syndromes, lack of concentration, and a previous fall. After a stroke, motor performance is consistently under conscious control and the execution of activities demands concentration and attention. 30–40% of stroke survivors have been reported to experience cognitive deficits. Hip fractures usually affect the paretic side due to the risk of falling toward the paretic side, a reduced ability to break the fall and the presence

of hemi-osteoporosis. Bone loss is greater in stroke patients with 4–7% differences in BMD between the paretic and non-paretic femoral neck. The determinants of bone mineral loss are duration of hemiplegia-induced immobilization, severity of palsy, lower weekly dietary intake of vitamin D, and insufficient to no sunlight exposure due to reduce mobility. **Conclusions:** The combination of impaired balance and gait impaired cognition, including perception difficulties, increases the fall risk and, in combination with hemi-osteoporosis, means that the stroke patients are prone to suffer fractures. Prevention of falls and hemi-osteoporosis must be included in routine assessment, treatment, and rehabilitation of the stroke patient.

O228

ARE ROTATIONS IN PERCEIVED VISUAL VERTICAL AND BODY AXIS AFTER STROKE CAUSED BY A SAME MECHANISM?

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Background and Purposes: To investigate whether or not allocentric and egocentric coordinate systems are congruently biased after hemisphere stroke, which would suggest a single underlying mechanism is involved. **Methods:** The perception of the Long body axis (LBA) and that of the subjective visual vertical (SVV) of 15 patients with a hemisphere stroke and 12 controls, were assessed both upright and with 30° lateral body tilts. **Results:** In controls, estimates were accurate in upright, but rotated in tilted positions (LBA (7°±6°) overestimation and SVV (8.8°±7.8°) towards the body). In patients, SVV (-4.4°±4.6°) and LBA (-4.8°±5.3°) were congruent in upright and when patients were ipsilesionally tilted (1.5°±7°; 1.9±7). In contrast SVV and LBA were dissociated when the body was tilted to the contralateral side, with overestimation of the LBA (-9.2°±4.6°) but no effect on SVV (-4.1°±6.4°). **Conclusions:** Since rotations in egocentric and allocentric reference systems found after stroke are differently modulated by lateral tilts, they are not due to a single underlying mechanism. However, they share common bases and can be simultaneously reduced by an ipsilesional body tilt. This could have clinical implications for rehabilitation.

O229

KINEMATIC CAD ORTHESIS FOR HEMIPLEGICS

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Introduction: Since 1970s the orthosis are prescribed in a large number of cases. According to Colville (1), orthosis increases resistance to displacements as well as the stability impression of the subjects. Martinek (2) does not find a scientific argument justifying the wear of orthosis. The aim of this study is to develop the foot raising device orthosis for hemiplegics. **Methods and Results:** In the aim to choose a realistic solution depending on the actual techniques and available means, we have done as a first step several sketches. As second step we have used the CAD programs CATIA and SolidWorks. These two programs gave us an idea for the final product and allowed to see theoretically if the device is realistic. We conceived each part and after the whole design taking into account

the different stresses. The last objective was to reproduce this device industrially easily and cheaper. **Conclusion:** The advantage of this raising device is that it raises the sole by a pivot at the same level than the ankle of the patient. The raising device of the foot has three springs located in two discs. We can adjust springs for each patient. With the elasticity of the springs, the foot can reproduce easily the movement. The presented methods are successfully used for 3D modeling oriented to design and manufacturing.

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O230

REHABILITATION OF BALANCE AFTER STROKE BY MULTISENSORIAL TRAINING: A RANDOMIZED CONTROLLED TRIAL

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Aim: To compare two rehabilitation approaches to restore balance after stroke, on the hypothesis of the superiority of a ‘multisensorial’ approach, based on quantity of balance tasks and amount of exercise in visual deprivation versus a conventional one, ‘NDT’, with global sensorimotor rehabilitation derived from neuro-developmental concepts. **Patients and Methods:** This study was prospective, multicentric and randomized in parallel groups with single blind evaluation. Sixty-eight patients able to walk without human assistance were included between the 3rd and the 15th month (mean 7 months), after a first and only hemispheric stroke. They were randomly allocated for 20 rehabilitation sessions to the ‘NDT’ or the ‘multisensorial’ rehabilitation group. Blind assessment on Day30 and Day90 included assessment of balance (BBS, posturography), gait (velocity, double stance phase, climbing ten steps, amount of walking per day), daily autonomy (FIM), and quality of life (NHP). **Results:** All subjects improved significantly in balance and walking parameters. This study failed to reach the statistical significance level for its main criterion (BBS on D30). The analysis of the secondary criteria suggested a difference in favour of the experimental group, as attested on D90 by a shorter double stance phase during gait ($p=0.02$), better functional independence ($p=0.006$) and better quality of life ($p=0.004$). Nevertheless the differences are small and their clinical significance questionable. **Conclusion:** In semi-recent post-stroke patients, we found no strong evidence for the superiority of a multisensorial rehabilitation program based on exercises facilitating sensory plasticity versus a traditional program based on exercises targeting quality of gait.

O231

TREADMILL WALKING WITH BODY WEIGHT SUPPORT IN STROKE PATIENTS DURING ACUTE PHASE

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Introduction: Locomotor training using body weight support and a treadmill as a therapeutic modality for rehabilitation of walking post-stroke is being adopted into clinical practice, but still there is

a need for trial to determine the effectiveness of this intervention in acute phase rehabilitation. *Aim:* to compare the effect of walking training on a treadmill with body weight support (BWS) and walking training on the ground at an early stage of rehabilitation in patients affected by stroke. *Patients and Methods:* 102 first stroke patients admitted to the rehabilitation clinics were randomized into an experimental group (SG) and a control group (CG). The SG received 20 sessions of walking training on a treadmill with BWS for 20 min, 5 days a week, and for other 40 min they received traditional treatment. The CG received walking traditional training on the ground for 60 min 5 days a week, not including treadmill training. *Outcome Measures:* walking velocity for 10 m, Functional Ambulation Classification, Motricity Index, Trunk Control Test, Ashworth Scale, Barthel Index, Six-Minutes Walking Test associated with Borg Scale, Rankin Scale, Walking Handicap Scale; blood pressure and heart rate were measured before and after every treadmill session. Assessments were performed before treatment (T0), after 10 training sessions (T1), at the end of the treatment period (T2), at discharge (T3) and at 6-month follow-up (T4). *Results:* There were no statistically significant differences between the groups at every assessment regarding to every outcome measures we used. Patients in both groups improved in these variables from T0 to the 6-month follow-up (T4). No changes in heart rate and blood pressure were seen in experimental group patient from first to last treadmill session. *Conclusions:* Treadmill training with BWS early after stroke is a comparable choice to walking training on the ground.

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O232

THE ROLE OF LOKOMAT IN CENTRAL NEUROLOGICAL IMPAIRED PATIENTS: A PROSPECTIVE, CROSSOVER GAIT REHABILITATION STUDY

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Introduction: Robotic-driven gait orthosis (Lokomat) is becoming a more important tool in gait rehabilitation after stroke or incomplete spinal cord injury. The treadmill training with partial body weight support is suggested as a benefit for gait rehabilitation. *Aim:* To demonstrate an improvement in gait speed, independence of gait, endurance, energy cost, balance or spasticity using the Lokomat instead of conventional physical therapy. *Patients and Methods:* A heterogeneous group of 23 patients (hemiparetic patients ($n=16$), MS patients ($n=2$), spinal cord injury patients ($n=4$) and tetraplegic patient after ICB ($n=1$) received 12 weeks treatment in a prospective, crossover study. The whole group followed an ABA pattern (A=4 weeks of Lokomat training, B=4 weeks of conventional physical therapy). The independence of gait is expressed as the Functional Ambulation Classification (FAC); other outcome measures include 10 min timed walking speed, 6 min timed walking distance, heart beats/min after 10 or 45 m, Berg score end Ashworth scale. Outcome measures were evaluated at the start and after 4, 8 and 12 weeks of treatment. *Conclusions:* The Lokomat robotic assistive device proves beneficial in gait rehabilitation of central neurological impaired patients.

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O233

FUNCTIONAL OUTCOME IN SPINAL TUBERCULOSIS – A 5 YEARS EXPERIENCE FROM A TERTIARY CARE CENTER IN UNITED ARAB EMIRATES

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Introduction: To review the outcome of patients with spinal tuberculosis and the role of physical therapy in restoring functional status in combination with medical and surgical treatment. *Patients and Methods:* A 5-year retrospective review was done by using international classification of disease coding for spinal tuberculosis. 20 medical records were identified. The collected data for all the patients was age, gender, nationality, occupation, coexisting medical conditions, social habits and risk factors for immunodeficiency syndrome, presenting symptoms, duration of symptoms, admission Functional Independence Measure (FIM), diagnostic workup for TB, surgical or medical treatment, surgical complications and FIM measurements at the time of discharge. *Results:* A total of 20 medical records were reviewed, 13 patients had complete information and were included in the study. Mean age of the patients was 32 ± 12 years, there were 10 (76%) male and 3 (23%) females. All patients had negative Human Immunodeficiency Virus testing. The average duration of symptoms was 2–4 weeks. 70% of the patients presented with the initial complaint of back pain with myelopathy, followed by paraplegia (23%). The mean FIM on admission was $90 \pm 19.46\%$ had a positive Mantoux test; only 30% of patients had their Erythrocyte Sedimentation Rate (ESR) >50 mm/h. All patients had abnormal findings on spinal computed tomography and magnetic resonance testing. Biopsy cultures were positive for Tuberculosis in 70% of the patients. All patients were treated medically with antituberculosis medications. 60% of the patients received combined surgical and medical therapy. All patients received Physical therapy in the form of strengthening exercises, balancing exercises, closed chain exercises and gait training with the help of appropriate spinal orthoses. The mean FIM at the time of discharge was 115 ± 7 . All patients were discharged ambulating and the follow-up was available for 6 months. *Conclusion:* The mainstay of therapy for spinal tuberculosis is medical therapy, with surgical correction in selective cases, however our findings suggest that timely introduction of physical therapy can improve the functional status.

O234

CONTRIBUTION OF EACH LOWER LIMB TO UPRIGHT STANDING IN STROKE PATIENTS

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Objective: To analyze the postural behavior of standing stroke patients: *i)* To differentiate between postural impairment due to the neurological condition (deficits due to the cerebral lesion) and postural impairment due to new mechanical constraints caused by body weight asymmetry; *ii)* To assess the involvement of each leg in the postural disability; *iii)* To better understand which clinical deficits underlie the postural disability. *Methods:* The posturographic characteristics of each leg in 41 stroke patients (first hemispheric stroke: 16 left, 25 right cerebral lesions) required to stand in their preferred posture were compared to those in 40 matched healthy individuals required to stand asymmetrically. *Results:* Compared to normal individuals in a similar asymmetric posture, stroke patients were more unstable. The postural instability and weight bearing asymmetry were mainly related to spatial neglect. The paretic leg

was unable to bring into play a normal longitudinal pattern of the centre of pressure, which reflects an impaired stabilization control. Overall postural instability occurred when the strong leg was unable to compensate for the postural impairment of the paretic leg. *Conclusions:* The weight bearing asymmetry of standing stroke patients is not the primary cause of their postural imbalance, which is rather the consequence of impaired control of postural stabilization involving both legs. *Significance:* Weight bearing asymmetry may not be the principle target of rehabilitation programs aiming at restoring standing balance after stroke. Instead it is suggested that more account should be taken of the compensatory role of the strong leg.

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EFFECTS OF BILATERAL MOVEMENT TRAINING VERSUS DISTRIBUTED CONSTRAINT-INDUCED THERAPY ON UPPER LIMB CONTROL IN PATIENTS WITH CHRONIC STROKE: A KINEMATIC STUDY

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Introduction: Bilateral movement training (BMT) (1) and constraint-induced therapy (CIT)/distributed CIT (2) have been separately and empirically demonstrated to promote recovery of upper limb function in chronic stroke patients. No study compared the relative effects of these two interventions. Understanding of the relative effects of both interventions may lead to individual and maximized training benefits for patients. *Aim:* This study investigated the relative effects of these two approaches on movement kinematics in stroke patients. *Patients and Methods:* In a pre-post randomized, controlled trial, twenty-one unilateral stroke patients were randomly allocated to either BMT (2-h intensive bilateral simultaneous and symmetrical training per day) or the distributed CIT group (2-h intensive training for the affected hand combined with 6-h restraint for the unaffected hand per day) for a period of 3 weeks. Kinematic performance of the unilateral and bilateral desk bell tasks was obtained. *Results:* In comparison with the distributed CIT group, the BMT group showed earlier initiation of reaching during the unilateral and bilateral tasks with both hands ($p=0.023\sim 0.046$), and more preplanned control during the unilateral task with the affected hand ($p=0.027$). The BMT group also demonstrated better bilateral synchronization than the distributed CIT group ($p=0.04$). *Conclusion:* The findings suggested the BMT programme facilitated better reaching control and temporal synchronization than the distributed CIT group. The possible explanation for improvement might be that the practice of bilateral symmetrical movements could allow for decreasing the interhemispheric inhibition and facilitating coupling between the upper limbs, leading to promoted motor control of the affected limb and bimanual coordination. Future research may use serial bimanual tasks (e.g., pouring the drink into a cup) to further examine the extent to which the benefits of BMT on bimanual control, in comparison with distributed CIT.

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O236

MIRROR THERAPY IN PATIENTS AFTER STROKE WITH UPPER-EXTREMITY HEMIPARESIS

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Introduction: Upper limb hemiparesis after stroke has serious impact on ADL performance and independent living. In current treatment dominate occupational and physiotherapy focused on guided limb manipulation and task-oriented exercise. Mirror therapy (MT) has been described to be of proven benefit in the treatment of regional and phantom pain syndromes, after stroke, after hand and foot injury or surgery. *Goals:* To evaluate the effects of MT on upper- extremity motor recovery and motor functioning of patients with stroke. *Patients and Methods:* 30 patients with hemiparesis 3–6 months after stroke randomized in 2 groups – the MT group and control group. While patients in MT group made active movements of unaffected hand, they watched the moving image of the unaffected hand reflected in the mirror and actively or passively moves the paretic hand. The control group only received passive movements to the affected hand by the therapist or moves actively paretic hand without usage of mirror. Patients participated in the MT programme (20 min) in addition to a conventional stroke rehabilitation program 5 days a week 2–5 h a day for 4 weeks. Outcome measures: Fugl-Meyer Assessment, Nine Hole Peg test, Modified Ashworth Scale (MAS), FIM, active and passive ROM. *Results:* The mean change score and 95% confidence interval of the Fugl-Meyer Assessment as well as the FIM motor score, fine motor coordination and finger dexterity (Nine Hole Peg test) showed significantly more improvement in MT group compared with control group. Neither MAS nor ROM in wrist joints showed a significant difference between the groups. *Conclusions:* Mirror therapy combined with a conventional rehabilitation programme enhances upper-extremity motor recovery and motor functioning in stroke patients.

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O237

CONVENTIONAL MUSCULAR STRENGTHENING OF THE HEMIPARETIC KNEE IN POSTSTROKE PATIENTS: A RANDOMISED CONTROLLED TRIAL

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Aim: To compare a conventional technique of muscular strengthening for the paretic knee muscles (Progressive Resistance Exercise (PRE) technique) with the isokinetic strengthening. *Patients and Methods:* Thirty-five (35) post-stroke hemiplegic patients were included (6 to 30 months after stroke) in this randomised controlled trial. The quadriceps and the hamstring muscles of the affected limb were trained a) using an isokinetic dynamometer (Cybex® 6000), in a pure eccentric mode for the control group ($n=15$) (three sets of 10 repetitions of maximal effort at 60, 90 and 120°/sec); b) by the conventional isotonic technique (DeLorme and Watkins) for the PRE group ($n=20$) (sets of ten maximal repetitions; the session began with 2 sub-maximal series at 2/5 and 3/5 of the Maximal Resistance (MR), then subjects were asked to make as many series as they could at 4/5 of the MR). The two programs made of 3 weekly 40 min sessions were carried out over 6 weeks. The patients were assessed before (T1), at the end of strengthening (T2) and one month (T3) after the end of the treatment. Quadriceps and hamstring peak torque, Ashworth scale for same muscles and Biceps Brachialis, motricity index, Toulouse Motor Scale, Bessou gait analyser, Barthel Index and FIM were assessed. *Results:* At T1, there was no significant difference between groups. At T2, the quadriceps MR significantly increased when isokinetic peak torque remain unchanged for both groups. Clinical motor scales (Motricity index, Toulouse Motor Scale) showed in both groups that paretic lower limb motricity had improved. Between T2 and

T3, in both groups, motor scales, gait analysis and four steps climbing remained improved or increased their improvement. The Barthel index was significantly improved at T3. Spasticity, measured by Ashworth and Toulouse Motor Scales, did not increase. The improvement was no significantly different between the two groups. **Conclusion:** Both techniques increased equally the strength of the muscles of the knee, the functional independence without increasing spasticity. The isokinetic technique is more expensive and poorly accessible, the PRE technique, cheap and ecological, could be a current and useful practice for post-stroke chronic hemiparetic patients.

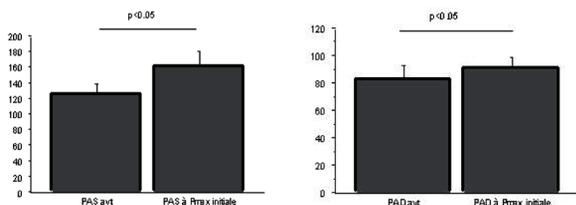
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THE EFFECTS OF CYCLOERGOMETER TRAINING ON HEART RATE AND ARTERIAL SYSTOLIC PRESSURE AFTER STROKE

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Objective: To investigate the effects of aerobic cycloergometer training on the cardiovascular system in stroke survivors. **Design:** Uncontrolled prospective trial. **Setting:** Medicine and Rehabilitation unit in an academic hospital. **Participants:** 14 patients whose stroke had occurred more than three months and less than two years prior to enrolment. **Intervention:** Aerobic training with a cycloergometer for 8 weeks. **Main Outcome Measures:** Workload, VO_{2peak} , maximal hear rate and arterial systolic pressure. **Results:** There was a significant increase after aerobic training in maximal power (P_{max}) (mean 23.21%, $p < 0.0001$), in VO_{2peak} (mean 14.84%, $p = 0.04$). Maximal heart rate and arterial blood pressure (systolic and diastolic) were not significantly affected by training. By contrast, a significant increase in systolic (130.5 ± 24.5 vs. 160.6 ± 20.6 ; $p = 0.0012$) and diastolic blood pressure (84.00 ± 11.01 vs. 90.63 ± 9.04 ; $p = 0.03$) were observed at given workload. **Conclusion:** Patients with stroke improved aerobic performances after endurance training but they not improved blood pressure parameters. These results must be interpreted with caution considering the small size of our sample, but they do suggest that cycloergometer training is a safe and potentially effective training after stroke. But this method of training in stroke may be shortest to improve cardiovascular parameters in stroke patients.



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DYSPHAGIA REHABILITATION IN STROKE PATIENTS

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Introduction: Acquired swallowing difficulties are commonly to occur after stroke beside other physical & mental impairment. Dysphagia rehabilitation is essential part of the multidisciplinary rehabilitation program in Physical Medicine & Rehabilitation Hospital in Kuwait. **Aim:** Dysphagia management should be applied as early as possible to avoid the occurrence of its complications (e.g. chest infection & malnutrition, etc) which may delay the progress of the whole rehabilitation program. **Patients and Methods:** A Special protocol has been developed since 2002 for

stroke patients with dysphagia. Dysphagia management protocol in PMR hospital depends on the proper diagnosis, as there is a variety of pathological conditions may affect each phase of swallowing as well as its pathological background. If the clinician didn't start with the accurate diagnosis, he will loose a precious time and may expose the patient to the hazardous of complications. The following modalities used to diagnose & treat the dysphagic patients in PMR hospital. 1) Clinical Evaluation. (a) Full history, (b) General examination (body built, chest infection, etc), (c) Full neurological examination, (d) Oral cavity & laryngeal examination. 2) Laboratory checks up. 3) Swallowing investigation such as (a) Vidiofluroscopic image analysis, (b) FEES investigation, (c) EMG, Respiratory analysis for the swallowing events. **Results:** This paper will mention the statistical results according to the age, sex, and phase defects for stroke patients with dysphagia in PMR hospital in KUWAIT in 5 years duration (since 2002 till end of 2007). **Discussion:** Discussion of the early diagnosis of the patient main defect, methods of treatment, and analysis of the statistical results of swallowing function after rehabilitation program, will inform about the success rate of applying early dysphagia management program for stroke patients.

O240

ECOLOGICAL ASSESSMENT OF NUMERICAL COMPETENCE IN VASCULAR APHASIC PATIENTS

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Introduction: Dealing with numerical data is extremely frequent in daily life activities such as shopping or scheduling appointments. Vascular aphasia is responsible for alteration of numerical competence. However, numerical competence is usually evaluated with tools that do not deal with daily life activities. We propose here the ecological assessment of numerical competence in aphasic patients. **Aim:** We created the BENQ (Batterie d'Evaluation des Nombres au Quotidien) to assess numerical competence in daily life activities. We aimed to evaluate the numerical capacities of aphasic patients after a left hemispheric stroke. Patients also underwent a classical numerical assessment, a standardized analytic battery the TLC2 – Test Lillois du Calcul. Results for both batteries were compared so as to prove the validity of the BENQ. **Patients and Methods:** Twelve right-handed aphasic patients were included in the study. Inclusion criteria included outpatients in our rehabilitation unit that had returned home after a left hemispheric stroke. They underwent the Ducarne's battery for assessment of their language impairments. All patients sustained a brain MRI or scan. The BENQ battery consists of eleven tasks using numbered data in daily life activities (handling schedules, dealing with coins, etc.) and was formerly normalised in healthy controls. Both numerical batteries, BENQ and TLC2 were proposed to the patients in pseudorandom order. **Results:** Age ranged from 22 to 59 years old with a mean of 44. All patients were autonomous for daily life activities (Barthel over 90). Time between stroke and assessment ranged from one to eighty months. 75% of the patients claimed they felt impaired when dealing with numbers in daily life activities. Executing the BENQ lasted less than an hour for all patients (30–55 min). Eight patients (66%) presented with pathological scores. Scores significantly correlated with analytic assessment (TLC2). **Conclusion:** Aphasic outpatients often present with impaired numerical competence. Rapid and ecological assessment of their difficulties is provided by the BENQ. We proposed this assessment for outpatients considering that inpatients rarely need numerical competence. We now propose this assessment and subsequently when needed a specific rehabilitation focused on numbers processing.

References:

1. La batterie de Ducarne.
2. Le TLC2.

O241

ADULTS WITH BILATERAL SPASTIC CEREBRAL PALSY ARE AT RISK FOR AN INACTIVE LIFESTYLE

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Introduction: Physical activity is an important aspect of a healthy lifestyle. No data are available on this aspect in adults with bilateral spastic cerebral palsy (CP). **Aim:** To quantify the level of everyday physical activity (PA) in adults with bilateral spastic CP and to study its correlates. **Patients and Methods:** Fifty-six adults with bilateral spastic CP (mean age 36.4±5.8 years, 62% male) participated. About 75% had a high level of gross motor functioning (GMFCS level I or II). We measured level of everyday PA with an accelerometry-based Activity Monitor. Main outcomes were duration of dynamic activity in minutes/day (composite measure of walking, running, cycling, wheelchair-propulsion and non-cyclic movements), and intensity of activity (motility, in gravitational acceleration [g]). We compared outcomes in CP with able-bodied controls. **Results:** Duration of dynamic activity in adults with CP was 116±53 min/day and intensity of activity was 0.020±0.007g. Women with CP were less physically active than able-bodied controls (121 min/day for CP versus 175 min/day for controls, $p=0.00$); for men this difference was not significant (113 min/day versus 136 min/day, $p=0.11$). In both women and men, intensity of activity was lower than in controls (in women: 0.021 g for CP versus 0.028 g for controls, $p=0.03$; men: 0.019 g versus 0.027 g, $p=0.00$). Adults with a higher level of gross motor functioning had higher duration ($p=0.00$) and intensity ($p=0.00$) of dynamic activity than those with a lower level of gross motor functioning. We found no differences for other personal and CP-related characteristics (age, gender, level of education, limb distribution of paresis and spasticity). **Conclusions:** Adults with bilateral spastic CP, and particularly those with a lower level of gross motor functioning, are at risk for an inactive lifestyle.

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EU'REKA': A MULTIDISCIPLINARY REHABILITATION PROGRAMME FOR ADJUVANT TREATED WOMEN WITH BREAST CANCER

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Introduction: Breast cancer is the most important cancer in women. In the period of 2000–2001, a total of 10,240 women with invasive breast cancer were registered in Flanders. Medical interventions have documented survival advantages but have a substantial impact on the quality of life of these patients. A multidimensional approach including physical and psychological interventions and lifestyle accompaniment could be effective to face the problems of women diagnosed with breast cancer. **Aim:** A controlled trial was conducted to examine the effects of a group multidisciplinary rehabilitation programme on health-related QOL and aerobic fitness in breast cancer survivors. **Patients and Methods:** Fifty-nine women (mean age 51.47 years; standard deviation, 9.07 years) who had completed treatment for breast cancer were assigned to an intervention group ($n=26$) or a control group ($n=33$). The intervention group participated in a multidisciplinary programme including exercise and interactive sessions, two times per week. Assessments were conducted at baseline and after the rehabilitation programme (12 weeks). The endpoints were health-related QOL (MOS SF-36), aerobic capacity (maximal incremental exercise test

on a treadmill) and body composition (skinfold measurements). Generalized Linear Model (GLM) procedure was used to analyse the effects of the intervention within groups and between the experimental and control group. **Results:** Significant improvements ($p<0.01$) were recorded in the intervention group for maximal aerobic capacity (absolute and relative), time till exhaustion, velocity at the anaerobic threshold, heart rate at 3–4–5–6 km/h, Borg scale score at 3–4–5–6 km/h and the physical dimension of health related QOL. Significant differences ($p<0.05$) that favored the intervention group relative to the control group were maximal aerobic capacity (absolute and relative), time till exhaustion, heart rate at 4–5 km/h and Borg scale score at 4–5–6 km/h. The intervention did not improve body composition ($p>0.05$) as measured by changes in body weight, body mass index and skinfold measurements. **Conclusion:** A multidimensional rehabilitation programme has beneficial effects on health-related QOL and aerobic exercise capacity of breast cancer survivors.

O243

IMPROVING QUALITY OF LIFE AND RE-EMPLOYMENT FOR BREAST CANCER SURVIVORS BY OFFERING ASSISTANCE IN REHABILITATION

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Introduction: There is not enough systematic and scientifically founded knowledge concerning the way the perception of quality of life and role of work evaluates with people after cancer in Belgium. **Aim:** The aim of this 3 year study is to set up, perform and evaluate an occupational therapy (OT) support that focuses on the professional and social rehabilitation of cancer survivors. In relation to the set up and performing of this OT support, the accent will be on re-employment and resuming significant (and manageable) forms of spending time for cancer survivors. In the process of evaluating, the accent will be on the influence of this OT on the quality of life (QOL). Secondary, prognostic factors are studied that may have an influence on the improvement of the QOL through the OT. **Methods:** In the first year of the project there was a desk-research and case-study. The goal of the first year was gather as much information as possible about breast cancer, re-employment and QOL. In the second year there was the testing of the OT instruments, selected based on the result of the desk-research. The third year consists of a qualitative survey. The goal is to explore the possibilities for a successful re-employment by using the OT instruments. The success will be measured by a possible evolution of perceived quality of life. **Results:** From preliminary results of 12 participants (qualitative survey) it can be concluded that the information found in the desk-research corresponds to the findings and experiences of the participants in the case-study. After the first year, the approach of Burt (2001) was selected for further use. This approach uses a 3-step method to make re-employment more feasible. **Conclusion:** The project is still running. Therefore it is only possible to make preliminary conclusions. One of these conclusions is that the QOL of cancer survivors will increase due to the OT, that focuses on the professional and social rehabilitation.

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O244

THE EFFECT OF A MULTIDISCIPLINARY REHABILITATION PROGRAM ON THE PHYSICAL AND PSYCHOSOCIAL CONDITION OF ONCOLOGICAL PATIENTS

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Introduction: After primary treatment, cancer patients experience symptoms which impair physical, psychological and social functioning. A frequent complaint is fatigue, which has a negative influence on daily activities and quality of life. In 2003, a study of a multidisciplinary rehabilitation program for patients with an oncological pathology in the Virga Jesse Hospital in Hasselt, Belgium, was started. **Aim:** The object of this preliminary investigation was to study the influence of a multidisciplinary rehabilitation program on the physical and the psychosocial condition of patients with an oncological pathology. **Patients and Methods:** 129 oncological patients were included in the study and evaluated before and after a 13 weeks rehabilitation program and one year later. The rehabilitation program incorporated a physical and psychosocial module of training. To evaluate the psychosocial condition of the patients standard questionnaires were used: Tampa scale for kinesiophobia, Fact-Fatigue scale for fatigue and EORTC QLQ-C30 for quality of life. The physical condition was measured with functional strength tests, a sit-and-reach test and a cycling test. **Results:** Compared to baseline, the score of the Fact-Fatigue scale ($p < 0.001$ after 13 weeks and after one year) and the majority of items of the EORTC QLQ-C30 ($p < 0.001$ after 13 weeks and after one year) increased significantly. The scores of the Tampa scale for kinesiophobia were comparable before and after the rehabilitation program. The results of the sit-and-reach test ($p < 0.001$) and most of the muscle strength tests ($p < 0.001$) were significantly better at the end of the rehabilitation program. The cycling test showed an increase of the mean maximum resistance and of the effort duration ($p < 0.001$). Also the maximal oxygen uptake and the anaerobic ventilatory threshold during the cycling test increased significantly ($p < 0.01$). **Conclusion:** A multidisciplinary rehabilitation program seems to improve the physical and psychosocial condition of oncological patients and appears to have a positive influence on fatigue and quality of life after the primary therapy. Further investigation regarding content, duration and indication of oncological rehabilitation programs seems warranted.

O245

VALIDATION OF THE SPANISH VERSION OF THE FACTB+4, A SPECIFIC QUESTIONNAIRE FOR RELATED BREAST CANCER UPPER LIMB LYMPHEDEMA

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The Functional Assessment of Cancer Therapy Questionnaire for Breast cancer (FACT-B) measures the impact on quality of life. It is composed by 5 subscales (Social, Physical, Emotional, Functional, and Breast) and a General score. To determine the arm morbidity impact in those patients, 4 items which were validated in United Kingdom (FACT-B+4) were added. **Objective:** To validate the FACT-B+4 Spanish version to measure the impact of upper limb lymphedema in breast cancer patients. **Patients and Methods:** Comprehensibility of the Spanish version was assessed by cognitive debriefing interviews to 10 patients. Afterwards, it was self-administered, together with the SF-36 Health Survey, on two different samples: A) 30 patients with upper limb lymphedema after breast cancer surgery; and B) 30 patients with incident breast neoplasm. Reliability was evaluated at two levels: internal consistency with Cronbach's alpha, and

reproducibility with the Intraclass Correlation Coefficient (ICC) in test-retest to sample A after 7 days. Mann-Whitney U test was used to assess discriminant validity of the arm subscale among known groups (patients with and without lymphedema). Spearman's rank correlations with SF-36 scores were used to assess convergent validity. **Results:** Cognitive debriefing showed a good enough comprehension for the whole questionnaire content, so no change was needed. None of the dimensions showed relevant floor or ceiling effect. The scores of the FACT-B+4 achieved the internal consistency standard for group comparisons (0.7) except for Emotional and Breast Cancer (0.54 and 0.59, respectively). Functional, Arm and General scores achieved the standard proposed for individual comparisons: 0.9. Test-retest showed stability with an ICC equal or higher than 0.7 for all scores except for Social and Emotional (0.4 and 0.6 respectively). Moderate correlations were found between SF-36 and 3 subscales of the FACT-B+4 (Physical, Functional, and Arm), as well as with the General score. The arm score showed significant differences between patients with and without lymphedema ($p < 0.001$). **Conclusion:** The Spanish FACT-B+4 is reliable, valid, and equivalent to the original; with the exception of Emotional domain which showed reliability problems in our lymphedema sample. These findings support the FACT-B+4 use as a standard outcome of arm morbidity in breast cancer patients.

O246

ALTERED 3-DIMENSIONAL KINEMATICS OF THE SHOULDER FOLLOWING TREATMENT FOR BREAST CANCER

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Introduction: A recent report from our laboratory has shown decreased muscle activity and size in key muscles acting at the shoulder (1). Altered muscle function at the shoulder means the potential exists for microtrauma and long term pain (2). However, no study has measured the effect on three-dimensional scapulothoracic motion in relation to glenohumeral motion in women treated for breast cancer. **Aim:** The primary aim of this study was to determine the kinematics of the glenohumeral joint and the scapulothoracic plane in relation to patient reports of pain and disability. **Patients and Method:** 202 women treated for unilateral carcinoma of the breast filled out the Shoulder Pain and Disability Index (SPADI). 3D - kinematic data for the humerus and scapula was recorded using the FASTRAC Polhemus™ system during elevation of the arm (scaption) on the affected and unaffected side. **Results:** Significant differences ($p < 0.001$) in scapular kinematics were most notable during the critical phase of arm elevation and during eccentric arm movement. High levels of pain and disability were significantly associated with a loss of posterior tilt of the scapula on the affected side. **Conclusion:** This study has shown distinct loss of normal scapulothoracic rhythm in women treated for breast cancer.

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O247

WHOLE BODY VIBRATION IN BREAST CANCER SURVIVORS

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Physical deconditioning plays an important role in the etiology of cancer related fatigue (CRF). Whole body vibration (WBV) can be used to improve muscle strength and to break through the vicious circle of CRF. Twenty breast cancer survivors (Experimental Group-EG: 50.25±6.32 years) and twenty healthy women (Control Group-CG: 49.10±4.62 years) performed static squats on a vibrating platform (Fitvibe Medical) at 0–20–30–40–50 Hz. Subjective fatigue was measured by a combination of the Visual Analogue Scale (VAS) and the Borg scale. Muscle activity (Root Mean Square-RMS) of the m. rectus femoris (RF), m. vastus medialis (VM), m. biceps femoris (BF), m. tibialis anterior (TA) and m. gastrocnemius (G) was recorded through use of surface electromyography (EMG). Generalized Linear Model procedure was used to analyse the effects of the intervention within groups and between EG and CG. No significant differences ($p>0.05$) were found between EG and CG for subjective fatigue and muscle activity. Significant lower VAS-Borg scores ($p<0.05$) were found in both groups at 20 and 30 Hz than at 40 and 50 Hz. No significant differences ($p>0.05$) were found for subjective fatigue between 20 and 30 Hz. RMS (VM) was significant higher ($p<0.05$) at 20–30 Hz than at 40–50 Hz. No statistical differences were found between RMS (VM) at 20 Hz and RMS (VM) at 30 Hz ($p>0.05$). No significant differences ($p>0.05$) were found for RMS (RF, BF, TA and G) at 20–30–40–50 Hz. No adverse events were reported. WBV can be considered as a safe intervention in breast cancer survivors. The optimal training frequency seems to be between 20 and 30 Hz. Due to the specific nature of the exercise (static squat), VM and RF were most recruited.

O248

MULTIDISCIPLINARY PULMONARY REHABILITATION IN RADICALLY TREATED LUNG CANCER PATIENTS: A PILOT STUDY

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Introduction: The radical treatment for early stages (I-II) of lung cancer includes surgery or radiotherapy, both with/without chemotherapy. Lung cancer and its treatment are known to contribute to muscle weakness, atrophy and functional impairment. **Aim:** To assess the effects of multidisciplinary pulmonary rehabilitation in patients with lung cancer. **Methods:** Patients with lung cancer or mesothelioma, radically treated, either by surgical resection with or without perioperative chemotherapy and thoracic radiotherapy were included. Participants had to be younger than 75 years without severe cardiac, neurological and orthopedic co-morbidity interfering with exercise training. The following variables were measured at baseline and after 12 weeks of rehabilitation. The program consisted of 90 min sessions, 3 times a week. **Results:** The table shows the effects of rehabilitation of 10 patients (8 lung carcinoma and 2 mesothelioma), who were all treated with surgery (6 pneumectomy/4 lobectomy) and chemotherapy. 5 patients had adjuvant radiotherapy.

	At baseline (n=10)	After 12 weeks (n=10)	p
FEV1 (% pred.)	63±19	55±12	0.037
BMI	22±5	23±5	0.128
Workload (% pred.)	47±13	60±16	0.028
VO ₂ max. (% pred.)	58±6	69±14	0.006
6 MWD (m)	470±100	529±78	0.009
6 MWD (% pred.)	69±11	78±9	0.011
Quadriceps force (% pred.)	59±12	65±12	0.123
Handgrip force (% pred.)	62±32	69±32	0.049
Pimax (% pred.)	54±21	67±19	0.074
CRDQd (points)	19±5	26±5	0.012

FEV1: Forced expiratory volume in 1 sec; BMI: Body mass index; VO₂max: Maximal Oxygen consumption; 6MWD: 6 minute walking distance; Pimax: Maximal Inspiratory Pressure; CRDQd: Chronic Respiratory Disease Questionnaire dyspnea

Conclusion: Patients with lung cancer have a decreased exercise capacity, muscle force and an increased level of dyspnea after their radical treatment. A statistical significant improvement of exercise capacity and dyspnea is observed after 12 weeks of multidisciplinary rehabilitation.

O249

DIAGNOSIS AND TREATMENT OF MULTIPLE MYELOMA

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Introduction: Multiple Myeloma (MM) is a disease characterized for the high production of monoclonal immunoglobulin (M Protein) in blood and urine, furthermore plasmatic cells collected in the bone marrow. The bone is the source of the extramedullary form, this is called bone Plasmocitom; also exist another form originated in other tissues, as gastrointestinal and respiratory system, and this is called extramedullary Plasmocitom. **Objective:** To estimate the frequent clinical presentation of the patients diagnosed of Multiple Myeloma in our Hospital. **Patients and Methods:** We designed a descriptive transversal study. 23 patients diagnosed of MM during the first six months of 2006 were enrolled. Information extracted from the Hospital General Archive using a designed form. The statistic analysis used was SPSS. Variables: age, gender, clinical presentation, diagnosis, treatment and following period. **Results:** the average age was 68 years old; males (40.9%) females (59.09%); 4 registered deaths. The frequent clinical presentation: anemia (30%), bone pain (25%), vertebral fracture (12.5%), infections and renal failure (10%), hemorrhage and pathological fracture (5%), neurological affection (2.5%). Frequent clinical presentation during hospitalization: dyscrasia (anemia 25%, neutropenia 20%, thrombocytopenia 14%) and bone pain (14%). Each patient was under blood test, proteinogram and bone marrow aspiration. Skeletal survey was made in 80% of the cases. **Treatment:** Pharmacotherapy (44%), bone marrow transplant (22%), surgical treatment (11.1%) rehabilitation (11.1%) and palliative care (11.1%). Half of the patients were followed-up during a period of 2–5 years. **Conclusion:** Multiple Myeloma affects the locomotor system in the early and chronic stages of the illness. We recommend to all professionals of Physical Medicine and Rehabilitation to get involved with the treatment and following-up of Multiple Myeloma.

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O250

EFFECT OF HIGH DOSE BOTULINUM TOXIN INJECTION ON IMPAIRMENT, ACTIVITY AND PARTICIPATION AMONG STROKE PATIENTS PRESENTING WITH A STIFF-KNEE GAIT

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Introduction: Walking is an essential activity for daily life and social participation, and is frequently limited after stroke (WHO-ICF). A lack of knee flexion during the swing phase (stiff-knee) is one of the impairments restricting walking ability among hemiparetic spastic patients. **Aim:** To study the effect of botuli-

num toxin type A (BTX) injection in several spastic muscles on impairments, activity and participation of chronic stroke patients presenting with a stiff-knee gait. *Patients and Methods:* Twenty chronic hemiparetic post-stroke patients with stiff-knee gait and able to walk on a treadmill were recruited. BTX was injected into several spastic muscles: the Rectus Femoris (RF, 200U), Semitendinosus (ST, 100U) and Triceps Surae (TS, 200U). Patients' neurological impairments (Ashworth scale, Duncan-Ely test, SIAS and instrumented gait analysis), activity (ABILOCO and 10m walking test) and participation (SATISPART-Stroke and SF36) were assessed before and 2 months after injection. *Results:* The BTX injection reduced the impairments: improved SIAS (56.5 [48–63] to 56.5 [52.5–63], $p < 0.001$) and reduced RF muscle tone (2 [1–2.5] to 0 [0–1], $p < 0.001$) and ST muscle tone (1 [1–1.5] to 1 [0–1], $p < 0.001$). Gait analysis objectified an increased knee flexion during the swing phase (21.6±19.6 to 27.2±16.5°, $p = 0.03$), a decreased external mechanical work (0.66±0.38 to 0.59±0.25 J kg⁻¹ m⁻¹, $p = 0.04$) and a lower energy cost (5.8±1.9 to 4.9±1.9 J kg⁻¹ m⁻¹, $p = 0.03$). The patients' locomotion ability (ABILOCO) was improved (2.2±1.9 to 3.2±2.1 logits, $p = 0.03$). The participation remained unchanged. *Conclusion:* High doses BTX injection improves the stiff-knee gait and the locomotion ability in adult stroke patients.

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O251

ASSESSMENT OF KINETIC PARAMETERS IN PHYSICALLY COMPETENT WOMEN WITH JUMPING MECHANOGRAPHY

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Introduction: In the study of muscle performance, movement has to be described in terms of velocity and acceleration. Force causes acceleration and each movement is the action of force along a distance in a certain time, has therefore measured as power. *Aim:* The purpose of this study was to analyze parameters of locomotor system in Greek women. *Patients and Methods:* We measured the objective parameters of movement with the mechanography system in Leonardo platform (Novotec, Germany) in 90 healthy women, aged 20–79 years (years), separated according to age decade in 6 groups: group 1 ($n = 11$): 20–29 years, group 2 ($n = 7$): 30–39 years, group 3 ($n = 14$): 40–49 years, group 4 ($n = 21$): 50–59 years, group 5 ($n = 12$): 60–69 years, and group 6 ($n = 16$): 70–79 years. This system measures forces (N) applied to the plate over time, calculates through acceleration the vertical velocity (m/sec) of centre of gravity and using force and velocity it calculates power (Watt) of vertical movements. Women performed a counter-movement jump (brief squat before the jump) with freely moving arms. The value Helios Fitness Index (HEL.F.I.) was based on the work of Runge M. in the German population. A value of 100% corresponds to the average value of the Greek healthy women of our material of the same age according to power/body weight parameter. *Results:* Body weight and BMI were gradually increased. On the contrary height and all kinetic parameters (force, velocity, jump height, power and power/weight) were statistically decreased during ageing and HEL.F.I. % was significant decreased in each age decade. *Conclusion:* The results suggest that in women a decline in the kinetic parameters is expected. Possible reasons are changes in body composition, reduction of skeletal mass and tendons properties.

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O252

NEUROMUSCULAR ELECTRICAL STIMULATION REDUCES SKELETAL MUSCLE PROTEIN DEGRADATION AND STIMULATES INSULIN LIKE GROWTH FACTORS IN AN AGE AND CURRENT DEPENDENT MANNER

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Introduction: Protein catabolism associated with surgical interventions leads to reduced muscle strength, increased clinical complications and prolonged convalescence. Immobilisation is suggested as a major stimulus for muscle wasting. Moreover, it has been shown that protein degradation is highly increased whereas protein synthesis is reduced. *Aims:* This study investigates the potency of neuromuscular electrical stimulation (NMES) on skeletal muscle growth factors and degradation parameters in major abdominal surgery patients. *Patients and Methods:* This observer blind study included 26 patients after major abdominal surgery mainly due to cancer aged 60±10 years. Starting on the first postoperative day one randomly assigned thigh of each patient was treated on 4 consecutive days with NMES whereas the other leg was used as sham-stimulated control. Thereafter muscle biopsies from both legs were performed. Differences in mRNA level, protein expression and enzyme activity between legs were analysed by cross-over analysis of variance. *Results:* NMES significantly increased total RNA content and total sarcoplasmatic protein content. NMES significantly reduced ubiquitin-conjugated sarcoplasmatic proteins and proteasome activity. The mechano growth factor mRNA level correlated positively with the applied current and negatively with the BMI of the patients. The increase in insulin like growth factor-1Ea mRNA after NMES correlated negatively with the age of the patients. *Conclusion:* This study shows that NMES increases total RNA content and reduces parameters of protein degradation in postoperative patients. Moreover, the induction of growth factors by NMES reveals dependency on BMI, age and applied current. Therefore, we conclude that NMES is a useful clinical tool to treat acute protein catabolism in surgical patients.

O253

DIAGNOSIS AND TREATMENT OF BALANCE IMPAIRMENT IN NEUROPATHIC AND NON NEUROPATHIC DIABETIC PATIENTS

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Introduction: Diabetes is a worldwide diffused chronic disease. According to the WHO, there are about 170 million people suffering from it and by the year 2030, this number is expected to double. Its complications are all due to small and large vessels diseases, and peripheral neuropathy is surely the greatest cause of morbidity and mortality in diabetic patients. Peripheral neuropathy can cause dysesthesia, pain and gait imbalance, thus representing an important cause of disability in diabetic subjects. *Aim:* We conducted a prospective study investigating on the role that physical exercise plays on the risk of falls and balance in neuropathic and non neuropathic diabetic patients. *Patients and Methods:* We recruited 20 diabetic patients, 10 affected by peripheral neuropathy and 10 without neuropathy. All of them underwent balance evaluation with 3 tests (Unipedal Stance Time Test, Tinetti Balance Scale e Get Up and Go Test), before and after a specific balance training. *Results:* Patients with neuropathy presented a significant increase of the risk of fall compared to the other group. After the training period, all patients presented an improvement in balance based on the three tests. In particular, the Tinetti Balance Scale showed

a statistical significant improvement in the group of patients with neuropathy and the Unipedal Stance Time Test resulted to be useful to identify neuropathic patients. *Conclusions:* Balance disorders are typical in diabetic patients with neuropathy. Physical activity has beneficial effects on balance in both groups, thus reducing the risk of falls. Unipedal Stance Time Test and Tinetti Balance Scale are good predictors of neuropathy. Tinetti Balance Scale is the gold standard to assess improvements in balance after training.

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O254

EFFECT OF TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION ON SENSORY FUNCTION IN PATIENTS WITH PAINFUL DIABETIC POLYNEUROPATHY

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Introduction: Pain in diabetic neuropathy can develop as a symptom (1) and can be treated with various agents, including transcutaneous electrical nerve stimulation (TENS). Several theories are used to explain the inhibition of pain with TENS, the most commonly used is the gate control theory of pain (2). Quantitative sensory testing (QST) is an established method of studying the perception of activity within C, A δ and A β fibers, which can all be affected in painful diabetic neuropathy (PDN). *Aim:* To determine whether managing pain with TENS in PDN influences sensory function examined with QST. *Methods and Patients:* Thirty patients with PDN were treated with TENS three consecutive hours a day for three weeks. The effect of the treatment was evaluated by the visual analogue scale (VAS), a thermotest, vibratory testing and von Frey's hair. *Results:* In all the patients, thermal-specific and thermal pain sensitivity determination showed remarkable quantitative and qualitative abnormalities in all the measured places. The vibration and touch perception thresholds were abnormal in the majority of the patients. After the therapy with TENS, the percentage of patients with qualitative abnormalities decreased, together with reduced thresholds in dorsum of the foot, lateral leg and anterior thigh. The measurements of vibration and touch perception thresholds did not show changes. After the therapy on VAS, the patients experienced on average 48.5% (\pm 54.0) regression of pain. *Conclusions:* TENS with the activation of large sensory myelinated fibers subserving touch, pressure and vibration (A α and A β) influences small myelinated (A δ) and unmyelinated (C) fibers. This effect can be confirmed with a thermotest. The thermotest could be used for the assessment of the effectiveness of therapy with TENS.

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O255

THE EFFECTS OF VIRTUAL REALITY TREATMENT USING PLAYSTATION II EYETOY GAMES ON GAIT SYMMETRY AFTER STROKE

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Introduction: Virtual reality (VR) has the capability of creating an interactive, motivating environment where intensity of practice and feedback can be manipulated to create individualized treatment sessions. Sony 'Playstation II EyeToy' is a low-cost video-capture system, which provides the opportunity to interact with virtual objects that can be displayed on a standard TV monitor. In this study, we investigated the effects of congruent virtual reality as provided by PlayStation II EyeToy games on weight shifting to the paretic limb and gait symmetry. *Materials and Methods:* Twenty inpatients with hemiparesis (mean age 61.1 years) all within 12 months post-stroke (mean time since stroke 4.0 months) were assigned to the treatment groups. In addition to a conventional stroke rehabilitation (CSR) program, 5 days a week, 2–5 h/day, for 4 weeks, the VR group ($n=10$) received 30 min/day of weight bearing, reaching, kneeling and stepping treatment, using PlayStation II EyeToy 'Goal Attack', 'Kung-Fuu', 'MrChef', 'Dig' and 'Home-Run' games whereas the control group ($n=10$) watched the games for the same duration but did not involve into the games physically. Quantitative gait analysis was performed at 0 month (pre-treatment), and 4 weeks after the treatment. Main outcome parameters were spatio-temporal asymmetry ratios (single-support time and step length) and first peak of vertical ground reaction force (GRF). *Results:* Both groups were similar in terms of baseline clinical characteristics. The difference between before-after change scores of the groups was significant for GRF ($p<0.039$) in favour of VR group. No significant differences were found between the groups for the spatio-temporal asymmetry ratios ($p=0.346$). *Conclusion:* Virtual reality treatment using PlayStation EyeToy games in addition to a CSR is more beneficial in terms of weight bearing on the paretic side than a similar treatment without VR therapy after stroke.

O256

MYOPATHY IN CRPS-I: DISUSE OR NERVE LESION?

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Background: The diagnosis Complex Regional Pain Syndrome type I (CRPS-I) is based on clinical symptoms, including motor symptoms. Histological changes in muscle tissue may be present in the chronic phase of CRPS-I. *Aim:* The aim of this study was to analyze skeletal muscle tissue from amputated limbs of patients with CRPS-I, in order to gain more insight in factors that may play a role in changes in muscles in CRPS-I. These changes may be helpful in clarifying pathophysiology of CRPS-I. *Methods:* 14 patients with therapy resistant and longstanding CRPS-I, underwent an amputation of the affected limb. Histological analysis of muscle tissue from the amputated limb was performed. *Results:* In all patients extensive changes in muscle tissue were present, such as fatty degeneration, fiber atrophy and nuclear clumping, which did not seem to be related to duration of CRPS-I prior to amputation. In 2 patients large group atrophy was present, suggesting nerve damage. Comparison between subgroups in arms and legs showed no difference in severity of changes in muscle tissue. Intrinsic and extrinsic muscles were affected equally. *Conclusion:* Our findings show that in the chronic phase of CRPS-I extensive changes can be seen in muscle tissue, not related to duration of CRPS-I symptoms. Signs of denervation were present in 2 patients.

O257

EVALUATION OF THE ADDENBROOKE'S COGNITIVE EXAMINATION VALIDITY IN A BRAIN INJURY REHABILITATION SETTING

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Background: Several reports have warned of the Mini Mental State Examination's (MMSE) inability to detect gross high executive

function, memory and non-dominant hemisphere impairments, therefore, the routine use of MMSE in brain injury patients is unjustified. Addenbrooke's Cognitive Examination-Revised (ACE-R) has gained enormous popularity in dementia screening as it addresses the main shortcomings of MMSE and possesses its main advantages being quick and need minimal training to use. ACE-R use in a brain injury setting has never been reported. *Aim:* Our study aimed at evaluating the use of ACE-R and to establish its sensitivity compared to MMSE in a cohort of brain injury patients. *Method:* ACE-R was administered to a cohort of chronic brain injury patients. All patients had a cognitive impairment which was severe enough to prevent them working or studying. Patients with significant sensory, communication or physical impairments were excluded. *Results:* Thirty-six patients were recruited, 31 males with a mean age of 37 years. For an upper cut off value of 27/30 for MMSE and 88/100 for ACE-R, their sensitivities were 36% and 72%, respectively. For a lower cut off value of 24/30 and 82/100 the tests sensitivities were 11% and 56%, respectively. Analysis of the ACE-R subtests indicated that memory and verbal fluency subtests showed the most dramatic impairment in our population. ACE-R was completed in 12–15 min in most cases. *Conclusion:* MMSE is insensitive as a screening test in brain injury patients. Our results showed ACE-R to be a sensitive, easily administered test.

O258

THE EFFECTS OF CORTICAL VISUAL FIELD DEFECTS ON DYNAMIC VISUAL SEARCH: INSIGHTS FOR REHABILITATION

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Introduction: Cortical Visual Field Deficits (CVFDs) are a frequent and common disorder occurring after brain injury. This incapacitating disorder causes impairments in particular in reading and visual search and exploration with disabling repercussions in patients' everyday lives. But despite this functional impact, there is no consensual rehabilitation approach. Two main methods (one restorative and one compensatory) have been explored over the past decades, with the aim of improving function. The most effective methods seem to be based on an active learning for making exploratory saccades into the blind hemifield in order to bring targets into the seeing hemifield. The results usually show improvements in visual scanning patterns but with marginal benefit in term of functional outcome. *Aim:* Here we test a dynamic visual training approach to improve functional abilities in patients with CVFDs. The principle of the protocol was to train patients to make targeted eye movements into the blind part of the visual field, to help compensate for the visual field loss during everyday activities. *Patients and Methods:* Four healthy subjects and 4 patients with CVFDs have been tested. Scanning abilities was assessed with 3 new tasks (a visual search task, a rapid scanning task and a reading task). 3 evaluation sessions were performed: 2 before and one after the training task. The training consisted of a novel ramp-step search paradigm that required subjects to pursue a stimulus (ramp phase) and then saccade to find its location when it suddenly jumped (step phase), either into an uncluttered or cluttered sector of space. Response times and errors were reported to the patient to provide online feedback of performance. The training task included several sessions, with an increasing difficulty gradient. *Results and Conclusion:* Preliminary results reveal different patterns of visual scanning and searching in patients compared to normal subjects. The results regarding effects of the training task will be discussed in relationship to the ability of different brain-damaged patients to learn new strategies for dynamic visual search.

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O259

PELVIC MORPHOLOGY AND PERINEAL DESCENT

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Introduction and Aim: The aims were to assess the relations between the pelvic floor disorders and the pelvic morphology, yielded by the pelvic incidence angle that could be a predictive factor of a perineal descent and/or anal incontinence: these hypothesis are not documented. *Patients and Methods:* In a defecography retrospective study of 197 women, the perineal descent at rest and during straining were measured. Incidence ($53^{\circ} \pm 9^{\circ}$, reliable morphological parameter, independent of the subject position, constant for an adult, not related to age, no sexual difference) is measured between the line perpendicular to the sacral plate at its midpoint and the line connecting this point to the middle of the femoral heads axis. One way-Anova and a Pearson matrix correlation were used. *Results:* The incidence was significantly greater when the perineum was descent at rest (64° versus 59°). As predictive factor of perineal descent at rest, a great pelvic incidence ($>62^{\circ}$) had a sensitivity (73%), specificity (82%), positive predictive value (81%) and negative predictive value (75%). Twelve patients with simultaneously an anal incontinence (liquid and/or faeces) and a great pelvic incidence ($>62^{\circ}$) had a perineal descent at rest, and none was observed in the patients without this association; the difference was significant ($p=0.02$). *Conclusion:* With incidence $>62^{\circ}$, a large overhang between the insertions increases the strains on the perineum which is rather horizontal. A great incidence could be considered as a predictive factor of perineal descent at rest before the apparition of the others admitted acquired with the age as parity, delivery, menopause, age, perineal surgery, obesity, diabetes, straining at stool, pudendal neuropathy.

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O260

ELECTRONIC URINE FLOW REGULATOR IN POST-TRAUMATIC SPHINCTER-DETRUSOR REFLEX ATROPHY OF THE URINARY BLADDER

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An attempt of a complex treatment of micturition dysfunction developed as a result of post-traumatic sphincter-detrusor reflex atrophy of the urinary bladder has been presented in the paper. Prototypical electronic device has been designed and built which controls the pressure value at which the bladder is emptied considering that the pressure on the walls of the bladder functions as a stimulus which enhances the micturition reflex. Volumetric parameters of the urine actuate the generation of sound signals which inform the patient of the degree to which the bladder has been filled and generate a magnetic impulse which allows for additional collateral conditioning of the sphincter detrusor reflex. *Aim:* The aim of the project was

to test the URBI device enabling: 1) intelligent control of opening and closure of urine outflow from catheter; 2) central conditioning of bladder reflex control through generation of sound signals and magnetic stimuli; 3) accumulation of urine in the urinary bladder to a determined level to prevent reflux; 4) electronic rehabilitation training program. *Subjects and Methods:* The tests were performed on 19 patients with a history of ThL spinal injury with symptoms of autonomous urinary bladder and no fracture to the vertebral body. Group A and B were subjected to: 1) selective exercises of the deep perineal pouch and pelvic muscles; 2) magnetotherapy, 3) group B – closure of the catheter; 4) group A: pre-programmed device URBI-controlling reflux of urine. The output data was compared after 14 days and after removing the catheter. *Conclusions:* Group A shows better synchronisation in the rhythm of bladder filling and voiding during use of the catheter compared to group B. Better synchronisation of rhythm continues on after the removal of the catheter.

O261

THE ASSOCIATION BETWEEN SUBJECTIVELY AND OBJECTIVELY ASSESSED LEVELS OF SPASTICITY DURING DAILY ACTIVITIES IN COMPLETE SCI

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Background: Spasticity is a sensorimotor disorder associated with involuntary activation of skeletal muscles after upper motor neuron lesions (1). In clinical practice the opinion of the patient is often used to direct and evaluate its treatment. Being momentary, these observations are at risk of not well reflecting spasticity during daily life (2). Furthermore, it is not known whether the opinion of the patient corresponds well to spasticity observed in terms of involuntary muscle activity. *Aim:* To explore the association between subjectively perceived and objectively measured levels of spasticity during daily life activities. *Patients and Method:* Motor complete SCI patients were recruited; in these patients muscle activity is involuntary *per se*. Long-term sEMG recordings of 4 upper leg muscles (*Rectus Femoris, Vastus Lateralis, Semitendinosus, Adductor group*) were performed continuously. Synchronously, patients scored their perceived level of spasticity on a Visual Analogue Scale (VAS) for each activity performed. Amplitude, duration, and number of sEMG bursts were calculated per muscle for each activity. Linear Mixed Modelling was performed following Principal Component Analysis (PCA) for sEMG parameters, to study the association between sEMG and VAS. *Results:* 173 h sEMG recordings ($n=14$) were obtained during which 263 activities were performed. VAS appeared significantly associated with number and duration of sEMG bursts in the four muscles, but not with amplitude. Percentage explained variance was low, i.e. 27%. *Conclusions:* Subjective and objective levels of spasticity observed during daily life in complete SCI are only marginally associated. Considering that sEMG recordings are closer to the definition of spasticity than subjective approaches, one could question the validity of subjective patient ratings for the assessment of spasticity. The evaluation of spasticity management on muscle activity may therefore benefit from complementary objective assessments using long-term sEMG recordings.

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O262

PATIENT-RATED SPASTICITY: ASSOCIATIONS WITH PAIN, COPING, AND COGNITIONS IN CHRONIC SPINAL CORD INJURED PATIENTS

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Introduction: Spasticity is a disabling, high incidence phenomenon after Spinal Cord Injury (SCI). Recent studies have shown that spasticity rated by patients is not strongly associated with spasticity assessed by clinicians and objective observations (1). One explanation is that patient-ratings are influenced by pain and psychosocial concepts, like coping and cognitions (1). However, evidence on this relation is lacking. *Aim:* To explore the relation between patient-rated spasticity and pain, coping, and cognitions. *Patients and Methods:* Chronic complete SCI patients rated their spasticity and average pain intensity level using 100 mm Visual Analogue Scales (VAS_{spasticity}; VAS_{pain}). Coping strategies with regard to problems or events that require adaptation (e.g. spasticity) were measured with the seven subscales of the Utrecht Coping List (UCL) (2). Cognitions with regard to spasticity were measured with the three subscales of the Illness Cognition Questionnaire (ICQ) (3). Spearman correlations were calculated between VAS_{spasticity} and VAS_{pain} and subscales of the UCL and ICQ. *Results:* Results include the data of the first 14 patients. Median VAS_{spasticity} was 35 (min 20, max 80), with a median VAS_{pain} of 41 (3–65). Median UCL subscores were average compared to a healthy norm group for all subscales, except for ‘active approach’ at which the SCI population scored high. Median ICQ scores were 8 (6–15) for ‘helplessness’, 21 (8–24) for ‘acceptation’, and 9 (6–19) for ‘disease benefits’ (maximum score 24, norm score not available). VAS_{spasticity} was significantly associated with ‘active approach’ ($r=-0.68, p=0.01$) and ‘helplessness’ ($r=0.56, p=0.05$) only. *Conclusions:* Patients with higher levels of spasticity showed lower levels of actively approaching problems behaviour, and higher levels of helplessness. Further research should aim at unravelling causality as this may have implications for successful management of spasticity.

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O263

SPASTICITY IN THE LOWER LIMBS AS PERCEIVED BY PATIENTS WITH COMPLETE SPINAL CORD INJURY DURING DAILY ACTIVITIES

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Introduction: Patients with spinal cord injury have a high probability to develop spasticity (1, 2). In decision making for optimal treatment, both the clinical assessment and the patients’ perception play important roles. However, correlations between different self-report scales and clinical examination scores have been found to be low (3). *Aim:* To describe how spasticity in the lower limbs is perceived by patients with a complete spinal cord injury during daily activities. *Patients and Methods:* Twenty-six patients with complete spinal cord injury and spasticity in the lower limbs were recruited for this explorative cross sectional study. They filled out a questionnaire, developed for this study, about the perceived spasticity. Patients were asked to list up to 5 activities during which they perceived the highest degree of spasticity. The degree of perceived spasticity during each activity was measured with 10 cm Visual Analogue Scale (VAS). Borg scale (0–10) was used for assessing the amount of discomfort, due to spasticity, experienced during the activity. Patients also answered questions about the type of spasticity they perceived. *Results:* The registered activities were divided into 5 groups: ‘changing position’ was the largest group (22.0%) with a median VAS of 6.8 (range 2.5–9.5) and median Borg scale of 3 (range 1–7). Other groups of activities were ‘making a transfer’ (20.7%), ‘activities of daily living’ (17.1%), ‘being active’ (17.1%) and ‘being in same position for a long time’ (12.2%). Spasticity manifested as extension spasms (84.6%), flexion spasms and/or clonus (both 69.2%), and less often as continuous strain (57.7%).

Correlation between the VAS and Borg scale of the activities with the highest degree of perceived spasticity was moderate (Spearman's $\rho=0.534$, $p=0.005$). *Conclusion:* Patients with complete spinal cord injury experienced several manifestations of spasticity, extensor spasms being the most common. Many daily life activities elicited different manifestations of spasticity. Perceived degree of spasticity during an activity was only moderately related to the experienced discomfort during the activity. Possibly the discomfort is caused by more factors in addition to the perceived spasticity.

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O264

STABILOMETRY MAY CONTRIBUTE TO PREDICT GAIT PERFORMANCE IN CHRONIC HEMIPARETIC STROKE PATIENTS

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Aim: In hemiparetic patients (H), the centre of pressure (CoP) is shifted toward the unaffected limb during quiet stance (1) and this asymmetry persists during gait (2). We have hypothesised that abnormalities of gait are correlated with degree of stance asymmetry and stability during quiet stance. *Patients and Methods:* In 15 patients with H and 17 normal subjects (N), position of CoP and its sway have been recorded during quiet stance with eyes open and closed (EC) on a force platform. Spatial-temporal variables of gait have been measured with baropodometry. *Results:* Medio-lateral (M-L) position of CoP in H was shifted toward the unaffected limb. Body sway was larger in H than N, the more so with EC, irrespectively of the side of lesion. No relationship was found between body sway and M-L CoP position across N or H. Regardless of the side of lesion, cadence and velocity were decreased, while duration of single support on the unaffected limb and duration of double support were increased. Degree of impairment of gait was correlated with M-L CoP position but not with body sway during quiet stance. Weakness of the affected lower limb was correlated with M-L CoP position and reduction of gait velocity. *Conclusion:* Both reduction of muscle force and M-L CoP position affect gait. Conversely, the absence of relationship between body sway and gait performance suggests that postural instability in H is not a limiting factor in gait ability. Stabilometry can help in measuring not only postural asymmetry and instability but also in predicting some variables of gait not otherwise measurable without dedicated devices. These data strongly support the administration of exercises aimed to strengthen lower limb muscles and to increase postural symmetry in H.

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O265

ITALIAN MULTICENTER RETROSPECTIVE DATA COLLECTION ABOUT PATIENTS AFFECTED BY ACQUIRED BRAIN INJURY AND TREATED WITH ITB

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Background: Spasticity is one of the most disabling outcome of acquired severe brain injury. Mobility, use of residual motor function, transfers, sleep, and the overall rehabilitation and functional outcome of these patients could be strong reduction by this condition. Spasticity refractory to oral treatment could be affective managed by ITB therapy. The aim of this retrospective data collection is to describe our Italian experience in the treatment of patients affected by acquired brain injury and treated with ITB therapy. *Patients and Methods:* Study population included 131 patients who underwent implant of SynchroMed pump in 21 Italian centers. 101 males (77%) and 30 females (23%) with a mean age at implant of 36 years underwent implant after a mean period of 2 years from the event. Brain injury aetiology is as following: 63% trauma, 28% cerebral anoxia, 4% infection, 3% neoplasia, 2% other reasons. Patients were assessed by Ashworth and spasm scale. At baseline objectives awaited were recorded and evaluated at a mean follow up of 2.5 years up through a three levels scale: 'not reached, partially reached, totally reached'. A satisfaction questionnaire was administered both to care-givers and to collaborative patients. *Results:* The difference between the follow-up and pre implant scores highlighted a significant improvement in both Ashworth upper and (3.8 vs 3.1, $p<0.05$), lower limbs scale (4.2 vs 2.9, $p<0.05$), and in spasm scale (1.5 vs 0.4, $p<0.05$). Through ITB prevention of deformities/contracture was partially/totally obtained in 71% of patients, an improvement of care management in 82%, an improvement in participation to rehabilitation programs in 66%, an improvement in activities of daily living (ADLs) in 70%, a decrease of pain in 67%, an improvement in mobility in 67%, and a decrease of neurovegetative crisis in 50%. 77% of caregivers expressed satisfaction with the procedure, and they would choose it again for the patients. *Conclusion:* These data confirm an improvement in spasticity and spasm. Moreover after implant all objectives expected were satisfactory reached for most of studied population. Retrospective collection data are not sufficient to investigate results of an early stage treatment with ITB and the impact on functional residual abilities. For these reasons a prospective study has already been designed and it is going to start.

O266

CLINICAL – FUNCTIONAL OUTCOME AND COMPLICATIONS OF INTRATHECAL BACLOFEN ADMINISTRATION FOR SEVERE SPASTICITY

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Introduction: Intrathecal baclofen (ITB) is at present the most effective treatment for spasticity of both spinal and cerebral origin. *Aim:* To evaluate the functional benefit and the complications related to the implantation in patients with severe spasticity who received ITB. *Patients and Methods:* Between 2002 and 2007, 84 patients with a long history of severe and disabling pharmacologically intractable spasticity, underwent implantation of a pump for intrathecal infusion. Patients were subdivided into different categories according to the etiology of spasticity. Twenty-two had multiple sclerosis, 16 cerebral palsy, 19 traumatic brain injury, 9 spinal cord injury and 18 patients with different etiologies (stroke, cervical myelopathy, etc.). Clinical status was assessed with the Ashworth and Penn spasm scales. Functional benefits were evaluated with the Barthel index score and pain relief with visual analog score. *Results:* Postoperatively all patients presented improvement in spasticity, reduction of spasm frequency, significant improvement in functional status, enhancement of life comfort and reduction of pain. Pump placement complication included seroma in 6 ($n=7.9\%$) patients, catheter kink or migration in 4 ($n=5.3\%$) and in 5 ($n=6.7\%$) patients infection that was treated conservative in all the cases. *Conclusion:* ITB is an effective treatment for severe spasticity with dramatic quality-of-life improvements and has a small number of significant complications.

O267

SPASTICITY: A BIG MISMATCH FOR A GLOBAL MOTONEURON DRIVING IMPAIRMENT**Marque P.***University Hospital Rangueil, Dept. of PRM, Toulouse, France*

Spasticity is as common after brain or spine lesions that the term may conjure up in every clinician's mind several quite different clinical images. However a fairly strict and narrow definition of spasticity has been given some years ago by Lance: 'spasticity is a motor disorder characterized by a velocity-dependent increase in tonic stretch reflexes...'. It is physiologically based definition built for studying maladaptive plasticity of myotatic reflexes but which does not really fit very well with clinical multiple symptoms of spasticity associating spastic dystonia, antagonist co-contractions, syncinesia and associated reactions, contractures, soft tissue changes or muscular shortening. Moreover it physiopathology still remains unclear. During the last two decade, each pathway involved in the control of myotatic reflexes has been systematically studied with the objective to find the "candidate" for explaining exaggerated reflexes: so gamma hyperactivity, reduction of presynaptic inhibition or of Ib inhibition have been successively promoted. In fact most of its pathways are modified in spastic patients at different level in function of the etiology. So these changes are more a consequence than an explanation of spastic impairment. Then more recently spastic disorders were associated with a global motoneuron driving impairment including supraspinal and spinal plasticity, paresis, disuse and soft tissue rearrangements. In this way, change in intrinsic contractile properties of motoneurons (V Dietz) or "plateau potentials" (H Hultborn) have been proposed to explain spastic impairment. The author will illustrate these changes in the concept of spasticity.

O268

QUANTITATIVE ASSESSMENT OF ANESTHETIC NERVE BLOCK AND SELECTIVE NEUROTOMY IN SPASTIC EQUINUS FOOT: ABOUT TWO CASES**Bleyenheuft C., Detrembleur C., Deltombe T., Lejeune T.***Cliniques Universitaires Saint-Luc, Dept. of Physical and Rehabilitation Medicine, Bruxelles, Belgium*

Introduction: Diagnostic soleus Motor Nerve Branch Block (MNBB) with anesthetics is a method frequently used in stroke patients to assess the role of soleus muscle in spastic equinus foot (1). In case of positive response to the block, a selective neurotomy of the soleus nerve can be performed. Neurotomy is supposed to have the same impact on spasticity as MNBB. **Aim:** To evaluate quantitatively the effect of MNBB and selective neurotomy of the soleus nerve on ankle plantar flexor muscles spasticity, reporting the case of two patients. **Patients and Methods:** Beside clinical assessment, we carried out quantitative measurement of ankle flexor muscles stiffness following Lehmann's method (2, 3). The path length (L_{path}) of the phase diagram between the elastic and the viscous stiffness quantifies the reflex response to movement and reflects the importance of the spasticity. Those assessments were carried out before and 30 min after MNBB of the upper soleus nerve (4) (lidocaine 2%), and more than 6 months after neurotomy. **Results:** MNBB and neurotomy allowed a near-normalization of elastic and viscous stiffness of ankle plantar flexor muscles in our two patients. The L_{path} were more than 6 times greater than normal at baseline (#1: 354 N m rad⁻¹; #2: 409 N m rad⁻¹). The L_{path} were almost similarly improved by MNBB (#1: 127 N m rad⁻¹; #2: 231 N m rad⁻¹) and neurotomy (#1: 60 N m rad⁻¹; #2: 162 N m rad⁻¹). **Conclusion:** This case-report highlights the fundamental role of the soleus muscle in triceps surae spasticity in our two patients; the predictivity of MNBB in the preoperative assessment; and the effectiveness of soleus neurotomy in spastic equinus foot.

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O269

SELECTIVE TIBIAL NEUROTOMY IN THE TREATMENT OF THE SPASTIC EQUINOVARUS FOOT AFTER STROKE: A 2 YEARS LONGITUDINAL FOLLOW-UP OF 30 CASES**Deltombe T.¹, Jamart J.², Gustin T.³***Spasticity group, Depts. of ¹PMR, ²Biostatistics and ³Neurosurgery, Université Catholique de Louvain, Cliniques Universitaires de Mont-Godinne, Yvoir, Belgium*

Introduction: Spastic equinovarus foot (SEF) is the most frequent disabling deformity after stroke. SEF is mainly caused by the triceps surae and tibialis posterior muscles spasticity sometimes complicated by a musculo-tendinous shortening. Selective tibial neurotomy (STN) is a neurosurgical procedure consisting in a partial section of the motor nerve branches innervating spastic muscles which provides a permanent and selective treatment of the spasticity. In the pre-operative assessment, a diagnostic nerve block (DNB) with anesthetics is performed to predict the expected functional improvement. **Aim:** To assess and compare the decrease in spasticity and the improvement in gait after DNB, at 2 months, at 1 year and at 2 years after selective tibial neurotomy. **Patients and Methods:** Thirty hemiplegic patients (mean age 44±14 years) with SEF were treated with a neurotomy of the tibial motor nerve branches (soleus, gastrocnemius and/or tibialis posterior) after DNB. The spasticity (Ashworth scale), muscle strength (MRC scale), ankle passive dorsiflexion, gait parameters (6 min walking test) and gait kinematics (video assessment) were measured. **Results:** As compared to baseline values, we noted a statistically significant improvement in triceps spasticity, in ankle passive dorsiflexion, in gait speed, in equinus and varus in swing and stance phase and in knee recurvatum after DNB and at 2 months, at 1 year and at 2 years after STN. All parameters were similarly improved after DNB and after STN. Improvement observed after STN still persists 2 years after surgery. **Conclusion:** This study confirms the long lasting effect of the tibial neurotomy in the treatment of SEF after stroke. The DNB predicts the functional improvement obtained after neurotomy.

O270

LATERAL APPROACH FOR INFILTRATION OF THE SUBSCAPULARIS MUSCLE: ITS EFFICACY AND SAFETY**Maia M., Teles J., Pires F., Festas M.J., Parada F.***Physical and Rehabilitation Medicine, Hospital S. João, Porto, Portugal*

Introduction: Subscapularis is one of the strongest shoulder internal rotators. Various infiltration methods have been discussed to control spasticity of the subscapularis muscle. Chiodo A. et al have concluded in its cadaveric study that a posterior fold axillary approach was the most effective infiltration method. However many authors concur that this technique may have a significant risk to damage neurovascular structures, and that other described techniques are difficult to execute. As such there is only one study of spasticity control with botulinum toxin A in the subscapularis muscle, in which a medial approach was used. **Aim:** Describe a lateral technique for the subscapularis infiltration, its efficacy and safety. **Methods:** The needle insertion method was evaluated by cadaver injection and made by a physician with experience in botulinum toxin administration. An anatomist served then as dissector to evaluate its effectiveness. Ten patients with shoulder pain and spasticity were then submitted to infiltration of the subscapularis muscle with botulinum toxin A using the same technique. **Results:** The cadaveric dissections demonstrated that the

infiltration was successful. The patients in which the application of botulinum toxin A was performed did not report any side effects nor demonstrated any type of vascular or neurological injury post injection. All had reduction in shoulder adduction and internal rotation spasticity and shoulder pain. *Conclusion:* This new lateral approach for the infiltration of the subscapularis muscle is both safe and effective, suggesting that it is a valuable technique for controlling shoulder spasticity.

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O271

COMPLICATIONS OF SEVERE TRAUMATIC BRAIN INJURY AND THEIR RELATIONSHIP WITH THE FUNCTIONAL OUTCOME IN PATIENTS WITH SEVERE TRAUMATIC BRAIN INJURY

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Introduction: The main aim in rehabilitation of severe TBI is prediction of the functional outcome. *Aim:* To record the post injury complications of patients with severe TBI and to correlate them with their functional outcome. *Patients and Methods:* 70 consecutive patients who suffered from severe TBI were followed up to 6 and 12 months. Patients' spasticity, heterotopic ossification, deep venous thrombosis, post traumatic epilepsy, post traumatic hyperthermia, respiratory dysfunction, bladder-bowel dysfunction, sleep disturbance, pressure ulcers, cognitive disorders, hydrocephalus, cerebral nerve injury were recorded post injury. Functional outcome was estimated with the Glasgow Outcome Scale (GOS) and the Functional Independence Measure (FIM). Correlation of each complication (forward conditional) to the functional outcome in 6 and 12 months was made and with the multiple logistic regression analysis all the complications were correlated with the functional outcome in 6 and 12 months (Fisher's exact test). *Results:* In all 70 patients, all complications but deep venous thrombosis and sleep disturbances seem to have significant correlation with the functional outcome either in 6 or 12 months post injury, ($p < 0.01-0.0005$). Heterotopic ossification seems not to have significant correlation with 12 month functional outcome. In multiple regression analysis among the 12 complications only respiratory and bladder-bowel dysfunction seem to have significant correlation with the functional outcome either in 6 or 12 month post injury. Specifically, those patients who do not suffer from respiratory or bladder-bowel dysfunction seems to have 12.6 and 14.6 times, respectively, greater possibility to become independent in 6 month outcome and 18.3 and 15.6 times, respectively, greater possibility to become independent in 12 month outcome. *Conclusion:* In patients with severe TBI, the majority of the post injury complications seems to have significant correlation with patients' functional outcome. Among them, respiratory and bladder-bowel dysfunction seem to be at a premium place.

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O272

PROGNOSTIC INDICATORS OF SEVERE TRAUMATIC BRAIN INJURY, THEIR ALTERATION IN TIME AND ITS RELATIONSHIP WITH THE FUNCTIONAL OUTCOME IN PATIENTS WITH SEVERE TRAUMATIC BRAIN INJURY

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Introduction: The main aim in rehabilitation of severe TBI is prediction of the functional outcome. *Aim:* To record the prognostic indicators, 2 and 4 weeks post injury, of patients with severe TBI and to correlate them with their functional outcome. *Patients and Methods:* 70 consecutive patients who suffered from severe TBI were followed up to 6 and 12 months. Patients' Glasgow Coma Scale (GCS), age, duration of coma, post traumatic amnesia, brainstem reflexes (pupil reflex, doll's eye reflex), CT findings and secondary injuries were recorded 2 and 4 weeks post injury. Functional outcome was estimated with the Glasgow Outcome Scale (GOS) and the Functional Independence Measure (FIM). Independent sample t-test was used for the correlation of the consecutive conditionals. Fisher's exact test was used for the correlation of the forward conditionals. The multiple logistic regression model was used to see which of the prognostic indicators, from those that seemed to have a significant correlation, affect the functional outcome in 6 and 12 months. *Results:* 2 weeks post injury, if a patient's GCS Motor response raised in 1 unit and he had not an intracerebral haemorrhage this patient seems to have 2.07 and 7.09 times, respectively, possibilities to become independent in the 6 month functional outcome. 2 weeks post injury, if a patient's GCS Motor response and his age raised in 1 unit this patient seems to have 1.78 and 0.94 times, respectively, possibilities to become independent in the 12 month functional outcome. 4 weeks post injury, if a patient's GCS Motor and Verbal response raised in 1 unit this patient seems to have 1.9 and 2.9 times, respectively, possibilities to become independent in the 6 month functional outcome. 4 weeks post injury, if a patient's GCS Motor response raised in 1 unit this patient seems to have 2.1 times possibility to become independent in the 12 month functional outcome. *Conclusion:* In patients with severe TBI, the study of the alteration of the prognostic indicators with time may reveal some useful indications about the functional outcome of these patients.

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O273

THE EFFECT OF AGE ON EXECUTIVE FUNCTIONING AFTER ACQUIRED BRAIN INJURY IN ADULTS

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Introduction: Executive functioning deficits have often been described in normal aging. They are also known to be a frequent

sequel of traumatic brain injury, where patients may exhibit severe long-standing impairments in instrumental activities of daily living. One could therefore expect that cerebral lesions affecting executive functioning would result in more severe impairments in older patients. We previously developed an ecological assessment of executive functions, consisting of a cooking task, requiring multi-tasking abilities and known to be sensitive to a dysexecutive syndrome (Chevignard et al. 2000). *Aim:* The aim of this study was to analyse the effect of age on the cognitive and ecological assessments of executive functions in a group of patients with acquired brain injury (ABI) resulting in a dysexecutive syndrome. We hypothesised that older patients would have poorer performances on the cognitive and ecological tests of executive functioning, when compared to younger patients. *Methods:* 45 patients with ABI resulting in frontal lesions and a dysexecutive syndrome participated in this study. Patients underwent a comprehensive battery of cognitive tests assessing executive functioning, as well as the cooking task. We also studied a group of 12 control subjects who performed the cooking task. *Results:* No effect of age was found on performance in the cooking task in the control group. Although the ABI group was relatively young (mean age: 40.3 years (SD=12.5), ranging from 17 to 63), results indicated a significant deleterious effect of age on the cognitive tests of executive functioning in the ABI group. We also highlighted a significant worsening of patients' performance in the cooking task with age, and this effect was found on several variables of task analysis: the number of errors, task duration and occurrence of dangerous behaviours. *Conclusion:* Our study demonstrates the deleterious effect of aging on cognitive and ecological assessment of executive functioning after ABI. The strength of this study is that it deviated from the traditional age considered in studies of elderly populations and focused on younger patients. It is therefore important to consider the implication that this may have on a patient's rehabilitation program and post-injury discharge.

O274

TBI REHABILITATION – COMPARISON OF TWO DIFFERENT ORGANIZING MODELS IN AN INTENSIVE REHABILITATION DEPARTMENT: WORSE, BETTER, IDENTICAL?

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Introduction: Traumatic brain injuries (TBI) represent a heavy burden in terms of human and economic costs, and they rehabilitation management is gaining more and more attention. The Italian Consensus Conference on rehabilitation interventions in patients with TBI gave recommendations to spread adequate rehabilitation practices. Our rehabilitation department tried to model its working routine upon those recommendations, in order to improve efficacy of daily work. *Aim:* To analyze efficacy of two different rehabilitation organizing models in terms of ICU and Rehabilitation LOS (Length of Stay), relating to patients outcome after TBI. *Patients and Methods:* Our rehabilitation ward has started accepting patients with severe brain injuries since august 1999. Since this date we started to collect data on severe traumatic brain injury patients both about patient's characteristics and efficacy indexes of our organizing model and rehabilitative pathways proposed. During this period our organizing model has changed, professionals have changed. Then, we compared the activity of the two different models (August 1999–October 2003: Group A, and June 2005–January 2008: Group B). Data collection occurred at rehabilitation admission, rehabilitation discharge and at one year follow-up. *Results:* We collected 65 patients in Group A and 37 in Group B. OAI (Onset Admission Interval) is shorter in Group B (20±9.3) than in Group A (22.1±13.5). Patients of both groups had superimposable GCS value at ICU admission, but there were significant differences in terms of nursing and rehabilitative burden between the two groups (Levels of Cognitive Functioning – LCF, Disability Rating Scale – DRS, Functional Independence

Measure – FIM, Glasgow Outcome Scale – GOS). Group B had higher burden and LOS was higher in Group B (45.2±31.5) than in Group A (40.2±39). Nursing and rehabilitative outcome at follow-up are superimposable. *Conclusion:* Our data show that these kinds of organizing models can both positively influence the cost-efficacy rate of rehabilitation process reducing care costs (ICU and rehabilitation LOS) without affecting outcome. But they also show that if an organizing model already tends to the shorter limits of OAI, it is difficult to reduce it further.

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O275

BODY WEIGHT SUPPORT TREADMILL TRAINING IN INDIVIDUALS POST-HEMISPHERECTOMY

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Introduction: Cortical hemispherectomy has become a therapeutic option for pediatric patients with therapy-resistant epilepsy resulting from a number of conditions including perinatal infarct, cortical dysplasia and Rasmussen encephalitis. Although effective for seizure control, this resection includes primary sensorimotor control leaving patients hemiparetic. Cognitively, the combined effects of intractable epilepsy, underlying pathology and surgery often result in cognitive deficits and lowered mental age in this population. *Aims:* To study feasibility of BWST training in individuals with hemiparesis and decreased mental age and determine if: 1) BWST training improves motor function and walking measures; 2) post-training changes are better in children with an early age at lesion/surgery. *Hypotheses:* Following BWST training, all post-hemispherectomy children will improve their gait, endurance and speed of overground walking, temporal and stride length as well as walking symmetry. *Patients and Methods:* In this pilot study we evaluated feasibility and efficacy of BWST training in 20 individuals (age 6–24 years, 10 females) who underwent cortical hemispherectomy (age at surgery 2–11 years). Only 2 patients were not ambulatory at the start of the therapy. Participants received three hours of training which included 40–50 minutes on a treadmill and 2 hours of overground training for a period of 10 days. Training took place in the Rehabilitation Laboratory at the University of South Carolina. The following tests were used pre- and post-therapy: 1) Functional Gait: DGI (Dynamic Gait Index) and 6-min walk; 2) Gait parameters as measured by Rite Gait; 3) Additional tests: ABC (Activities-specific Balance Confidence, the Fugl-Meyer scale, Berg balance, TMB (Timed Movement Battery), toe in/out degree and TUG (Timed Up & Go). *Results:* All participants have improved their performance on, at least, 3 or more outcome measures. On four measures (6 minute walk/distance, TMB self selected speed, the Fugl Meyer scale (the lower extremity part) and DGI) 60% or more of the group improved and the difference reached statistical significance. There was significant variation in gait-related outcome measures collected by the GaitRite with many participants improving on their step length symmetry, stride length and toe in/out rotation. *Conclusions:* Our study suggests feasibility of BWST training in individuals post cerebral hemispherectomy.

O276

THE EFFECTS OF PRAMIPEXOLO ON PATIENTS IN A VEGETATIVE STATE FOLLOWING SEVERE CEREBRAL LESIONS: A STUDY OF EEG SPECTRAL ANALYSIS

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Introduction: Some studies have indicated the existence of dopamine alterations in vegetative state (VS) following severe cerebral lesion. Amantadine has been tested in some studies with unclear results. Both L-Dopa and amantadine are used as stimulants whose effects have been evaluated by clinical scales but they seem to be little sensitive to detect changes. **Aim:** In our study we have examined pramipexolo's effects when administered to a group of patients in a VS. **Patients and Methods:** 10 patients in VS have been enrolled in the study. Study has been designed as series of individual case with A-B-A methodology. In A phase the patient was given no drug and a EEG was carried out. The drug was progressively used until a dosage of 0.18 for 3 time/day. After a week, phase B, an EEG has been recorded. The drug was progressively reduced and after 7 days with no drug (phase A again) a third EEG was recorded. The EEG's were recorded with EEG Galileo BE-Light and processed with "Galileo Spectral Cartooning and Advanced FFT" and analysed with "Galileo Statistical Package" (EBNuero) software packages. LCF scale was used as clinical evaluation. **Results:** Results show a reduction in delta power and a slight increase in the teta and beta power bands during the B phase compared to both phases A (before treatment and after drug suspension) in patients that improved in LCF also. **Conclusion:** The improving of EEG pattern can be assigned to pramipexolo. The drug can help arousal and awake of some patients in VS at least facilitating the recovery. EEG spectral analysis and A-B-A study design are very interesting for the evaluation of drugs effects in VS. The methodology is little time demanding, no expensive and it can be useful for deciding if drugs administration must be continued. No adverse effect has been recorded.

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O277

REHABILITATION OF PATIENTS WITH SPINAL AND MEDULLARY TRAUMATIC DISEASE

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Spinal and medullary lesions, despite preventive measures and their high incidence, still have a leading position among the severe disability conditions and rank the third on the scale of traumatic diseases being left behind only by the cylindrical and craniocerebral traumas. The contemporary approach of treatment for spinal and medullary traumatic disease (SMTD) includes a programme of surgical and orthopedic treatment and rehabilitation, all these aimed at excluding the causes of neurological disturbances and restoring hemo- and liquor circulations, as well as the stimulation of compensatory mechanisms. The Objective of this study was to evaluate the results of the complete treatment of patients with SMTD at different periods of spine trauma. **Patients and Methods:** We examined and treated 91 patients: 32 women, 59 men, aged 11–65 with SMTD at different periods (24 h to 3.5 years) of spine trauma. The patients we subjected to different surgical procedures: 1) posterior stabilization with Cotrel-Dubousset Instrumentation (CDI) and posterior spondylodesis – 32 (35.1%) patients; 2) spine decompression (laminectomy) and posterior stabilization with CDI – 21 (23.0%) patients; 3) spinal canal reconstruction through posterior and posterior-lateral approach – 12 (13.1%) patients. 13 (14.3%) patients have been approached anteriorly and anteriorlaterally. They have been performed

anterior decompression and interbody fusion. Anterior fusion and anterior-medullary decompression with posterior stabilization have been carried out in 13 (14.3%) patients. In the postoperative period all patients have been administered medication aiming restoration and improvement of body function: pain and inflammation therapy, regulation of muscle tone. Rehabilitation plan was individual and included physical activity, psychotherapy, behavioral therapy and cognitive behavioral therapy. Kinesiotherapy, exercise therapy, electrotherapy, ultrasound, limb massage have been introduced 3–4 days after surgery and recommended to recur in 2–3 months. **Results:** Most of the patients have been followed-up for a year and even more following the surgery. The analysis of orthopedic, surgical and recovery data proved positive in 86.6% of cases. Non-satisfactory results we reported in 13.4% of cases, the cause being a late surgical treatment following 10 month irreversible spinal and medullary changes. **Conclusions:** The positive outcome results in both complicated and non-complicated SMTD have always depended upon the timely surgical treatment and rehabilitation. Surgical treatment in combination with the adequate orthopedic rehabilitation regimen allows to achieve good physical professional and psychosocial results.

O278

PHYSICAL INDEPENDENCE DURING AND AFTER INPATIENT REHABILITATION FOR SPINAL CORD INJURY AND THE ASSOCIATION WITH PHYSICAL CAPACITY AND COMPLICATIONS

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Introduction: Regaining physical independence is an important aim of rehabilitation for patients with a spinal cord injury (SCI). Cross-sectional associations between physical independence, physical capacity and the occurrence of medical complications following SCI have been established, but insight into changes in physical independence over time, and longitudinal associations with physical capacity and complications may provide evidence towards causality. **Aim:** To determine changes in physical independence during and after inpatient rehabilitation for SCI. To investigate the association between physical independence on the one hand, and physical capacity and complications on the other. **Patients and Methods:** Prospective cohort study at eight Dutch rehabilitation centres, which included patients with SCI who were wheelchair-bound and at their first admission to rehabilitation. Physical independence, physical capacity and complications were determined at the start of rehabilitation ($n=176$), 3 months later ($n=124$), at discharge ($n=160$), and 1 year after discharge from inpatient rehabilitation ($n=133$). Physical independence was established by the Functional Independence Measure, which was computed as FIMmotor (maximum 91), and subsequently also dichotomized into the category 'independent' (FIMmotor ≥ 78) or 'dependent' (FIMmotor < 78) on the assistance of others. **Results:** Multilevel (logistic) random coefficient analyses revealed significant changes. The FIMmotor improved from 45 at the start to 71 at discharge, and the likelihood of being independent improved from 1% at the start to 33% at discharge from inpatient rehabilitation. During the year after discharge, the FIMmotor stabilized whereas the likelihood of being independent improved to 55%. Overall, physical independence was positively associated with physical capacity, the absence of complications and incompleteness of the lesion. Multiple regression analyses revealed prognostic models, which also showed that discharge independence, discharge physical capacity and completeness of the lesion together significantly predicted physical independence one year after discharge from inpatient rehabilitation ($R^2=0.79$). **Conclusion:** Overall, physical independence improves during inpatient rehabilitation, and the likelihood of being physically independent improves

even after discharge. The associations found could suggest that not only functional training, but also training physical capacity and the prevention and treatment of complications may improve physical independence after discharge from rehabilitation.

O279

NEUROPATHIC PAIN IN CHRONIC SCI PATIENTS

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Introduction: Pain is a common problem in the Spinal Cord Injury (SCI) patients and it can have such intensity that interferes with the activities, and reduces the QoL. Recent studies indicate that 75% of the SCI who are reintegrated into their social environment presents usual pain. **Aim:** The aim of this study is to understand the incidence of neuropathic pain (DN), in the chronic SCI patients, as there is little information in this regard. **Material and Methods:** A prospective, randomized study was performed with 120 patients with SCI in chronic phase to knowing the incidence of neuropathic pain (DN). The sample was 60 patients, 40 males (67%) and 20 women (33%), with an average age of 41.3 years (SD 16.6), range 16–82 years. The time of evolution of SCI was 97.9 months (range 15–360). The proportion of patients with ASIA A was 50%. The prevalence of DN was 58.3%. The most common form of presentation of DN was numbness to 55% and electric shocks for 40%. There are correlation between DN with age $p=0.005$, but not with sex or the time of evolution of SCI. **Conclusions:** More than 50% of patients with chronic LM presented DN. It is more frequent in the incomplete SCI and it is correlated with age, but not with sex or the time of evolution of the SCI.

O280

CAUSES OF DEATH AFTER TRAUMATIC SPINAL CORD INJURY IN THE WESTERN REGION OF NORWAY 1952–2001

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Introduction: Traumatic spinal cord injury (SCI) may cause life-shortening dysfunction in different organ systems. **Aim:** To study the causes of death in an unselected cohort of patients living in Western Norway who sustained a traumatic SCI in the period 1952–2001. **Patients and Methods:** All patients ($n=400$, 70 women and 330 men) diagnosed with a SCI in the period were included. The diagnoses were confirmed by reviewing the medical records. By 31st of January 2008, 167 patients were dead. Causes of death were collected from death certificates and classified according to the "European shortlist" of causes of death, and the frequencies of the different diagnoses between the 5 decades were compared. **Results:** Death certificates were available for 150 patients, 96 had a cervical injury and 54 had a thoracic or lumbar injury. The median age at time of injury was 59.6 years, 64.1 years for cervical injuries and 46.0 years for thoracic or lumbar injuries. The median time from injury to death was 7.3 years, 4.2 years for cervical injuries and 8.9 years for thoracic or lumbar injuries. A total of 423 diagnoses were given on the 150 death certificates (mean 2.8). Through the whole period the most frequent mentioned diagnoses were cardiovascular diseases (38.0%), followed by respiratory diseases (32.7%), urogenital diseases (10.0%), neoplasm (16.0%), diseases of the nervous system (12.7%), and suicide (8.7%). The frequency of urogenital diseases decreased from 25.0% in the first decade to 6.1% in the last decade, and suicide decreased from 12.5% to 6.1%, while respiratory diseases increased from 45.8% to 75.8%, respectively. **Conclusions:** The main causes of death after traumatic SCI were cardiovascular diseases and respiratory diseases. The frequencies of urogenital diseases and suicide have decreased and the frequency of respiratory diseases has increased during the period. To optimise long-term ef-

fects of SCI, special attention must be paid on preventing circulatory and respiratory co-morbidity and complications.

O281

BENEFITS OF INTERVAL-TRAINING ON FATIGUE AND FUNCTIONAL CAPACITIES IN CHARCOT-MARIE-TOOTH DISEASE

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Exercise intolerance and undue fatigue are common complaints in patients with Charcot-Marie-Tooth (CMT) disease. Part of the reduced physical ability is directly due to the neuromuscular disease, but the disease also leads to physical deconditioning. The aim of this study was to test the hypothesis that 24 weeks of interval-training exercise (ITE) cycling can significantly improve physiological, neuromuscular and functional capacities, and alleviate fatigue in patients with CMT disease. Eight CMT patients (4 CMT1A and 4 CMT2) participated in ITE for three non-consecutive days per week. Cardiovascular fitness, muscle strength, fatigue resistance, and functional capacities were measured before and after 12 weeks of supervised hospital training and again after another 12 weeks of unsupervised home training. Training was well tolerated. There were significant improvements in cardiorespiratory capacities, isokinetic concentric strength and functional ability measurements (+11 to 13%, +11 to 14%, and +6 to 27%, respectively). All patients experienced an improvement in their self-reported visual analogic scale for fatigue and pain during training ($p<0.001$). However, there was no significant change in their isometric force production and indices of fatigue resistance after training. Although the improvement in exercise tolerance may be due in part to reversal of the deconditioning effect of their related sedentary life style, this clinical trial suggests that ITE can benefit patients with CMT especially in their functional performance and subjective perception of pain and fatigue. Moreover, the improvement observed at the end of the first supervised period ITE was maintained after the second unsupervised home period although there was no further improvement in performance and tolerance.

O282

THE EFFECT OF FUNCTIONAL ELECTRICAL STIMULATION (FES) ON THE PHYSIOLOGICAL COST OF WALKING IN PEOPLE WITH MULTIPLE SCLEROSIS

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Introduction: Functional Electrical Stimulation (FES) is used in the management of drop foot in people with neurological disorders. FES works by directly stimulating the ankle dorsiflexors and evertors in a timely manner to produce a more 'normal' and efficient walking pattern (1). Almost no studies have looked at the effect of FES on the energy requirement to walk for people with MS. **Aims:** The aim of the study was to investigate the effects of FES, in terms of gait speed and physiological cost of walking, in people with Multiple Sclerosis (pwMS). **Patients and Methods:** Twelve pwMS and 12 healthy matched controls walked at their own preferred walking speed (PWS) for 5 min around a 10 m elliptical course set out by cones 9.5m apart. Subjects with MS completed the protocol with and without using their FES. In addition control subjects completed the protocol twice more walking at the same PWS of the MS subject to which they were matched. A COSMED K4b2 gas analysis system was used to measure the percentage of expired oxygen during gait. Heart rate, gait speed

and distance walked were measured *Results:* Wearing FES lead to a significant improvement in walking speed ($0.49\text{m}\cdot\text{s}^{-1}$ and $0.43\text{m}\cdot\text{s}^{-1}$ with and without their FES, respectively; $p<0.001$) and a significant reduction in the energy expenditure of walking ($0.41\text{mL}\cdot\text{min}^{-1}\cdot\text{kg}^{-1}\cdot\text{m}^{-1}$ and $0.46\text{mL}\cdot\text{min}^{-1}\cdot\text{kg}^{-1}\cdot\text{m}^{-1}$; $p=0.017$) in pwMS. The speed of walking, oxygen uptake and energy expenditure were significantly different between pwMS and controls both at preferred and matched speeds. *Conclusions:* People with MS exhibit a higher physiological cost of walking. The use of FES appears to offers an orthotic benefit to pwMS by reducing the effort required to walk and as such may be a useful treatment option.

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O283

A LIFESPAN PERSPECTIVE ON FUNCTIONING AND HEALTH OF ADULTS WITH CHILDHOOD ONSET DISABILITY

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Introduction: Most children with childhood onset disabilities such as cerebral palsy (CP) and spina bifida nowadays survive into adulthood. Their medical and functional follow-up at adult age is limited, caused by discontinuity of care at the end of paediatric care. *Objective:* To get insight in functioning and health issues of (young) adults with CP and spina bifida. *Methods:* Within a research program we performed several studies among adolescents and adults with CP (cohorts of $n=103$, $n=56$ and $n=54$), meningocele ($n=51$), and actually we perform a study in men with Duchenne muscular dystrophy. We present a brief overview of main research findings, focussing on three issues. *Results:* a) Transition into adulthood and determinants of adult outcome. Youth with CP without severe learning disabilities showed a delayed transition into adulthood in housing, employment and sexual experience. Difficulties encountered in social participation were associated with level of gross motor functioning, manual ability, education and age, explaining 61% of the variance in participation. b) Secondary impairments and health issues in adults. Adults with CP reported several impairments. Pain (59%) and joint deformities (59%) but also vision, speech and swallowing problems were frequently indicated. We found that both ambulatory and non-ambulatory youth with meningocele had a very poor aerobic fitness (80%), were extremely inactive (37%), and obese (35%). In adults with bilateral CP comparable patterns were found. c) Unmet needs and utilization of health care. Three-quarters of youth with CP reported unmet needs on mobility and information on their condition, whereas only 40% visited a rehabilitation physician recently. After discharge from paediatric rehabilitation, utilization of rehabilitation therapies decreased at adult age. *Conclusion:* These results show the need to develop lifespan care for persons with childhood onset disabilities.

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NEUROGENIC HETEROTOPIC OSSIFICATION: A REVIEW FROM THE LITERATURE

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Introduction: Neurogenic Heterotopic Ossification (NHO) is a well known complication, usually following trauma to the central

nervous system (CNS), and is characterized by the formation of extra osseous bone in soft tissue surrounding peripheral joints, commonly in hip, knee and elbow. *Aim:* To describe the pathophysiological mechanisms responsible for NHO, the clinical presentation and best management. *Patients and Methods:* A review of the literature in the past ten years was made, by search in the international medical databases. *Results:* NHO is an important cause of secondary motor disability in neurological patients. It is thought that local factors and impaired neural pathways between the peripheral tissues and the CNS, would lead to autonomic dysregulation, humoral and neural changes. Heterotopic bone formation would be the result of the differentiation of primitive mesenchymal cells, in connective tissue, into osteoblastic tissue maturation and differentiation into bone. Nevertheless, despite all the researches, its aetiology and pathogenesis is not completely known. The presence of limb spasticity, urinary tract infection, pressure sores and deep venous thrombosis are believed to increase the likelihood of development of NHO. Clinically, limitation on the range of motion of the affected joint, local inflammatory reaction and a palpable mass, can lead to diagnosis although it can be misdiagnosed with deep vein thrombosis. Treatment with bisphosphonates, namely etidronate, and NSAIDs, namely indomethacin, is effective in early stages. In late stages, when the inflammatory response subsided, surgical removal is the best choice, although recurrence is frequent. *Conclusions:* Clinically, NHO can mimic other pathologic conditions, and its necessary a high suspicious to diagnose it. Investigations such as metabolic tests, bone scintigraphy and radiographs, may help the diagnosis. Early detection and adequate intervention is essential for a better outcome; in the later stages, treatment is usually less effective and surgery becomes necessary.

O285

THE PREVALENCE OF SMOKING IN PATIENTS ADMITTED TO A NEUROLOGICAL REHABILITATION UNIT

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Introduction: Smoking is a major risk factor for stroke and other cardiovascular disease. There are significant barriers to quitting smoking. *Aim:* To determine the prevalence of smoking among patients admitted to a Neurological Rehabilitation Unit (NRU) and to ascertain barriers to quitting. *Patients and Methods:* All consecutive patients admitted to the NRU, CGMC during a 3-month period. *Exclusion Criteria:* Dysphasia, unreliable “yes/no” response, cognitive impairment. *Assessments:* Demographic data (age, gender, primary diagnosis, highest educational level attained) and smoking status (“never”, “ex-smokers” and “current smokers”) were determined. Total pack years were calculated for “ex-“ and “current smokers”. “Current smokers” were asked if they had tried to quit, if a doctor had advised them to quit, if they were still smoking. Barriers to quitting were assessed by completion of the Modified Reasons for Smoking Scale (MRSS). *Results:* 84 patients were admitted during this period. 19 were excluded because of: dysphasia ($n=7$), non-English speaking ($n=4$), lost to follow-up ($n=3$), cognitive deficits ($n=2$), refusal to participate ($n=2$), medically unstable ($n=1$). 65 patients were enrolled with the following smoking status: “never” ($n=27$; 41.5%), “ex-“ ($n=24$; 37%) and “current” ($n=14$; 21.5%). 71% (10/14) of current smokers were male (mean age 49 ± 14 years, mean cigarette intake 38 ± 42 pack years). 90% (9/10) of these had completed high school only. Primary diagnoses were: stroke (3/10), head injury (2/10), tumour (1/10), demyelination (1/10), muscular dystrophy (1/10). 20% (2/10) of male smokers reported that no doctor had advised them to quit. 60% (6/10) of male smokers continued to smoke while admitted. Only 6% (4/65) of the study population were current female smokers. All had completed high school. Primary diagnoses were: stroke (2/4) and

peripheral neuropathy (2/4). 75% (3/4) reported no doctor had ever advised them to quit, while 75% (3/4) continued to smoke. Reasons for continuing to smoke were “pleasure” (mean MRSS score 4.1 ± 0.6 , maximum score of 5), “relaxation and relief of tension” (mean score 3.8 ± 1.2) and “addiction” (mean score 3.5 ± 1.3). *Conclusions:* 64% of smokers continued to smoke during rehabilitation despite suffering smoking-related illness and receiving education/advice to quit. The most compelling reasons for smoking were “pleasure” and “relaxation and relief of tension”. Rehabilitation physicians need to address this important risk factor with a multi-disciplinary approach, targeted at an appropriate educational level and with frequent repetition.

O286

ACUTE NEUROSURGICAL REHABILITATION BEGINNING DURING THE INTENSIVE CARE (PILOT STUDY)

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Introduction: Immediate and systematic applications of adequate rehabilitation are the most important factors for restitution of impaired brain function. Integration of these applications in the intensive care makes it possible to start rehabilitation therapy directly, without any interruption. *Aim:* The aim of the study was to investigate the efficiency of early rehabilitation program beginning

at the neurosurgical intensive care unit. *Methods:* In the prospective study, 29 patients (age 55.8, range 43–89 years, m: f=1:1) surviving the brain injury were investigated. Early rehabilitation program started if the patients have no need of sedation, after stabilisation of cardiopulmonary functions and normalization of ICP. Early rehabilitative treatment lasted mean 19.8 (7–48) days. Therapy was adapted to the individual capability and was performed for 300 min each day. For the income and outcome evaluation we used the Early Reha Barthel Index (ERI). Here have been introduced aspects of functional deficits relevant in early rehabilitation patients to the Barthel Index in a separate section: state requiring temporary intensive medical monitoring, tracheostoma requiring special treatment (suctioning), intermittent artificial respiration, confusional state requiring special care, behavioural disturbances requiring special care, swallowing disorders requiring special care, and severe communication deficits. *Results:* At the time of income to the rehabilitation program, the ERI was at mean -136.2 points (range -225 – $+20$ points), 18 of the patients had ERI of -175 points or less. At the time of discharge, the ERI reached at mean $+0.34$ points (range -225 – $+100$ points), 10 patients (one third) reached $+80$ points or more and were in the activities of daily living nearly independent. Only 6 patients reached only the ERI of -175 points or less. *Conclusion:* The results of this project show that already during intensive care treatment an efficient early onset rehabilitative therapy is possible. In summary we conclude that by integration into the acute clinic, complications can be treated more adequately and delays with negative consequences for the patients can be avoided. If early rehabilitation therapy can practically be established in the most of the acute units is widely depending on the future development in health-politics.

POSTER PRESENTATIONS

P1

BLADDER DYSFUNCTION AND SACRAL TARLOV CYSTS: AN UNSUSPECTED DIAGNOSIS*Bru I., Geers S., De Muynck M.**Dept. of Physical and Rehabilitation Medicine, University Hospital Gent, Belgium*

The sacral perineural cyst was first described by Tarlov in 1938 as an incidental finding at autopsy. Tarlov or perineural cysts are pathological formations located in the space between the peri- and endoneurium of the spinal posterior nerve root sheath at the dorsal root ganglion. The cyst can enlarge via net inflow of cerebrospinal fluid, eventually causing symptoms by distorting, compressing, or stretching adjacent nerve roots. There are very few data in the literature regarding the role of Tarlov cysts in causing symptoms. However, Tarlov cysts can cause a diversity of symptoms, i.e. headache, abdominal pain, low back pain, sacral radicular pain, bladder dysfunction, impotence, anal dysfunction, coccydynia, motor deficits, dyspareunia, etc. The authors present two patients with a Tarlov cyst, shown on MRI results, who have bladder dysfunction, documented by uro-electromyography. The initial complaints in the first patient were low back pain and radicular pain. The initial complaints in the second patient were pain in the right testis and vague abdominal pain.

P2

LEARNING AND MEMORY DISORDERS IN 6-HYDROXYDOPAMINE-INDUCED RAT MODEL OF PARKINSON'S DISEASE*Ciobica A.¹, Hritcu L.¹, Artenie V.¹, Padurariu M.²**¹Alexandru Ioan Cuza University, Dept. of Molecular and Experimental Biology; ²Gr. T. Popa, University of Medicine and Pharmacy, Iasi, Romania*

Introduction: The most widely used animal models of Parkinson's disease involve intracranial infusion of the neurotoxin 6-hydroxydopamine (6-OHDA) directly into the ascending dopaminergic forebrain bundle, thereby, inducing severe dopaminergic neuronal degeneration associated with profound deficits in feeding, drinking, sensorimotor and learning functions [1]. **Aim:** The aim of the present work was to study the effects of right-unilateral 6-OHDA lesions of the ventral tegmental area (VTA) or substantia nigra pars reticulata (SNr) on learning and memory processes evidenced by means of Y-maze task and shuttle-box task, respectively. We also examined the effect of nicotine treatment on the 6-OHDA lesioned rats. **Method:** Male Wistar rats were subjected to right-unilateral 6-hydroxydopamine (6-OHDA) lesion of the VTA or SNr, or were sham lesioned, and nicotine treatment and their ability to acquire the operant task was studied by means of Y-maze task and shuttle-box task, respectively. The sham-operated rats were injected with saline. Learning and memory tests were begun 2 weeks after the operation. **Results:** Lesions of both the VTA and SNr resulted in an impairment of both conditioned avoidance response and crossing latency tested by means of shuttle-box task, suggesting significant effects of long-term memory. 6-OHDA significantly decreased spontaneous alternation % in Y-maze task, suggesting effects on spatial memory, especially on short-term memory. A low dose of nicotine, a specific nicotinic acetylcholine receptors agonist, administered 4 consecutively days attenuated the impairment of learning and memory processes in 6-OHDA lesioned rats. **Conclusions:** These data suggest that VTA, SNr and nAChRs have a facilitator role in learning and memory processes. Therefore, the integrity of these nervous areas may be necessary for processing and storage of information.

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P3

THE IMPLICATION OF OXIDATIVE STRESS IN A RAT MODEL OF PARKINSON'S DISEASE*Ciobica A.¹, Hritcu L.¹, Artenie V.¹, Padurariu M.²**¹Alexandru Ioan Cuza University, Dept. of Molecular and Experimental Biology; ²Gr. T. Popa University of Medicine and Pharmacy, Iasi, Romania*

Introduction: Parkinson's disease (PD) stems from the loss of dopamine caused by the degeneration of the dopaminergic neurons of the substantia nigra. The nature of this degeneration remains unclear, although current theories suggest that reactive oxygen species are involved in the disease process [1]. The administration of 6-hydroxydopamine (6-OHDA) into the brain of the rat produces a well-established model of PD. Many investigators have demonstrated that 6-OHDA induces oxidative stress which can lead to the induction of apoptosis. The effects of 6-OHDA are age-dependent as there is a greater effect seen in aged animals compared with young animals. **Aim:** The purpose of the present study was to determine the development of oxidative stress that is generated in a substantia nigra (SN) and ventral tegmental area (VTA) 6-OHDA lesion model of PD through assessing the antioxidant enzymes activities in the temporal and frontal lobes homogenates. **Material and Methods:** Male Wistar aged rats, 22–23 months old, were used for all experiments. 6-OHDA lesions: SN lesion; VTA lesion. Biochemical estimations: determination of superoxide dismutase (SOD), glutathione peroxidase (GPX) and malondialdehyde (MDA) activities. **Results:** The data were recorded 2 weeks after neurosurgery. Lesioning of SN and VTA with a low dose of 6-OHDA induced significant reduction in SOD and GPX specific activities and non-significant reduction of MDA concentration in the temporal lobe rather than in the frontal lobe homogenates, comparative with sham-operated control group. Also, the role of the SN is more prominent than that of the VTA. **Conclusion:** Our results support that oxidative stress plays a role in the damage produced by substantia nigra and ventral tegmental area injection of 6-OHDA, and that indices of oxidative stress could potentially be important markers for evaluating therapeutic strategies and their effects on 6-OHDA-induced dopaminergic neurotoxicity.

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P4

CASE REPORT: EFFECTIVENESS OF DONEPEZIL (ARICEPT®) ON MEMORY, ATTENTION AND REM-SLEEP IN AN ADOLESCENT WITH SEVERE TRAUMATIC BRAIN INJURY*van Rhijn J.¹, Ansoms N.¹, Ceulemans B.^{1,2}**¹Revalidatiecentrum voor Kinderen en Jongeren Pulderbos; ²Universitair Ziekenhuis Antwerpen, Belgium*

Introduction: Memory impairment after traumatic brain injury (TBI) is common and problematic. It has a significant impact on one's ability to function independently. For adolescents, memory dysfunction and sleep disturbances after TBI can have major consequences on school results. The availability of acetylcholine-esterase inhibitors like donepezil for memory disorders was approved for use in dementia in Alzheimer's patients. Due to these promising results, donepezil provides hope for TBI-survivors with a persistent amnesia. **Aim:** Case report of donepezil in an adolescent with a post-acute TBI to improve memory, attention and REM-sleep. **Methods:** Patient received donepezil in a dose of 5 mg once a day for 6 weeks and was inclined to 10 mg once a day for 6 weeks. After 12 weeks the donepezil was

stopped over 6 weeks. Neuropsychological testing to evaluate the patient was performed baseline, at 12 weeks and after wash-out. Memory measures included the Auditory Verbal Learning Test (AVLT), Benton Visual Retention Test (Benton VRT), 15 Rey figures and Children's Memory Scale (CMS). Attention measures included the Test of Every Day Attention for Children (Tea-CH). Polysomnographic examination was performed baseline and at 12 weeks. *Results:* On objective tests of memory at 12 weeks, clinically relevant improvements were observed in both immediate and delayed visual memory. Another important finding after 3 months of donepezil was the improvement of all the sub-tests of attention. REM-sleep increased from 9.6% to 22.5 % of total sleep after 12 weeks of donepezil. *Conclusion:* These findings suggest that donepezil may enhance both immediate and delayed visual memory and all the aspects of attention. The amount of REM-sleep was significantly increased during donepezil treatment. Based on the findings that REM sleep is associated with memory consolidation, these results could be an interesting topic for the future. Large-scale randomised double-blinded placebo-controlled studies are needed.

P5

SUBJECTS WITH PHYSIOLOGICAL VERTICAL HETEROPHORIA ARE LESS STABLE THAN SUBJECTS WITH VERTICAL ORTHOPHORIA

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Introduction: In upright stance, the antigraviphic muscles permanently respond and the human body continuously oscillates. The postural control requires: visual, vestibular, cutaneous and muscle proprioceptive sensory inputs; their central neurological integration; and the motor responses adapted, i.e. to maintain the body centre of mass in equilibrium. Clinical observations reported a link between vertical phoria, chronic pain and qualitative balance test (1). *Aim:* To test the quality of postural performance in quiet upright stance in healthy young adults with vertical heterophoria (VH) - relative deviation of the visual axes reduced via binocular vision mechanisms - within the physiological range (less than one diopter: 0.57°) (2) or without VH (vertical orthophoria, VO). *Patients and Methods:* Twenty-six healthy young subjects (mean age: 27.04±3.29 years) were recruited, without neurological, otoneurological or ophthalmologic symptoms, with no medication or musculo-skeletal problem. We used the Maddox rod test which is one of the most valid clinical tests appropriate for clinically measuring VH. The postural control was recorded on a force platform while the subjects were fixating a target at a close and at a far viewing distance. *Results:* The results indicate that the postural control is better for subjects with VO than subjects with VH. Particularly we found an interaction between vertical phoria and distance: the subjects with VH show greater instability than the subjects with VO at a far distance only. *Conclusion:* The quality of postural performance in quiet upright stance is lower in the subjects with VH. This could be attributed to a somatosensory/proprioceptive deficiency that perturbs the sensorymotor loops required in the postural control leading to a greater instability. We speculate that VH even when small in size, indicates a perturbation of the somatosensory/proprioceptive loops involved in postural control, and could be the sign of the capacity of the central nervous system to integrate optimally proprioceptive cues. Using the Maddox rod test in this way, i.e. to determine the vertical phoria state, prevention possibilities could be investigated.

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P6

IS PHYSICAL ACTIVITY AND AEROBIC FITNESS RELATED TO MEMORY RETRIEVAL IN ELDERLY ADULTS?

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Introduction: For the work of elderly adults, physical and mental health have a big importance. Human epidemiological studies have suggested beneficial effects of exercise and activity on cognitive function and physical health, particularly in aging populations (1). The mechanisms mediating this effect are not yet clear. Animal studies suggest that an increase in neurotrophic substances and synaptic density may drive the beneficial changes in learning and function. *Aim:* To determine if activity and aerobic fitness parameters predict memory performance. *Patients and Methods:* In this cross-sectional study, we assessed 75 healthy elderly adults (50–78 years old, mean 60.5 years, SD 6.9) for level of physical activity (questionnaire), aerobic and anaerobic fitness (lactate threshold), peripheral neurotrophin and neurotransmitters levels, and memory performance. Multiple regression analysis was used to examine associations between level of physical activity fitness and memory scores. *Results:* Multiple regression analysis revealed that frequent physical activity, but not aerobic and anaerobic fitness, positively predicted success in episodic verbal memory ($p < 0.05$), after controlling for possible confounders (age, sex, and education). Neurotrophin and neurotransmitter levels are still under study. *Conclusion:* The present study demonstrated that staying physically active in the second half of life is associated with better memory retrieval. We are currently examining if the beneficial effects of regular aerobic exercise may be mediated by neurotrophins or neurotransmitters (2).

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P7

EXERCISE PERFORMANCE IN CHRONIC BRONCHIAL ASTHMATIC PATIENTS

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Introduction: Bronchial asthma (BA) is a chronic inflammatory disease of the airways (3). The main goals of pulmonary rehabilitation in BA are to maximize the functions of daily living and the learning of skills, which can be used to control the physical situation, to enhance quality of life (QoL) (1, 2). *Aim:* The aim of the present study was to analyze the exercise performance (express through 6MWD value – distance walking in 6 min) and the correlation between 6MWD and some parameters followed during rehabilitation program – biographic data (age, sex, profession), severity and type of BA, the severity of dyspnea (scores of Borg scale) and index of QoL (Asthma Quality of Life Questionnaire - AQLQ). All patients performed an 8-week pulmonary rehabilitation program (monitoring pharmacotherapy, education, exercise and respiratory muscle training, psychological support). *Patients and Methods:* Clinical evaluation, spirometric tests, 6MWD and AQLQ were performed in 84 asthmatic patients (30 females, 54 males, between 30–63 years old). We calculated a severity score, adapted through Blanc P.D. Subjects were evaluated before and after pulmonary rehabilitation. *Results:* All patients had improved the 6MWD after rehabilitation program. We established correlations between AQLQ and 6MWD ($r^2=0.57$; 95% CI = [0.40; 0.71]), after

rehabilitation program. We found no correlation between the mean values of studied parameters. *Conclusion:* Our results confirm the hypothesis that chronic asthmatic patients had an irreversible airway obstruction with a significant clinical and functional impact. The exact role of pulmonary rehabilitation in the management of exercise performance of the BA requires further studies.

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P8

EFFORT ADJUSTMENT IN PATIENTS FOLLOWING LUNG CANCER THORACOTOMY

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Introduction: A descriptive and prospective study of effort adjustment in patients following lung cancer thoracotomy. *Patients and Methods:* A sample of 37 patients with basal dyspnea < 2 in 89.1%, according to the Modified MRC Scale. There were 11 lost during the follow-up; 8 due to failure to report, and 3 due to postoperative death. The following variables were studied: Sex (70.3% males and 29.7% females), surgical technique (54.1% segmentectomy, 40.5% lobectomy, and 5.4% pneumonectomy), surgery location (56.7% right hemithorax, 43.3% left hemithorax). All patients followed a preoperative and postoperative treatment, protocolled by the Physical Medicine and Respiratory Rehabilitation Unit. The effort adjustment was evaluated preoperatively and 1, 3, 6 months postoperatively using the 6 Minutes Walking Test. The parameters obtained were analysed with the computer program SPSS 12.0. *Results:* Using the GLM Test with repeated measurements for the distance covered in meters, a statistically significant intragroup improvement ($p < 0.05$), and a statistically non-significant intergroup improvement were obtained. Applying the Friedman Test for repeated measurements to analyse oxygen saturation and cardiac frequency, no statistically significant differences were found. *Conclusion:* The distance covered in meters improves globally in patients, in a statistically significant way. There is no statistical significance in the evaluated improvement, with respect to: Sex, surgery technique, location of the surgery, oxygen saturation and cardiac frequency. It would be convenient to increase the size of the sample, and to extend the study up to 1 year post-surgery.

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P9

EFFICACY OF RESPIRATORY PHYSIOTHERAPY COMBINED WITH VENTILATION PERCUSSIVE INTRAPULMONARY (VPI) IN STABLE ADULT

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Introduction: The bronchiectasis are defined as an abnormal and permanent expansion, of bronchi that it deals with cough and

chronic expectoration, difficulty in breathing, respiratory infections of repetition and hemoptysis. It is estimated, that in 78% of the patients present at least an annual acutement with hospitalization from at least 10.5 days to the year. Nevertheless, a sufficient agreement does not exist in the scientific community as for the therapeutic action. Though the efficiency of the respiratory physiotherapy has been demonstrated, there has not been established the level of scientific definitive evidence on the efficiency in the treatment of the bronchiectasis; neither of the place that instrumental complementary technologies, like the VPI, occupy in the treatments of these patients. Our hypothesis formulates that the respiratory physiotherapy combined is a useful technique in the treatment of patients with stable adult bronchiectasis when compared with other standard techniques in respiratory physiotherapy. *Objectives:* To evaluate the efficacy of respiratory physiotherapy joined to IPV in stable adult bronchiectasis. *Material and Methods:* 30 subjects fulfilled the inclusion criteria. Patients were evaluated before, at the end and three months after the treatment. We evaluate functional improvement, mucociliar clearance, exercise tolerance and quality of life through validated tests, either in control group or in the study population. Control group receive hygienic bronchial and pulmonary measures. *Conclusions:* Provisional results suggest treatment, can reduce urinary symptoms in the MS population studied. Results are yet to be evaluated before obtaining definitive conclusions.

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P10

THE CHEST SHAPE CHARACTERISTIC IN EXPLOSIVE EXPIRATION – PILOT STUDY

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Introduction: The term explosive expiration means respiratory manoeuvres used for respiratory tract cleaning, e.g. coughing or sneezing. The explosive expiration is characterized by high speed non-steady state flow with typical changes in chest shape. There are also extreme pressure changes influencing whole-body logistic system (hemodynamics, CSF transport). All of these can cause many complications, such as mechanical damage of organs, muscular rupture or syncope. *Aim:* The aim of our study is a biomechanical analysis of a single voluntary cough in a pilot study and to determine application methods of chest shape and flow detection. *Methods:* Qualisys Motion Capture optoelectronic system was used for chest shape detection. The principle is to scan markers situated on the thorax in infra-red spectrum. We used 22 markers in 4 transversal planes. Antero-posterior and diagonal distance variation of marker's pairs was measured in isolated planes. The spirometer based on Pitot tube was designed in order to describe flow characteristics. Tested person was healthy young man without respiratory diseases or chest deformations. *Results:* Distances increase in caudal direction. Compared with L1 plane, distance values in Th4 plane were less about 43% in antero-posterior direction and 36% in diagonal direction. The maximal flow rate was on average 3,73 l/s and expiration time 0,72s. *Conclusions:* Qualisys was sufficient non-invasive method for kinematic evaluation of explosive expiration. Flow characteristics obtained by designed spirometer correspond to Yanagihara's study [1966]. Spirometric investigation combined with Qualisys results can be

used for following biomechanical studies, e.g. kinematic chest model design.

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P11

PRELIMINARY STUDY OF VARIATION OF BODE INDEX IN PATIENTS WITH EPOC SUBMITTED TO A LUNG TRANSPLANT

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Introduction: The BODE index, which integrates body mass index (BMI), forced expiratory volume in one second (FEV1), dyspnea by Medical Research Council Index (MRC), and exercise capacity measured by 6-min walk test (6WT), is a good predictor of the mortality rate per year in patients diagnosed with Chronic Obstructive Pulmonary Disease (COPD). Patients who have a score of BODE >7 on the scale, show an overall mortality rate of 80% in four years.

Material and Methods: A prospective study of 15 patients diagnosed with COPD, to whom a lung transplant was made (TXP) after being included on the waiting list in the year 2006 and following a program of post-TXP rehabilitation treatment. The analyzed variables were: age, sex, type of lung transplant, FEV1, MRC, BMI, meters walked in 6WT and score on the BODE test, pre-TXP and post-TXP. Two patients were excluded that passed away in the immediate postoperative period. **Results:** 76.9% (10) of the patients were male, with an average of age of 56.92 years (43–66 years). More than half of them 53.8% (7), were submitted to a double TXP, and the rest of them were unilateral, 23.1% (3). The TXP was done 6.46 (1–12) months from the date of inclusion on the waiting list. **Conclusions:** The BODE test shows an important improvement after the carrying out of TXP, independently of the type of transplant and the time of post-transplant evaluation, the average increase in score being 4.46 points, $p < 0.001$.

	Pre-TXP	Post-TXP	
BODE index	5.46 (4–7)	1.00 (0–2)	$p < 0.001$
FEV1 (%)	30.2 (16.5–62)	70.4 (39.2–100.7)	$p < 0.001$
MRC (1–4)	2.23 (2–3)	0.38 (0–1)	$p < 0.001$
6WT (m)	258.85 (140–380)	386.92 (340–480)	$p < 0.001$

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P12

TERIPARATIDE FOR PATIENTS IN A LUNG TRANSPLANT PROGRAM

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Introduction: Osteoporosis is a highly prevalent disease among patients included in a lung transplant (TXP) program, due to immobility and steroid treatments. It can become exacerbated during the post-transplant period as a result of immunosuppressant therapy. Sequential Teriparatide (the N-terminal fragment of the parathyroid molecule) promotes a positive balance of bone turnover, making it of particular interest in these patients.

Patients and Methods: Prospective, descriptive, two-year study (2006–2007) of nine patients included in a TXP program diagnosed with osteoporosis for whom bone densitometry (DMO) values were available and treated with Teriparatide 20 mg/24h/sc for eighteen months. The following were determined at baseline, three, six, twelve, and eighteen months: calcium, alkaline phosphatase, and X-rays of the thoracic-lumbar spine; in addition DMO and body mass index (BMI) were quantified at baseline and endpoint. All patients had undergone previous treatment with bisphosphonates, calcium, and vitamin D. **Results:** The mean pre-treatment DMO was: mean lumbar T score –3.2 and the mean femoral T score was –2.3. Post-treatment DMO was evidenced by means of a mean lumbar T score of –2.2 and a mean femoral T score of –2.2; ($p = 0.18$ and $p = 0.54$, respectively). Two vertebral fractures occurred in the same patient during treatment and a crush fracture appeared in another patient. **Conclusions:** Treatment with Teriparatide improves bone mass at the lumbar level and maintains femoral bone mass in patients undergoing TXP with severe osteoporosis, who have previously been treated with bisphosphonates.

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P13

THE TREATMENT OF THE POSTOPERATIVE LOBAR ATHELECTASIS WITH PERCUSSION MACHINE

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Introduction: Patients who undergo thoracic surgery often have COPD and are of greater risk to develop postoperative complications, especially lobar atelectasis. We investigated the effects of application of percussion machine along with other methods of respiratory rehabilitation in the treatment of these patients.

Methods: Two groups of 15 patients each who developed lobar atelectasis on the first day after thoracic surgery were treated with respiratory rehabilitation. Group A (11 males, 4 females, mean age 58 years) was treated with diaphragmal breathing exercises, kinesitherapy on bed level in sitting position and aerosol treatment via percussion machine IMP2 3 times a day for 3 days. Control group (C, 10 males, 5 females, mean age 55 years) underwent the same treatment, except that aerosol was applied via continuous positive pressure 4–6 times daily for 3 days. **Results:** In group A after 3 days complete radiographic regression was achieved in 13 pts (87%), while only in 9 (60%) pts in group C ($p < 0.01$). Mean oxygen saturation of arterial blood on day 3 was 95% in group A, but only 92% in group C ($p < 0.05$). On day 3 mean sputum production was 10 ml in group A, but 15 ml in group C ($p < 0.05$). **Conclusion:** Application of percussion machine significantly quickens resolution of postoperative lobar atelectasis and improves rehabilitation in patients after thoracic surgery.

P14

THE EFFECT OF DETRAINING IN ATHLETES WITH CARDIAC RHYTHM DISTURBANCE

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Purpose: The purpose of the study of the long term detraining in the athletes with cardiac rhythm disturbance. **Method:** 100 young athletes are studied, that male (mean [\pm SD]; age: 16, 23 \pm 3, 48 years; mean training: 4, 2 \pm 2, 6 years; with connective tissue of heart dysplasia syndrome and 30 healthy athletes' controls. Detraining characteristics may be different depending on the duration of training cessation or insufficient training. Short term cardio respiratory detraining is characterized in highly trained athletes by a rapid decline in maximal oxygen uptake and blood volume. All sportsmen are studied by electrocardiograms, veloergometre, and arrhythmias are studied, as recorded by the Holter monitor. **Results:** The most common of arrhythmias in sportsmen with long-term detraining is ventricular extrasystoles. The physical working capacity and maximal O₂ consumption in athletes with long-term detraining and ventricular arrhythmias (more than 30 ventricular extrasystoles in hour) is lower than other groups (lower than 30 ventricular extrasystoles in hour) ($p < 0.05$). Long-term detraining is associated with cardiac morphologic changes, including decreased left ventricular (LV) cavity dimension, wall thickness and mass ($p < 0.05$). **Discussion and Conclusion:** The lowest of physical working capacity and maximal O₂ consumption exist in groups of athletes with progressive abnormality. Exercise heart rate increases insufficiently to counterbalance the decreased stroke volume, and maximal cardiac output is thus reduced.

P15

MANAGEMENT PRINCIPLES IN REHABILITATION OF SURGICALLY TREATED CARDIAC OUT-PATIENT

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Aim: The goal of cardiac rehabilitation is to improve the functional capacity, to decrease the morbidity and mortality and to change patients' life style in order to increase their life quality. **Materials and Methods:** The cardiac rehabilitation program consisting in four phases was applied at 100 patients with different forms of heart diseases, during 1 year period. In the second year we applied just the other three outdoor phases. Each phase of the rehabilitation program had three important elements: exercise training, relaxation and patient informing and counseling concerning the disease, life style and medication. There were some particularities according to cardiac disease type. Patients' assessment, at the beginning and at the end of each phase, was realized by Borg scale. **Results:** Starting from 7.3 on the Borg scale, at the end of the first year we succeeded an average of 12.8 points and at the end of the second year an average of 17.2 points. No patient left the rehabilitation programme and women were more compliant in performing the exercises at the beginning of the programme, status which equalized at the end of the second year. **Conclusion:** Cardiac rehabilitation of a surgically treated cardiac patient is a team work program. The evidence regarding the health benefits of cardiac rehabilitation are overwhelming: reduction in total mortality and cardiovascular events, improvement in patients' life quality, functional capacity and decreased cardiovascular risk factors.

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P16

EXERCISE REHABILITATION PROGRAMS INCREASE QUALITY OF WALK IN PATIENTS WITH PERIPHERAL ARTERIAL DISEASE (PAD)

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Introduction: PAD of the lower extremities affects 20%–30% of older patients in general medical practices. Compared with those without PAD, persons with the disease have significantly greater functional impairment and more rapid functional decline. Exercise rehabilitation programs increase quality of walk in patients with PAD. However such barriers as cost, transportation, program availability often limit access to a complete and correct medical assistance. Clinical guides for PAD recommend supervised walking exercises, but evidence for the benefits of the unsupervised walking exercise is minimal to absent. **Aim:** To determine if patients with PAD who report that they walk for exercise 3 or more times per week have less annual functional decline than those who walk less frequently. **Material and method:** We included 65 patients with PAD divided in 2 subgroups: A (30 patients) that report minimum 3 times per week walk for exercise and B (35 patients) which walk less frequently. They are evaluated at baseline and after a year using 2 parameters: 6-minute walk distance (6-MWD) and 4-meter walking speed (4-MWS). **Results:** Compared with those that exercised less frequently, patients who walked 3 or more times per week had a significantly smaller average annual decline both in walking distance and speed. **Conclusions:** Self directed walking exercise is associated with less functional decline among persons with PAD. Our dates suggest that patients with PAD who are unable or unwilling to participate in supervised exercised programs may benefit from self-directed walking at home.

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P17

THE CHANGES IN CONCENTRATION OF D-DIMERS IN SERUM OF PATIENTS WITH LYMPHOEDEMA BEFORE, DURING AND AFTER USING INTERMITTENT NEGATIVE PRESSURE ON THE LOWER EXTREMITIES

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Introduction and Aim: After discovering the fact that applying intermittent hipobaric pressure causes a long-time improvement of microcirculation, we investigated the functionality of the hemo-

static system in 62 patients with peripheral artery occlusions, who were treated with intermittent hypobaric pressure using hypobaric sack 'Greensac' manufactured by 'Iskra-Medical' from Slovenia. The presence of D-dimers in plasma shows the previous synthesis of fibrinogen, which was disintegrated in fragments that can no longer be used for synthesis of coagulum. Besides that, those fragments inhibit the further polymerization of the fibrin monomers and lower the thrombin activity. The clinical significance of determining D-dimers is valued in the sense that the pathological values of D-dimers imply a coagulation disorder of the hemostatic system which can be manifested by thrombosis or development of the pathological bleeding. The normalization of the D-dimer values achieved by different treatments implies that the function of the hemostatic system is also normalized. The obtained results show that the values of D-dimers before the therapy are significantly higher in relation to normal values: 580ng/ml (normal: 255 ng/ml), after 10 treatments the level gradually increases to 620 ng/ml, but, 2 weeks after the treatment, a significant decrease in the level of D-dimers to 330 ng/ml is registered. We conclude that the treatments with intermittent hypobaric pressure had positive impact on the coagulation component of the hemostatic system (determined through D-dimers).

Patients and Methods: The influence of hypobaric therapy on the functionality of the hemostatic system was tested on 43 patients who have a peripheral arterial occlusive disease or venous insufficiency. The patients were treated in Specialist Policlinic of the Clinical Centre of Novi Sad, in the department of Vascular Surgery and the Department for Thrombosis Prevention, and the therapy with hypobaric sac was done in the Clinic for Medical Rehabilitation. The group tested consisted of 21 men and 22 women, aged 49–75 years, the average being 60.35 years. The patients underwent treatments using the hypobaric sac «Greensac» by the manufacturer «Iskra-Medical» from Slovenia: 10 treatments of 20 min duration, 3 times/week. In all patients an echoplebographic examination of the lower extremities was performed before starting with the laboratory testing and hypobaric sac treatment, in order to exclude the presence of an acute thrombotic process. The functionality of the hemostatic system was tested by a range of laboratory tests which included all three basic components of the hemostatic system: vascular, thrombocytic and coagulation. The material for examination of the hemostatic system was taken before the therapy, a day after the last (tenth) therapy and two weeks after the end of the treatment. For the aPTT, a reagens Cephotest, manufactured by Axisis Shield, Norway was used, while the other coagulation tests were done by the reagens manufactured by the Instrumentation Laboratory (IL), Milano, Italy and the coagulometer ACL 9000 by IL manufacturer. The concentration of D-dimers was determined by the highly sensitive reagens IL-latex particles coated with mouse monoclonal antibodies specific for the D-dimer (MA-8D3). The other laboratory tests that were used on all of the patients were: SE, FBC, standard biochemical tests, lipid status, CRP. **Results:** The results of the basic tests for hemostasis-aPTT, PT and TV were in the normal range except for the three patients who were on an oral anticoagulant therapy, so accordingly there prothrombin time was prolonged, that is, the INR was in the therapeutic range. Based on the results of the D-dimer levels before the start of the therapy by «Greensack» (so called basic level), the patients were divided into two groups: group A consisted of 27 patients (62,8%) whose level of D-dimer was in the normal range (up to 255 ng/ml) and group B consisted of 16 patients (37,2%), whose D-dimer level was increased, in average 580 ng/ml. A day after the therapy finished, a slight increase in the D-dimer level was noticed in group A for 10% compared with the basal value, but the average value stayed below the upper limit of the reference range, while in group B the D-dimer level stayed significantly increased, 568 ng/ml. Two weeks after the therapy finished, in group A (with the normal D-dimer value), a slight decrease in the D-dimer value was registered (from 129 to 124 ng/ml), while in group B a significant decrease in D-dimer value occurred—the average values of 330 ng/ml were obtained, that is, the average value was 250 ng/ml lower, which represents a significant decrease in the level of thrombin activity.

Discussion and Conclusion: We can assume that hypobaric therapy with its impact on the endothelial cells can, among other things,

lead to an increased release of the tissue activator plasminogen and that way move the dynamic balance of the hemostatic system towards increased fibrinolytic activity, which represents a state of decreased risk for the development of thrombotic complications. Therefore, the future investigations of the effects of hypobaric therapy on the hemostatic system functionality should necessarily contain the additional laboratory parameters used for the direct diagnosis of the fibrinolytic system activity.

P18

CAN VERTEBRAL DYSFUNCTION LEAD TO HEART ARREST? A CASE REPORT

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Vertebrogenic pain localized in the anterior thorax can imitate anginal pain ('pseudoangina pectoris'). The most common causes of vertebrogenic chest pain are segmental dysfunction and degenerative changes at the level of the lower cervical and upper middle thoracic spine. Segmental dysfunction can be a source of pseudoradicular pain radiating to the chest. A female patient with the age of 45 reported several episodes of back pain in the thoracic spine leading to breathing insufficiency followed by heart arrests. These incidences happened 7 times since 1995. All resuscitations were successful. During the last resuscitation several rib fractures occurred. Diagnostic procedures of lung and heart showed no kind of pathology so far. During manual medical diagnosis a vertebral dysfunction could be observed between thoracic vertebrae T4–6 and on cervical vertebrae C4–Th1. As diagnostic procedures like NMR did not show any kind of pathology either it is quite likely that the source of the problem is due to these vertebral dysfunctions.

P19

EARLY CARDIAC REHABILITATION AND RISK STRATIFICATION AFTER MYOCARDIAL INFARCTION

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The objective of the study carried out in our hospital was to determine the cardiac rehabilitation effects upon the clinical and paraclinical performance in patients with acute myocardial infarction and their effort tolerance. **Patients and Methods:** We analysed the hemodynamic, echocardiographic, biochemical data and the coronary risk level considering the TIMI classical score in 198 patients (59 men, 6 women) aged 36–76 with acute 'non-q' myocardial infarction, included in the '7 steps' cardiac rehabilitation program (Braunwald și Julien). **Results:** Regarding the TIMI classical score the patients have been divided into three groups: low risk: 30%, middle: 58%, and major: 22%. The patients with non-complicated myocardial infarction after successful reperfusion with normal ejection fraction and low risk score began an early cardiac rehabilitation just after the acute event occurred. They were discharged in 5–7 days. The patients with middle cardiac risk score began the cardiac rehabilitation 2–3 days after the cardiac attack and were discharged in 8–9 days. The patients in the above-mentioned groups were recommended to reduce the risk factors and were administered medication. A different algorithm of rehabilitation was attempted in the patients with major cardiac risk score who developed an onset of ventricular tachyarrhythmia, hypotension and cardiac insufficiency (22%). They were recommended angiocoronarography. Correct patients selection for rehabilitation and discharge prevents the increase of early complications in patients with 'non-q' myocardial infarction. **Conclusion:** Early cardiac rehabilitation improves clinical and paraclinical cardiac data, effort tolerance, reduces hospitalization time and the incidence of early complications in patients with

'non-q' myocardial infarction in terms of risk stratification according to the TIMI classical score.

P20

DEVELOPMENT OF CARDIOVASCULAR RISK FACTORS AFTER AN INDIVIDUALIZED IN-HOSPITAL REHABILITATION PROGRAM: 1- AND 3- YEAR FOLLOW-UP

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Introduction: Cardiovascular diseases are responsible for the majority of deaths in industrialized countries. The aim of secondary prevention after coronary artery bypass grafting (CABG) is to decelerate the progression of atherosclerosis and thereby to improve life expectancy. **Aim:** The purpose of this study was to investigate the development of cardiovascular risk factors in patients with or without an individualized in-hospital RP in a 1- and 3-year follow-up period. **Patients and Methods:** 142 consecutive patients undergoing elective CABG were prospectively divided into two groups (group I received the usual care; group II received the intervention). Medical variables concerning all cardiovascular risk factors, the current medication plan, and smoking habits were evaluated on admission and 1 and 3 years after surgery. The modifiable cardiovascular risk factors were evaluated and the number of risk factors per patient outside the target range was assessed. Risk factor control was graded as follows (perfect, good, acceptable, improvable, and poor). **Results:** At time of operation the number of modifiable cardiovascular risk factors per patient was 2.1 and 2.4 (2.0 and 1.9 after 1 year, 2.2 and 2.0 after 3 years) in the control and the intervention group, respectively. There was a decrease of the proportion of patients with perfect risk factor control over the time (from 23% and 24% at operation to 29% and 30% after 1 year and 21% and 11% after 3 years in the control and the intervention group, respectively). After 12 months significant reductions in systolic blood pressure ($p=0.02$), LDL-cholesterol ($p=0.02$) and triglyceride ($p=0.04$) were found in the intervention group on comparison of the two groups. The HDL-cholesterol improved in the intervention group and decreased slightly in the control group. In the follow-up period there was a decrease in the usage of medication known to improve outcome in patients with coronary heart disease. **Conclusion:** The main result of this follow-up study is that the fortified patient motivation with an early, individualized in-hospital rehabilitation program does lead to a significant improved cardiovascular risk factor control within the first year after operation. After three years nearly all parameters have been retained unchanged in both groups.

P21

PHYSICAL ACTIVITY PROFILE IN HEART FAILURE PATIENTS: WHY ARE THE GUIDELINES NOT FOLLOWED IN BRAZIL?

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Background: Physical activity (PA) has shown benefits in primary prevention of chronic diseases and in the secondary treatment of heart diseases, as heart failure (HF). Although it is well known, HF PA habits and physicians orientation are poorly described. **Aim:** The aim of this study was to investigate if physicians were orientating HF patients to practice PA and to quantify patients exercise profile. **Methods:** All 131 HF patients, 80 male, 53±10 years, NYHA class I-V, LVEF 35±11%. 35 ischemic, 35 idiopathic, 32 hypertensive and 29 chagas went to the hospital for a HF routine check-up. On this occasion, after the physician attendance in the

HF Ambulatory, we asked the patients if the physician had orientated them about PA. Then, we asked to fill in the international physical activity questionnaire (IPAQ) Short Form to classify the PA level. **Results:** Our data showed a significant difference between patients that received any kind of PA orientation by physicians (36%) and the ones who did not (64%, $p<0.0001$). Using the IPAQ criteria, from 36% of the patients that received orientation, 12.4% were classified as low and 23.6% as moderate. Sixty-four percent of patients that did not receive recommendation were classified as: low 26.8% and moderate 37.2%. Etiology (except chagas), functional class, ejection fraction, sex and age did not influence the PA profile. **Conclusion:** Brazilian physicians did not orientate the patients satisfactorily to PA. It opposes the guidelines orientation. Our data support the necessity of intensification on exercise encouragement by physicians and complementary studies on this area like home-based exercise orientation programs.

P22

EFFECT OF EXERCISE TRAINING ON 24-HOUR AMBULATORY BLOOD PRESSURE MONITORING IN HEART FAILURE PATIENTS

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Background: Heart Failure (HF) is characterized by a circadian exacerbated neurohormonal activation. The effect of Exercise Training (ET) on 24-h Ambulatory Blood Pressure Monitoring (ABPM) in beta-blockade (HF) patients is unknown. **Aim:** The aim of this study was evaluate the ABPM response to ET in HF patients. **Methods:** Twelve HF patients (32±5% EF, NYHA class 1.6±0.6, beta-blockade dose= 55±30 mg/day, $VO_2=20\pm3$ ml/kg/min, 52±9 years, BMI= 22±3 cm/kg²) and fifteen controls (sedentary healthy subjects, $VO_2=30\pm5$ ml/kg/min, 25±8 years, BMI= 20±5 cm/kg²) underwent ET in a 20±1° controlled temperature room for two months (three times/week at 6 p.m. at 90% of the ventilatory threshold). ABPM (Space Labs Redmond, Wash, USA) was measured before and two days after the last exercise session. **Results:** HF ABPM before and after exercise training was: 111±6 to 112±10mmHg, $p=0.74$ for 24-h mean of SBP; 66±6 to 66±7mmHg, $p=0.81$ for 24-h mean of DBP; 68±6 to 67±7 bpm, $p=0.35$ for 24-h mean of heart rate; 114±10 to 113±11mmHg, $p=0.60$ for daytime mean of SBP; 70±10 to 68±9mmHg, $p=0.56$ for daytime mean of DBP; 70±10 to 68±8bpm, $p=0.31$ for daytime mean of heart rate; 108±11 to 109±12mmHg, $p=0.57$ for night-time mean of SBP; 62±8 to 62±10mmHg, $p=0.97$ for night-time mean of DBP; 63±5 to 63±7 bpm, $p=0.92$ for night-time mean of heart rate. **Controls:** 117±8 to 115±9mmHg, $p=0.019$ for 24-h mean of SBP; 73±6 to 71±5mmHg, $p=0.016$ for 24-h mean of DBP; 80±6 to 79±7 bpm, $p=0.81$ for 24-h mean of heart rate; 121±9 to 120±9mmHg, $p=0.37$ for daytime mean of SBP; 78±7 to 76±5mmHg, $p=0.15$ for daytime mean of DBP; 84±7 to 83±8 bpm, $p=0.54$ for daytime mean of heart rate; 107±8 to 103±9mmHg, $p=0.004$ for night-time mean of SBP; 63±5 to 59±5mmHg, $p<0.0001$ for night-time mean of DBP; 70±5 to 71±6 bpm, $p=0.30$ for night-time mean of heart rate. **Conclusion:** 24 h blood pressure did not change with ET in HF patients. Controls had their blood pressure decreased, mainly at night.

P23

HEART RATE DYNAMICS DURING TREADMILL CARDIOPULMONARY EXERCISE TEST IN OPTIMIZED BETA-BLOCKED HEART FAILURE PATIENTS

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Background: Maximum heart rate (HR) for the age a method to characterize an effort, but little is known about HR dynamics in

optimized beta-blockade heart failure (HF) patients. *Aim:* Evaluate HR dynamics: basal, peak and % increase of HR in optimized beta-blockade HF patients and in sedentary normal individuals (controls) during a treadmill cardiopulmonary test. *Methods:* Twenty-five HF patients (49±11 years, 76% male) with LVEF 30±7% and fourteen controls were included in the study. Were excluded: atrial fibrillation, pacemaker, noncardiovascular functional limitations and whose drug therapy was not optimized. Optimization was considered as 50 mg/day or more of carvedilol and rest HR from 50 to 60bpm for 3 months. *Results:* Basal HR was lower in HF patients (57±3) than controls (89±14) $p<0.0001$, as peak HR (%maximum predicted for age) (65,4±11,1% for HF and 98,6±2,2 for controls; $p<0,0001$). Maximum RER did not differ from groups (1.2±0,5 for normal and 1.15±1 to HF patients, $p=0.42$). All controls reached the maximum HR for the age, but in HF group no one did. Moreover, the % increase of HR from rest to peak exercise between HF (48±9%) and control (53±8%) was not different ($p=0.157$). *Conclusion:* No patient in HF group reached maximum HR for the age during a treadmill cardiopulmonary exercise test, despite of the percentage increase of HR was the same in sedentary normal subjects. HR increase in optimized beta-blocked HF patients should be considered as 65% to an effort near to the maximum during exercise test, but new studies are required.

P24

NEUROHUMORAL ACTIVITY REMAINS INCREASED DURING 6-MINUTE WALKING TEST AFTER HEART TRANSPLANTATION

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The neurohormonal activity during exercise and recovery are powerful predictors of sudden death in selected population. The mechanism by which it occurs has not been established. Heart transplanted (HT) and heart failure (HF) patients have higher incidence of sudden death. *Methods:* We tested neurohormonal activity in 20 HT (18 men), 8.5 years after HT, age 49±11; HF (8 men), age 43±10 years, NYHA I patients were compared with 7 normal (NL, 5 men), age 39±8 years. All patients taking their usual medication. The patients and NL underwent 6-min cardiopulmonary walking test (6WT) using a treadmill without inclination and with self-controlled velocity. We determined at: basal position (b) and the last minute of the last minute 6WT: HR (bpm), SBP (mmHg), DBP (mmHg), VO_2 (ml/kg/min), VE/VCO_2 slope, Distance (D, mph) and norepinephrine level (NOR, pg/ml). *Conclusion:* At rest, NOR levels are slightly higher in HF patients, than in HT and NL. During 6WT, that reproduces daily activity, NOR levels are much higher in HT and HF patients, compared to NL. The heart transplant is used to treat advanced HF but neurohormonal levels remains high in HT patients, in daily activities. At rest and during 6WT the HR, SBP, DBP and VE/VCO_2 slope also are slightly higher in HT patients, than in HF and NL. The consequences of neurohormonal activity should be better investigated in HT patients. *Results:*

Variable	HT (n=20)	HF (n=11)	NL (n=7)
HR rep	104±14‡*	72±5	80±10
HR 6WT	122±21‡*	95±12	97±15
NR rep	463±167	659±225†*	512±132
NR 6WT	1248±692*	1174±653*	545±95
SBP rep	140±24‡*	111±12	121±12
SBP 6WT	152±24‡	123±19	142±15‡
DBP rep	83±16‡*	61±12	69±11
DBP 6W	82±16‡	61±10	74±9‡
VO_2 6WT	14.1±2.2	12.3±4.8	12.6±4.1
VE/VCO_2 slope	33±6‡*	25±5*	20±3
D	0.22±0.04	0.20±0.03	0.24±0.06

† $p<0.05$ dif HT, ‡ $p<0.05$ dif HF, * $p<0.05$ dif NL

P25

EARLY REHABILITATION FOLLOWING OPEN-HEART SURGERY ON THORACIC AORTA

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A number of studies have indicated that beneficial results of early rehabilitation following reconstructive surgery on thoracic aorta can be done only by experienced team. *Aim:* Assessment of incidence of respiratory complications, deep vein thrombosis and duration of in-hospital stay in patients following open-heart surgery on thoracic aorta. *Methods:* A total of 52 patients have been operated in 2007 at our institution. Patients were between 19 and 75 years of age. There were 20/52 female patients (38%). Coronary artery disease was found in 4/52 (7.69%) and mild-to-moderate aortic stenosis and/or regurgitation was found in 27/52 (52%) of patients. 4 of 52 patients (7.69%) died within 30 days of surgery and 18/52 (34%) had significant respiratory, neurologic and/or cardiac morbidity. In-hospital stay was between 9 and 28 days. All patients were subjected to adequate pre- and postoperative rehabilitation program. *Conclusion:* Well designed and thorough early rehabilitation program can have important impact on definitive success of treatment in these complex patients.

P26

HEART RATE VARIABILITY – STYLE OF LIFE AND BODIES PARAMETERS DEFINING STRUCTURE

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Introduction: Cardiac parasympathetic regulation is associated with cardiorespiratory fitness and training load, respectively. It seems to be interesting to find the information about estimating HRV during rest and submaximal activity in groups with different style of life and different BMI. *Aim:* We have measured HRV indexes during rest, ascending and descending stairs. We have analysed dependence HRV, level of activity and BMI. *Patients and Methods:* 21–22 year old healthy men have been investigated. The following parameters were estimated: RR, HR, RMSSD, pNN50%, LF[ms], HF[ms], LF%, HF%, LF/HF. HRV indexes were analyzed at rest and during ascending and descending the stairs. Subjects ascended and descended 2 stories of 24 steps. 30 men were measured for: height, weight and activity levels. *Results:* The differences between groups with different BMI and style of life during exercises were not statistically significant. RMSSD, pNN50%, LF[ms], HF[ms] parameters were significantly higher in group associated with long-term endurance exercise training during rest. *Conclusion:* HRV parameters are not related to HR. BMI are not related to HRV during rest and submaximal exercise. HRV parameters are related to style of life during rest. These results indicate that vagal-related HRV indexes are not related to cardiorespiratory fitness during submaximal exercise.

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P27

HEART RATE VARIABILITY RESPONSES TO ASCENDING AND DESCENDING STAIRS – VALIDITY OF THESE RESULTS TO CARDIOLOGICAL REHABILITATION IN HOSPITAL

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Introduction: Heart rate variability (HRV) indexes are related to cardiorespiratory fitness. It appears to be associated with training load. There is not much information about estimate HRV during submaximal activity. **Aim:** We have measured HRV indexes during rest, ascending and descending stairs. **Patients and Methods:** 21–22-year-old healthy men have been investigated. The following parameters were estimated: RR, HR, RMSSD, pNN50%, LF[ms], HF[ms], LF%, HF%, LF/HF. HRV indexes were analyzed at rest and during ascending and descending the stairs. Subjects ascended and descended 2 stories of 24 steps, each step of 15 cm in height, one step per sec. **Results:** The differences between rest and during exercises were statistically significant. R-R intervals, HR and RMSSD were significantly different in the ascending and descending stairs. Ascending RR (549±41); HR (111±10) and descending RR (606±50); HR (100±9) $p < 0.001$. Ascending RMSSD (15±9) and descending RMSSD (21±10) $p < 0.05$. **Conclusion:** HRV parameters are not related to HR. HR is not reliable indicator of the intensity and balance of the autonomous regulation. There are no significant differences autonomous regulation to ascending and descending stairs. In contrast to activity heart rates. It seems to be interesting to find information about cardiological patients in the same test.

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P28

THE IMPACT OF VARIOUS ENOS POLYMORPHISM ON CLINICAL EVOLUTION OF CORONARY PATIENTS WITH CABG REFERRED TO A COMPREHENSIVE CARDIAC REHABILITATION PROGRAMME

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Coronary artery disease (CAD) is a multifactorial disorder, endothelial dysfunction playing an important role in the development of coronary atherosclerosis. Variation in nitric oxide (NO) level, produced by endothelial nitric oxide synthase (eNOS), is a key factor in production and progression of endothelial dysfunction. **Aim:** The aim of our study was to identify the presence of 2 different eNOS polymorphisms in a group of 31 coronary patients with coronary artery by-pass grafting (CABG) referred to cardiac rehabilitation and followed-up for 1 year and also to investigate their role in the prognosis (expressed as cardiovascular death, cardiovascular events – acute coronary syndrome, stroke). **Material and Methods:** We investigated 31 coronary patients at 7±3 days after CABG, addressed to Cardiac Rehabilitation Clinic Timisoara in order to be included in a comprehensive rehabilitation programme. **Results:** The polymorphisms distribution in the studied population was as follow:

C460T promoter and G894T exon were identified in 6 patients and 12 patients, respectively. 2 patients (6%) presented both form of polymorphism. A single mutation was observed in 10 patients (32%) for G894T and in 4 patients (13%) for C460T. Regarding the impact of C460T and G894T polymorphism on CAD prognosis, we found no correlation between the studied polymorphisms and the CV death. A statistical correlation was established between the presence of each polymorphism and the cardiovascular events (C460T polymorphism: $r^2=0.2729$, $p=0.0045$; G894T polymorphism: $r^2=0.1696$, $p=0.0277$). We also studied the influence of the simultaneous presence of both polymorphisms. Our results showed no correlation with CV death. The relation is statistically significant for CV events ($r^2=0.2571$, $p=0.0119$). **Conclusions:** Our results suggest a high prevalence of eNOS polymorphisms in coronary patients – eNOS polymorphism was identified in almost half of the patients. The number of CV deaths does not correlate with eNOS polymorphism, even if both forms are simultaneous present in the same subject.

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KINESITHERAPY AS REHABILITATION PARAMETER IN CHILDREN AFTER CORRECTION OF CONGENITAL HEART DEFECTS

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Introduction: Congenital heart defects (CHD) can cause in some cases delays during growth, pulmonary complications and muscle hypotrophy. Kinesitherapy helps these children boost condition and growing capacity. **Aim:** Our study is to present optimal and expected duration of kinesitherapy in days in children after correction of CHD in Intensive Care Unit (ICU). **Patients and Methods:** We evaluated 396 children treated at University children's Hospital in Belgrade during 2004–2008. Due to type of CHD we divided children into 7 groups: group with ventricular septal defect (VSD), group with atrial septal defect (ASD), group with ductus arteriosus persistens (DAP), group with coarctation of the aorta (CoA), group with tetralogy of Fallot (ToF), group with transposition of the great arteries (TGA) and group with the stenosis of the aorta (StA). The values are expressed in days. **Results:** We had 118 patients with VSD and duration of kinesitherapy was 5.82±2.52 days, 81 children with ASD and duration of kinesitherapy was 4.73±1.21 days, 67 children with DAP and implementation of kinesitherapy was 4.63±1.95 days, 57 children with CoA and duration of kinesitherapy was 6.42±4.58 days, 43 patients with ToF with duration of kinesitherapy of 7.93±6.17 days, 18 children with TGA with implementation of kinesitherapy of 8.62±2.98 days and 12 patients with StA with duration of kinesitherapy of 5.69±1.12 days. **Conclusion:** Optimal duration of kinesitherapy in ICU is from 4–14 days due to type of CHD and expected duration of kinesitherapy for VSD, ASD, DAP, CoA and StA is 4–7 days while for ToF and TGA it is 9 days.

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P30

REHABILITATION OF LYMPHEDEMA

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Introduction: Lymphedema is a common chronic illness characterized for liquids and proteins accumulated in subcutaneous tissue,

as consequence of the incapacity of lymphatic system to drain the lymphatic fluid. *Patients and Methods:* A 76-year-old woman treated in our Department with history of: Hypertension treated, left gonarthrosis, hiatal hernia and chronic gastritis associated with *Helicobacter pylori* (2002), non-complicated internal hemorrhoids and diverticulitis (2002), syncope related to paroxysmic atrial fibrillation (2005), iron deficiency anemia and depression. The current medication is: furosemide, enalapril, adiro 100, transgorex, adofen, paracetamol and oral iron. The previous surgical procedures: Prosthesis of right knee (2003), Hysterectomy with double adnexectomy (1985), resection of vulvar carcinoma (1990) and appendectomy. 18 years ago vulvar carcinoma was diagnosed that needed vulvectomy with superficial and deep bilateral lymphadenectomy. Non-coadjuvant treatment with chemotherapy or radiotherapy was received. A few months later signs of bilateral lymphedema in lower extremities was shown and it was necessary to start manual lymphatic drainage with physical decongestant therapy. She was well until 2 years ago when she was forced to stop treatment due to reassignment of Hospital. Requested by orthopedic surgeon she arrives to our Rehabilitation Department with the aim of improving her clinical condition before surgery of total prosthesis on the left knee for restriction in her autonomy and difficulty for the independent gait. *Results:* After satisfactory surgery the articular balance was for extension 0° and for active flexion 120°. She started rehabilitation for lymphedema with combined manual lymphatic drainage with compressive bandage in first phase and measures of elastic containment in maintenance phase. *Conclusion:* Treatment of lymphedema is based on Complex Decongestive Therapy (CDT), pharmacotherapy, psychological follow-up and surgical treatment. The CDT shows the best results because it reduces the volume of the edema; balanced the function of the lymphatic system and prevented complications. This therapy should be precocious, traditional and life long.

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P31

HIP PAIN IN A TETRAPLEGIC PATIENT – ILIOPSOAS ABSCESS

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Introduction: Iliopsoas muscle abscess is an uncommon condition which is often difficult to diagnose. It may have an insidious onset and present with vague clinical features. This condition becomes even harder to identify in a tetraplegic patient. Laboratory investigations may reveal a raised white blood cell count, raised C-reactive protein and raised erythrocyte sedimentation rate. CT scan is considered the 'gold standard' for the diagnosis of this entity although some authors consider MRI superior. Treatment involves the use of appropriate antibiotics and drainage of the abscess if necessary. *Aim:* Although iliopsoas muscle is a rare entity it should be considered, namely in patients with fever and hip pain. Our aim is to call attention to this disorder and to the importance of early diagnosis and treatment. *Patients and Methods:* We present the case of a 29-year-old man, previously healthy, who suffered C3–C4 medullar contusion with consequent tetraplegia ASIA D after a car crash. The patient was treated conservatively with corticotherapy and cervical orthosis. Three weeks after the accident the patient started developing fever and severe pain in his left hip. Laboratory findings included elevated C-reactive protein and erythrocyte sedimentation velocity. The patient was studied with an MRI of his left hip that revealed an abscess of the iliopsoas muscle with oedema of the neighbouring muscles. The patient was treated with antibiotics – clyndamicin and cefoxitine.

Results: The patient showed a significant improvement with a decrease in pain and an increase of the passive range of motion of his left hip, as well as a normalization of the laboratory and imaging studies. *Conclusion:* The correct diagnosis of the entity affecting this patient allowed for its prompt treatment which resulted in a considerable decrease of the patient's morbidity. The resolution of the iliopsoas abscess allowed the patient to resume his rehabilitation program with good results.

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P32

OSTEOPOROSIS IN IRAN

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Introduction: Osteoporosis is one of the most common metabolic disorders and the most common metabolic bone disease. The incidence of osteoporosis is increasing worldwide and especially in Asia. Because of proposed dietary deficiencies of calcium and vitamin D and the special wear of the Moslem Iranian women, a thorough study and focusing on preventive approaches are mandatory in Iran. *Methods:* More than 30 related studies performed in Iran in the recent 5 years were reviewed. *Results:* About 50% of men and 70% of women with age 50 or older suffer from osteoporosis or osteopenia in Iran. In postmenopausal women, the prevalence of osteoporosis, osteopenia, and normal bone density is 41.8%, 50%, and 8.2% respectively. After menopause, bone loss will become more accelerated and the frequency of osteoporosis increases and the frequency of osteopenia decreases with age. The mean age and the mean postmenopausal duration of patients with osteoporosis are significantly higher than patients without osteoporosis. Menopausal duration of over 10 years is associated with 5.6 fold increased risk of osteoporosis. Osteoporosis is more frequent (61.5%) in the postmenopausal women with the symptom of low back pain. The prevalence of osteoporosis and osteopenia in men more than 50 years age was shown to be 3.9% and 50%, respectively. The prevalence of osteoporosis at L2–L4 region was 16.7% in men and 56.3% in women. The prevalence of osteopenia at L2–L4 region was 38.9% in men and 25% in women. Peak bone mass at L2–L4 region was reached at the age 29.3 years in women. Means of BMD in subjects aged 20–45 years (Peak Bone Mass), at lumbar spine and the hip were: for females 1.20±0.013 and 0.994±0.13 and for males 1.18±0.14 and 1.05±0.16 gr/cm², respectively. Peak bone mass in Iranian population seems to be 3.9% higher than Japanese and 5.6% lower than American population. Vitamin D and calcium intake, tea consumption, serum Zn, consumption of soy proteins, physical activity, BMI, and education level have a positive relation to BMD and smoking, renal stone history, hyperhomocysteinemia as a result of folate deficiency, diabetes mellitus, hyperthyroidism, thalassemia, hemodialysis, PTH levels, and glucocorticoid use have a negative relation to BMD. Disabled veterans show a marked reduction of bone mass in the neck of femur. Prevalence of vitamin D deficiency is significant in Iran, and one study showed that 80% of the population has at least mild vitamin deficiency. Hip fracture is the most serious consequence of osteoporosis. The estimated incidence of osteoporotic fractures in the year 2001 in Iranian women was 417 fractures in spine, 4337 fractures in femur, and 1806 fractures in the forearm. Using DALY's formula, the disease burden related to osteoporosis in the year 2001 in Iran was estimated to be 36761 years for the population, 17619 years attributed to females and 19143 years attributed to males. *Conclusion:* Osteoporosis

is a major health problem in Iran and preventive measures as for education, appropriate nutrition, sun exposure, and weight bearing physical exercises should be encouraged from childhood to minimize this condition.

P33

IS MODERATE PHYSICAL ACTIVITY ENOUGH FOR THE PREVENTION OF SPINAL DEFORMITIES DUE TO OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN?

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Introduction: Some studies have suggested that patients with osteoporosis exhibit lower back extensor strength (BES) than normal women. This decrease was specific to the back and was not part of generalized muscle weakness, which is often observed with aging. These deficits developed in women with osteoporosis even though they were performing the same type of occupational and homemaking activities as age-matched subjects who did not have osteoporosis. Conversely, others have noted significant relationships between BES and physical activity. As the back extensors are the major supportive muscles of the trunk, it has been postulated that increasing the BES may help decrease thoracic kyphosis. **Aim:** To determine whether physical activity levels of postmenopausal women were associated with their bone mineral density (BMD), BES, severity of thoracic kyphosis and range of spinal motion. **Patients and Methods:** 189 female subjects from 50 to 80 years of age were divided into active ($n=63$) and sedentary ($n=126$) groups according to their physical activity level, measured by the Physical Activity Score (PAS). BMD, BES, severity of thoracic kyphosis and range of spinal motion in the sagittal and frontal plane were measured. **Results:** The groups differed significantly in the range of spinal motion in the sagittal plane ($p<0.05$) (active: $26.9^{\circ}\pm 10.8$; sedentary: $23.0^{\circ}\pm 10.2$), as well as in the frontal plane ($p<0.001$) (active: $77.6^{\circ}\pm 15.8$; sedentary: $23.4^{\circ}\pm 7.5$). There were no significant differences in BMD ($p>0.05$) (active: $0.88\text{ g/cm}^2\pm 0.18$; sedentary: $0.98\text{ g/cm}^2\pm 0.15$), severity of thoracic kyphosis ($p>0.05$) (active: $52.9^{\circ}\pm 12.4$; sedentary: $51.9^{\circ}\pm 11.8$) or BES ($p>0.05$) (active: $49.0\text{N}\pm 14.6$; sedentary: $46.6\text{N}\pm 15.1$). **Conclusions:** This study demonstrates that active women had better range of spinal motion than sedentary women, but they did not differ significantly in severity of thoracic kyphosis, BES and BMD.

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P34

BOTULINUM TOXIN TYPE A IN THE TREATMENT OF LOWER LIMB SPASTICITY IN CHILDREN

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Introduction: Spasticity is one of the major problems in children with cerebral palsy (CP). Botulinum Toxin Type A (BTX-A, Dysport®) chemically denervates the muscles and is used for the treatment of limb spasticity in children with CP. **Aim:** The aim was to determine the effect of BTX-A in reducing spasticity and increasing the range of motion of lower limbs even after the dissolving of the BTX-A effect. **Material and Methods:** The study included twenty children (mean age 5 years and 9 months). All children participated in the habilitation treatment (30% diplegia, 20% hemiplegia, 15% quadriplegia, paraplegia and the mixed form of CP each and 5% with

triplegia). The assessment included measuring of the range of motion and Modified Ashworth scale before the BTX-A treatment and 3 months thereafter. In most cases the BTX-A was applied into the gastrocnemius, semitendinosus and thigh adductors using so-called multilevel approach (dose was 11.6 U/kg). The physical treatment started 3 days after the application of BTX-A (the first 2 weeks 2–3 times a day after that 2–3 times a week). **Results:** Three months after the treatment, statistically significant changes were detected in the increase in the range of motion of hip joint (abduction with 0 degree knee-joint position) and ankle joint (dorsal flexion with 0 and 90 degree position of the knee-joint). Also, significant changes were noticed in the decrease in spasticity (measured with Modified Ashworth scale) in adductors, hip flexors, hamstrings and plantar foot flexors. **Conclusion:** Application of BTX-A leads to the decrease in spasticity of treated muscles and facilitates regular treatment of habilitation of children with CP.

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P35

TREATING SPASTICITY – A CASE REPORT

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We present a 66-years-old woman who was unable to walk for the last one year due to severe painful and spastic knee contractures. Almost abandoned from her family, her past medical history reveals only hypertension. Being well orientated, without any aphasia, and without any psychological problem, uses her arms almost perfectly. She complains only about her legs and really suffers from a terrible itching. Laboratory tests are normal. Brain MRI shows multiple brain infarcts. The examination is very difficult because every tactile stimuli produced pain and itching. After many discussions with neurologists and dermatologists we concluded that both spasticity and itching arose from the multi-infarct disease. She finally was treated with gabapentin 400 mg, three times daily. BTX-A was injected to hamstrings muscles in high dosages (200 UI in each one). Mild physical therapy was started not to produce pain. Day by day she was cooperated and after two months she was walking without help for short distances with a walker with her knees slightly in flexed position. Before completing her programme, she asked to be discharged from the hospital. We conclude that spasticity itself can be treated in many ways. But when pain and proprioception complications accompany spasticity, gabapentin may be the drug of choice.

P36

TRAINING IN BODY-WEIGHT-SUPPORTED TREADMILL AFTER SEVERE BRAIN INJURY

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Introduction: People with brain injury learn to walk safe and efficient in order to gain a walking speed that will be as similar to normal as possible. **Aim:** This study was made to investigate the effectiveness of walking training in a body-weight-supported treadmill training (BWSTT). **Patients and Methods:** Two men with combined spastic and ataxic quadriplegia due to brain injury took part in the study. Both of them, as rehabilitation outpatients, were walking totally depended using a single four-posted cane. Patients performed a 10 m walk before and 11/2 month after body-weight-supported treadmill training. Oxygen saturation, heart rate and CO₂ changes in the airway of intubated patients were measured before and after the training with the 9847 NONIN® Pulse Oximeter and Carbon Dioxide Detector. Walking speed, number of steps and step width

were also measured. In treadmill they were training three times weekly with self-selected walking speed for 10 min. **Results:** Subject A had before training a walking speed of 3.7 m/min for 10 m, completed with 38 steps and 44 cm step width. Oxygen saturation 97%, heart rate 79 beats/min and CO₂ changes 41. Subject A had after training a walking speed of 4.3 m/min for 10 m, completed with 32 steps and 39 cm step width. Oxygen saturation 98%, heart rate 70 beats/min and CO₂ changes 42. Subject B had before training a walking speed of 13.3 m/min for 10 m, completed with 29 steps and 44 cm step width. Oxygen saturation 95%, heart rate 115 beats/min and CO₂ changes 47. Subject B had after training, a walking speed of 16.7 m/min for 10 m, completed with 26 steps and 38 cm step width. Oxygen saturation 97%, heart rate 106 beats/min and CO₂ changes 50. **Conclusion:** Results indicated improvements in motor balance, gait speed. Parameters like oxygen saturation, heart rate and CO₂ changes were not influenced.

P37

THE EFFECT ON SPASTICITY AND STIFFNESS OF THE ANKLE AND THE KNEE JOINT OF CONTINUOUS PASSIVE MOVEMENT IN CHRONIC STROKE PATIENTS – SHORT TIME EFFECT AND FUNCTIONAL GAIT OUTCOMES

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Introduction: Continuous passive movement is recently considered in only a few neurological studies with good effects on ankle stiffness and spasticity. **Scope:** To evaluate the short time effect on changes in spastic hypertonia and/or contracture of the ankle and the knee flexors and extensors after dynamic stretching on triple flexion and double extension and to assess the functional gait outcomes. **Design:** Non-controlled trial. **Setting:** Neurorehabilitation Unit. **Participants:** Fifteen stroke patients with hypertonia and/or contracture after stroke. **Intervention:** Stretching of the plantar- and dorsiflexors of the ankle and flexors and extensors of the knee, 5 times a week for 30 min, during a 3-week period by using a continuous passive movement and programmed stretching device. **Main Outcome Measures:** Spastic hypertonia and distal contracture were assessed on the basis of Modified Ashworth Scale, passive and active ROM. Functional gait outcomes were assessed by Functional Ambulation Classification, 10-m walking time and Gait-Motor Assessment Scale. The measurements were performed before and after treatment. Patient and doctor satisfaction on spasticity reduction was evaluated by a five-point questionnaire (1=very poor, 2=poor, 3=acceptable, 4=good, 5=very good). **Results:** There were improvements in reducing of ankle and knee spasticity and stiffness and also in functional gait outcomes. In addition, patient and doctor satisfaction regarding short-term therapeutic effects was mainly good (ranging from acceptable to very good). **Conclusions:** Overall impression was positive in reducing ankle and knee spasticity and/or contracture in stroke patients after continuous passive movement. Patient and doctor satisfaction was positive.

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P38

COMPARISON OF TWO SLINGS MADE OF DIFFERENT FABRICS IN HEMIPLEGIC PATIENTS

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Introduction: Upper extremity functional impairment is common after stroke and arm slings are used for shoulder subluxation. **Aim:** We aimed to search whether there was difference in weight bearing of upper extremity between hemiplegic and normal sides and whether subluxation had an effect on this loading. **Patients and Methods:** 33 hemiplegia patients were enrolled to the study. Demographic characteristics including age, etiology, Brunnstrom level in upper extremity, subluxation in hemiplegic shoulder were recorded. We modified a specific shoulder sling which could measure the weight of upper extremity and we used 2 different fabrics with different stretching properties (canvas and cotton) for the sling. We compared the weight bearing capacity of these slings and weight bearing difference between 2 sides for each fabric. **Results:** The mean of disease duration of the patients was 6.1±6.8, Brunnstrom of upper extremity was 3.09±1.6; Ashworth scale was 1.3±1.2. Weight bearing capacity of the canvas sling was 1.85±0.79 kg for the involved side and 1.65±0.71 kg for the normal side; that of cotton sling was 1.77±0.89 kg and 1.64±0.71 kg, respectively. Thirteen of the patients had subluxation; in patients with subluxation the mean weight bearing of the canvas sling was 1.77±0.66 kg and cotton sling was 1.63±0.76 kg and those for the nonsubluxated patients were 1.9±0.87 kg and 1.87±0.97 kg, respectively. **Conclusion:** Our study indicated that hemiplegic upper extremity does not constitute additional weight on different kinds of arm slings and stretching of the fabric of the arm sling is not influenced by the load of the upper extremity.

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ASHWORTH EVALUATION IN DIFFERENT JOINT POSITIONS IN HEMIPLEGIC PATIENTS

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Introduction: Spasticity is a common problem for positioning in hemiplegic patients and this could lead to contractures. Ashworth scale is mostly used for determining the severity of spasticity. **Aim:** In this study we planned to search whether different positions of joints had an influence on Ashworth scale values. **Patients and Methods:** The demographic characteristics of the patients including age, sex, involved side, functional motor level assessed by Brunnstrom were recorded. We selected elbow, hip, knee and ankle joints and measured the Ashworth scale in sitting, supine, prone and lateral recumbent positions in patients with hemiplegia. **Results:** 31 female and 34 male patients were evaluated, 49.2% of the patients had right and 50.8% had left hemiplegia. 76.9% had thromboembolic etiology. Ashworth scale values in different joint positions are shown in Table I. Knee flexion and extension, ankle plantar flexion and hip extension was significantly different in different joint positions ($p<0.05$). **Conclusion:** We found that intensity of spasticity was influenced from different positions of knee, hip and ankle. Therefore it would be better to choose the least spastic positions for positioning and exercising in patients with hemiplegia.

Table I. Ashworth values in different positions of the joints

	Ashworth	Sitting	Supine	Lateral recumbent	Prone
Elbow flexion	0	35.4%	30.8%	33.8%	
	1	33.8%	41.5%	18.5%	
	2	26.2%	21.5%	33.8%	
	3	4.6%	6.2%	13.8%	
Elbow extension	0	95.4%	90.8%	95.4%	
	1	3.1%	4.6%	4.6%	
	2	1.5%	4.6%		
	3				

Hip flexion	0		98.5%	93.8%
	1		1.5%	6.2%
	2			
	3			
Hip extension	0		70.8%	90.8%
	1		18.5%	7.7%
	2		10.8%	1.5%
	3			
Hip abduction	0		98.5%	98.5%
	1		1.5%	1.5%
	2			
	3			
Hip adduction	0		80.0%	86.2%
	1		20.0%	10.8%
	2			3.1%
	3			
Knee flexion	0	92.3%	100.0%	100.0%
	1	3.1%		
	2	3.1%		
	3			
Knee extension	0	80.0%	86.2%	95.3%
	1	10.8%	7.7%	4.7%
	2	6.2%	4.6%	
	3	1.5%		
Ankle dorsiflexion	0	96.9%	95.4%	90.8%
	1	3.1%	1.5%	9.2%
	2		3.1%	1.5%
	3			
Ankle plantar-flexion	0	38.5%	29.2%	40.0%
	1	40.0%	30.8%	21.5%
	2	21.5%	30.8%	35.4%
	3		9.2%	3.1%

P40

SPASTICITY AND ITS ASSOCIATION WITH FUNCTIONING 6 MONTHS AFTER STROKE IN YOUNG ADULTS

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Introduction: Stroke is not an uncommon issue in children or young adults, but in a significant number of cases, no obvious risk factors are found; spasticity is a frequent feature, diminishing the capacity of the patient to accomplish work using his motor system. **Aim:** The aim of the present study was to describe the association between spasticity and functioning on patients at 6 months after the stroke. **Patients and Methods:** 19 patients aged under 30 were considered, with first ever stroke of different causes (carotid dissection, AVM, aneurysm, homocysteinuria, coagulopathy, vasculopathy), all spastic. They were examined 6 months after the event with Modified Ashworth Scale (for spasticity), FIM and Barthel (for functionality). **Results:** Among the 19 patients studied, all of them were spastic, 4 of them with score 1, 8 with 1+, 5 with 2 and 2 with 3; correlations were noticed between the level of spasticity (MAS scale) and the functional scores. **Conclusion:** Long-term spasticity contributes to the limitation of activity and movement function.

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P41

TENS VERSUS PARAFFIN APPLICATIONS FOR HAND SPASTICITY MANAGEMENT IN STROKE PATIENTS

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Introduction: TENS applications for spasticity management are still in the experimentation stage. The existent studies appreciate that this form of physical therapy influences spasticity by stimulating peripheral afferents and muscular perfusion. **Purpose:** Measurement of TENS efficiency on hand spasticity treatment in stroke patients in comparison with local paraffin applications. **Material and Method:** This study included 35 patients (16 women and 19 men, medium age 53±5 years) with hand spasticity grade 2 to 3 on modified Ashworth scale after stroke (after 6 or 12 month). The standard rehabilitation program included TENS applications (80Hz, 20 min), two times every day, on forearm (group A); the second group B (23 patients with similar characteristics of age, sex and spasticity) received paraffin applications (45°C, 20 min), two times every day. We measured (at admission, after 3 weeks of treatment, and after a month) the following clinical (stroke type, localization and age, spasticity grade and localization, the presence of pain) and functional parameters (joint mobility, Functional Independence Measure). **Results:** In group A half of patients presented a significant improvement of radiocarpian joint mobility and of arm coordination and the diminution of pain; this result was persistent at a month after the completion of the treatment. On the other hand, the second group had an insignificant improvement after a month even though the initial results were similar. **Conclusions:** TENS applications can prove their long-term efficiency in spasticity control and arm functioning, with better results than classical methods. For selected cases with resistant spasticity, TENS devices for home use can be a useful therapy.

P42

EARLY USE OF INTRATHECAL BACLOFEN IN A PATIENT WITH SEVERE TRAUMATIC BRAIN INJURY

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Introduction: In the early course of severe head trauma the clinical value of intrathecal administration of baclofen (ITB) to reduce autonomic disorders and spasticity has not yet been established. The Food and Drug administration (FDA) has approved the use of ITB for spasticity exclusively for patients who are at one year post injury. **Patients and Methods:** We report a case of a 22-year-old male with Glasgow Coma Scale (GCS) 4, autonomic disorders and severe spasticity after a severe traumatic brain injury. Three months post injury all conventional measures were not effective, and the spasticity remained intractable an intrathecal bolus test of 50 µg/ml baclofen was administered. The bolus test was successful and a programmable pump (Medtronic Synchronomed II) was implanted – with the tip of the spinal catheter in the medi thoracic region. **Results:** Immediately post surgery score in the modified Ashworth scale was decreased from 3 to 1 in the upper extremities and from 4 to 1 in the lower extremities. The autonomic storms ceased and the patient could be discharged from all oral and intravenous medications for tone, storming and fever. The elimination of the medications resulted in the patient becoming much more alert and interactive. At 2-years post brain injury, the patient has a 6 score on the extended Glasgow Outcome Scale and the dose of ITB is gradually being tapered. **Conclusion:** This case shows that the early use of ITB may play a significant role in the rehabilitation of patients with severe traumatic brain injury. ITB appears to be effective in preventing the development of severe joint contractures that typically occur in brain injury patients within the first 12 months after injury. Further investigation with randomized controlled studies is warranted.

P43

THE EVALUATION OF SPASTICITY ACCORDING TO POSITION IN PATIENTS WITH PARAPLEGIA

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Introduction: Spasticity is a common complication and interferes with quality of life in spinal cord injury (SCI). Posture and positioning are very important for assessment of spasticity. **Aim:** To investigate the influence of different positions on hip, knee and ankle spasticity measured by Ashworth Scale in paraplegia patients with lower limb spasticity. **Patients and Methods:** Sixty-two patients (13 female, 49 male) with paraplegia were included in the study. A personal history and demographic characteristics were obtained, and the level of injury (ASIA scales of international standards), spasticity grade (Ashworth scale) and baseline sitting, supine and prone spasticity grades at the hip, knee and ankle joints were determined. The patients' motor activity and functional activities were also evaluated. **Results:** Mean age was 36.7±13.2 (15–75) years and the average duration since injury was 2.2±4.7 years. American Spinal Injury Association (ASIA) grades were as follows: ASIA grade A in 35 (56%), ASIA grade B in 6 (10%), ASIA grade C in 12 (19%) and ASIA grade D in 9 (15%) patients. There was no statistically significant difference between the grades of spasticity of the patients in different joint positions ($p>0.05$). **Conclusion:** We showed that the outcome of clinical assessment of spasticity was not influenced considerably by subject positioning.

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INTRATHECAL BACLOFEN PUMP IN MANAGEMENT OF SEVERE SPASTICITY

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Introduction: Severe spasticity can present complex issues in patients with acquired brain injury, stroke, spinal injury, multiple sclerosis and cerebral palsy. When severe, spasticity causes pain, loss of function and difficulty with hygiene and care. Management within interdisciplinary rehabilitation programme includes passive stretching, splinting, oral medication and focal intramuscular botulinum toxin injection. Intrathecal baclofen (ITB) has been shown to be effective in severe spasticity of spinal or cerebral origin. **Case study:** A 38-year-old man suffered a 20 min asystolic cardiac arrest resulting in hypoxic encephalopathy and persistent vegetative state (PVS). Twelve months later he was admitted to inpatient rehabilitation programme with severe spasticity and contractures in all limbs and neck despite multiple interventions. He was constantly sweating, grimaced with every passive movement and was bed bound. It was not possible to seat him and hygiene care was difficult. ITB pump insertion caused marked improvement in tone. After 8 weeks of titration, an optimal dose was reached. He was seated successfully in a customised chair, looked comfortable and was easier to care for in personal hygiene. A significant amount of medication were weaned off. A series of photographs presented illustrates improvement and outcome. **Discussion:** Clinical research trials support the effectiveness of ITB in the management of severe spasticity showing improvement in pain control, functional status and quality of life from the paediatric age group to patients over 65. This case illustrates improved comfort, ease of care, contracture and seating management with the use of ITB in a patient with PVS.

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P45

CONSENSUS STATEMENT FOR THE TREATMENT OF ADULT SPASTICITY WITH INTRATHECAL BACLOFEN

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Background: Spasticity is a motor disorder, characterised by a velocity-dependent increase in tonic stretch reflexes (muscle tone) with exaggerated tendon jerks, as a result of hyper-excitability of the stretch reflex as one component of the upper motor neurone (UMN) syndrome. Affecting the patients' functional abilities, spasticity can also have a strong influence on their quality of life (QoL). Depending of the clinical presentation, several therapeutic approaches are available. In case of severe and diffuse spasticity, oral medication is often only partly effective and can lead to unbearable side effects. Intrathecal baclofen administration (ITB) can then be indicated. **Objective:** This article results from a consensus statement on the management of adult patients with spasticity, focussing on ITB. Along with a treatment algorithm, it aims to promote a more consistent approach to treatment and to provide information made available to clinicians, patients and their caregivers. **Methods:** Data on clinical studies and clinical experience were collected during two 1-day meetings and completed by searches in medical literature databases for specific terms associated with ITB, in order to form a consensus statement based on clinical experience and evidence. **Results:** A consensus statement and an accompanying algorithm were developed to ensure a standard approach to treatment in the selection of eligible candidates for ITB therapy. **Conclusions:** ITB should be considered in patients with diffuse and severe refractory spasticity, or in those experiencing unacceptable side effects or an inadequate response to oral or focal medication. **Acknowledgements:** This work was supported by an unrestricted educational grant from Medtronic Europe. The content of this report was not influenced by the funding source.

P46

COST-EFFECTIVENESS OF INTRATHECAL BACLOFEN THERAPY VERSUS CURRENT THERAPIES IN DISABLING SPASTICITY

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Introduction: Disabling spasticity often impairs an individual's ability to perform every day activities. While physical therapy is pivotal in the overall management of the impairment, a variety of pharmacological and surgical approaches can be employed over time including intrathecal baclofen (ITB). ITB has been shown to be effective in controlling the harmful effects of spasticity in selected patients. **Aim:** The aim of this study was to compare the therapeutic and cost-effectiveness of ITB used as a first-line treatment within the current medical management of spasticity in France. **Patients and**

Methods: Two decision tree models represent current best practices in managing spasticity patients: 1) A first model simulates current therapies using various sequences of physical treatment only, oral treatments, focal spasticity treatments, neuro-surgery and nursing; 2) A second model simulates strategies starting with ITB as the first line treatment. A successful treatment has been defined as a patient or caregiver satisfaction and an improvement of 1 point or more in the Ashworth score. Direct medical costs were collected in the context of the French health care system. Effectiveness and cost parameters were included in the model according to specific distribution shapes in order to take into account medical practices variability. **Results:** ITB as first line strategy is the dominant strategy over 2 years, providing greater treatment success rate (78.7% versus 59.3%, $p < 0.001$), lower costs (59'391 Euros versus 88'272 Euros, $p < 0.001$) and better cost-effectiveness (75'204 Euros/success versus 148'822 Euros/success, $p < 0.001$) than current strategies. **Conclusion:** This robust cost-effectiveness modeling is the first study assessing the cost-effectiveness of various treatment sequences in disabling spasticity according to current medical practices. This study establishes that introducing ITB as the first line therapy is more effective and less costly over a time period of 2 years.

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P47

PAIN CONTROL IN HEMIPARETIC SPASTIC SHOULDER

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Objective: To assess the efficiency of specific muscular electrostimulation on spasticity-induced shoulder pain in hemiparetic patients in chronic stage. **Material and Method:** We studied 51 patients with previous stroke (3–9 months) with shoulder pain. We excluded specific shoulder pathology: subluxation, tendinopathies, retractile capsulitis, hand-shoulder syndrome, bursitis, brachial plexus elongation. The remaining underlying pathology is shoulder muscle spasticity, especially on internal rotators. We applied low frequency TENS on spastic muscle antagonists, namely external rotators (subscapularis) on group A (26 patients). Group B (25 patients) served as control. We evaluated the patients with pain free ROM and Motor Assessment Scale (upper arm function, hand movements, advanced hand activities). **Results:** After 15 days we noticed a 53% increase of pain free ROM and a 38% increase in MAS – upper arm function. The MAS – hand movements and advanced hand activities had no significant variations. **Conclusion:** When the spasticity is the underlying cause of shoulder pain, attempts to reduce it (as with TENS on spastic muscles antagonists) may improve local pain and mobility.

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USING AURICULOTHERAPY TO TREAT STUDENT ANXIETY DURING EXAM PERIODS

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Introduction: The large majority of university students experience an increase in anxiety levels during exam periods. This increase

can impact negatively on students' performance in written and practical exercises. A review of the bibliography offers evidence that supports the use of auriculotherapy (ASP) to diminish anxiety levels in different pathologies. **Objective:** To diminish university students' anxiety levels during exam periods. **Materials and Method:** We carried out a longitudinal pilot study on a group of 23 volunteers, all of whom were university students. One week prior to the beginning of the exam period, we placed bilateral ASP with seeds at Shenmen, Mio-relaxant and Heart, which were left there for 15 days. We evaluated the pre-test and post-test anxiety levels using an analogic visual scale (0–10). **Results:** 80% of the participants experienced a reduction in anxiety level. Reductions averaged 2.5 points, and the greatest reduction in anxiety levels (4 points) were among students whose pre-test anxiety levels were the highest (8 out of 10 points). The ear puncture did not produce any secondary effects. **Conclusions:** 1) The use of ASP is a simple technique without side effects; 2) It was well-accepted by the participants who received it; 3) This method can help university students who, because they suffer from an excessive level of anxiety are unable to fully demonstrate their knowledge in exams; 4) The largest decrease in stress achieved through the application of this therapeutic method was in participants who exhibited the highest level of anxiety prior to the study; 5) It is a very safe method in terms of possible complications and/or side effects.

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STUDENT'S PRIOR KNOWLEDGE OF EVIDENCED-BASED MEDICINE

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Background: Evidence-based medicine (EBM) is a routine fact of the practice of medicine. Within the frame of a University that advances the European Higher Education Area, for the past 5 years we have included 'Teaching physiotherapy based on evidence' as part of the curriculum offered to students in Physiotherapy and Medicine. **Materials and Methods:** A survey, structured and completed before the evidence classes were given, of the students enrolled in their 6th year of Medicine and 3rd year of Physiotherapy at two universities for the 2001–2002 academic year, and compared these results to the ones gathered in the 2006–2007. **Results:** The average student age is still 23 among medical students and 20 among physiotherapy students, they enter the University from the last year of high school (73% in 2001, 69% in 2006), although the number of students over 25 has increased with 5%. The level of knowledge of computer technology has also increased: in 2001, 21% of the students admitted not knowing anything about computers, compared to 0% in 2007, and basic computer skills also rose from 30% to 38%. 81.3% of students have access to a computer, compared to 73% in 2001, and internet use is about the same (55.9 and 58%). There were no changes in the lack of awareness of EBM (100%) and interest in knowing more about it (100%). **Conclusion:** Students continue to be interested in "Scientific Evidence". Students knowledge of Scientific Evidence has increased in the last 5 years. The use of information systems is at the same level as in prior years.

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P50

EXTRACORPOREAL SHOCK WAVE THERAPY IN THE TREATMENT OF MUSCULUS BICEPS FEMORIS PARTIAL RUPTURE – CASE STUDY

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Introduction: Partial rupture of the hamstring muscles is caused by overstraining, sudden pulling or a blow. This causes an intramuscular haematoma. In the majority of cases, intramuscular haematoma heals without therapy, as the body itself resorbs the haematoma and evacuates it through its blood and lymph system. Sometimes the resorption may last for a long time or be incomplete causing the haematoma, as a foreign body, to disrupt a normal muscle function and to cause pain. Such conditions should be treated, so as to help the patient recover in the shortest period of time. **Aim:** To show the effect of Extracorporeal Shock Wave Therapy (ESTW) in the treatment of haematoma and m.biceps femoris partial rupture. **Patients and Methods:** A 60-year-old female patient feeling a constant pain at the back side of the right upper leg, when standing and walking for the past four months. The examination showed a palpable sensitivity to pain at the back distal part of the right upper leg, as well as a strong feeling of pain when flexing and extending the knee. Ultrasound examination discovered a partial spindle-shaped rupture indicating haematoma and/or posttraumatic cyst, in the distal part of m.biceps femoris below muscular fascia, 17×8.9 mm in diameter. We applied 5 ESWT, every other day, using a low-energy device according to the following parameters: pressure 1.5 bar, 2000 pulses per therapy. **Results:** After the completion of therapy, the patient feels no pain. The ultrasound examination, 16 days after the completion of therapy, shows a scar at the place of the rupture with a small cyst at the caudal part, dimensions 4x8 mm. **Conclusion:** The use of ESWT in the treatment of m.biceps femoris rupture has proven to be very effective in eliminating pain, rupture healing, as well as in quickly enabling the patient to perform her everyday activities.

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NEW FINDINGS ABOUT THERAPEUTIC EFFECTS OF WHOLE-BODY VIBRATION

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Introduction: Whole-body Vibration is a type of exercise that has recently been developed for treatment and prevention of diseases of muscle-skeletal-system. Several studies report about the benefit of Vibration exercises. But, mode of function and also therapeutic parameters are still unknown. **Methods:** We examine more than 50 healthy students of physical therapy at the fitvibe0. Sensors measuring movements, distance and acceleration of movement are placed at tibia front, at trochanter major and at processus spinosus L4 and C7. All probands do the same exercise at a frequency of 20, 40 and 60 Hz with an amplitude of 2 mm. **Results:** First results show that Vibration is leading to maximal muscular innervation depending on frequency and amplitude. Vibration effects were also detectable at lumbar and cervical spine. Effects of whole-body Vibration seems to be depend on body weight. We notice effects of fatigue at skeletal muscle which cause to different results of measurement.

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OPEN VERSUS CLOSED KINETIC CHAIN EXERCISES FOR PATELLAR CHONDROMALACIA

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Subject: Conservative treatment of patellar chondromalacia has been the subject of the several studies. One of its recommended treatments is the strengthening exercise of quadriceps, which may be performed in the closed or open kinetic chains. As, there is no study to compare the preference of these exercises, this study has been designed to compare the effect of SLR and Squat exercises on the treatment of patellar chondromalacia. **Material and Methods:** 32 Female university students with diagnostic of patellar chondromalacia randomly assigned in one of two experimental, SLR and Squat exercise groups. Before starting exercise protocols, Q angle, isometric maximal voluntary contraction force (IMVCF) of quadriceps, crepitation, circumference of thigh in 5 and 10 cm above the patella, patellofemoral pain in visual analogue scale (VAS) were assessed. Then both groups were undergone a three weeks (twice daily, started at 20 times each and 5 times added in each day) of quadriceps strengthening exercise including SLR or Squat. All measurements were repeated at the end of each week and also in two weeks after the 3 weeks exercise protocol. **Results:** Findings showed reduced Q angle ($p=0.016$) and crepitation ($p=0.04$), and also some increase in IMVCF of quadriceps ($p=0.01$) and in thigh circumference ($p=0.001$) in the Squat group compared to the SLR group. However, patellofemoral pain was decreased significantly in both. **Conclusion:** The results of this study indicate that Squat exercise (Closed Kinematics Chain) is more effective than SLR exercise (Open kinematics Chain) on the treatment of patellar chondromalacia. More studies are needed to investigate the most long term effect of this type of exercise.

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EFFECT OF LOW-INTENSITY ULTRASOUND (US), LOW-LEVEL LASER THERAPY (LLLT) AND ELECTRICAL STIMULATION (ES) ON BONE HEALING PROCESS – AN ANIMAL STUDY

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Objectives: Several modalities such as low-intensity ultrasound (US), Low-level laser therapy (LLLT) and electrical stimulation (ES) are using for decreasing the time for fracture healing. The objective of this study was to evaluate the effect of above noted modalities on fracture healing. **Method:** For 60 female New-land-white rabbits osteotomy at right tibial bone with external fixator was performed. These rabbits were divided in four groups equally as control group (C) that did not receive any modality, low-intensity ultrasound treated group (U), electrical stimulation treated group (E) and Low-level laser treated group (L). Callus density was evaluated with MD 64 CT scan at regular periods. At the end of 12th week after surgery all cases were killed and in each case both tibial bones (right or healed and left or intact) were extracted and were tested for biomechanical properties under bending force. **Results:** At 5th week callus density in our study groups is so: L has the highest density and the C group has the lowest one, and the other groups have intermediate densities in which U group has higher density than E group ($p=0.0001$), but the above-mentioned order has been changed in the 8th week as so in order: U, C, L and E groups ($p=0.001$). Tensiometry study showed poorer resistance against bending force in healed bones

in comparison with intact bone in L and U groups ($p=0.0001$ and $p=0.003$, respectively). *Conclusion:* Although US and LLLT can improve fracture healing rate, but the healed bone have poor biomechanical properties. Therefore, therapeutic use of these modalities is not recommended routinely for fracture healing and if any kind of modality will be used, ES seems to be better and safe.

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THE EFFECT AND PERSISTENCY OF THE BOTULINUM TOXIN IONTOPHORESIS IN TREATMENT OF PALMAR HYPERHIDROSIS

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Introduction: Injection of botulinum toxin type A can effectively inhibit the release of acetylcholine from the presynaptic cholinergic nerve fibres, causing chemodenervation of the eccrine sweat glands and reduction of the sweat production (1, 2), however this benefit may be negated by unintentional weakness of adjacent muscles and severe pain during multiple injections. *Aim:* In order to find a non-invasive treatment with least side effects, we speculated whether botulinum toxin type A can be delivered by iontophoresis. In this study we investigated the efficacy and persistency of botulinum toxin type A delivered by iontophoresis in the patients with primary palmar hyperhidrosis. *Patients and Methods:* Iontophoresis of Botulinum Toxin type A (Dysport®) was applied on patients' right (dominant) hand and the other hand was considered as control group and treated with normal saline. Gravimetry and iodine-starch tests were performed to evaluate the rate of sweating. The evaluation sessions were at baseline, 2 and 4 days, 1, 2, 3, 4, 8, and 12 weeks after treatment. *Results:* The mean sweating rate was reduced in both hands at all evaluation sessions. In the right hand the reduction was statistically significant at week 1, 3, 4, 8 and 12 ($p<0.05$) after treatment and at only week 3 and 4 ($p<0.05$) after treatment in the left hand. *Conclusions:* The results suggested that nonionic drug such as botulinum toxin can be effectively delivered by iontophoresis. Considering the conversion factor of 1:4 between Botox® and Dysport®, the moderate hypohidrosis (mean reduction of 48% and 42% after 3 and 12 weeks respectively) that was achieved from iontophoresis in our experiment is comparable with the result of the studies using injection of Botox® (1).

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P55

INFLUENCE OF INTERMITTENT NEGATIVE PRESSURE TREATMENTS (GREENSAC®) ON VASCULAR AND THROMBOCYTE COMPONENT OF THE HEMOSTATIC SYSTEM IN PATIENTS WITH LYMPHOEDEMA OF THE LOWER EXTREMITIES

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Objectives: The passability of the blood vessels is of crucial importance for tissue metabolism, which stands for the patients with lymphoedema of the lower extremities as well. One of the methods which can be used for diminishing the lymphoedema is

the treatment with intermittent negative pressure (INP) by using a vacuum sac we investigated the influence of this therapy on some components of the hemostatic system. *Methods:* 43 of the patients with lymphoedema (mean age 58.2 years) were treated with INP, using a hypobaric sac Greensac® (Iskra-Medical Slovenija): 10 treatments of 20 min during one month. Before the beginning of the treatment, just after the treatment and two weeks after, a screening of the hemostatic system was done: number of thrombocytes, fibrinogen, prothrombin time, thrombin time, the degree of thrombocyte aggregability and the level of factor VIII. *Results:* The results of the basic tests used for the hemostatic system, as well as SE, FBC, standard biochemical tests, lipid status and CRP were in the reference range. The degree of the thrombocyte reactivity, measured by the aggregometer, before and just after the treatment was moderately increased: with the ADP added-80%, adrenaline-72% and collagen-78%. However, two weeks after the end of the treatment, the degree of the thrombocyte aggregability was below the lower margin of the reference range which is 65%. *Conclusions:* The application of the INP by using the vacuum sac significantly and in long term lowered the degree of the thrombocyte reactivity in patients with lymphoedema. That way, the danger of thrombus forming and occlusion of the vessels of the affected limbs is lowered and this preserved and improved passability of the blood vessels positively affects the final results of the lower limb lymphoedema treatment.

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THE ROLE OF GLUCOSAMINE AND CHONDROITINE IN OSTEOARTHRITIS TREATMENT – A REVIEW OF THE RECENT LITERATURE

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Background: Osteoarthritis is a major social and medical problem by its incidence and consequent functional deficit. Incidence of the disease varies from 7% to men and 2% to women of 18–24 years of age to 100% to old people in their 80's. *Methods:* A review of the last ten years specific literature shows the latest news regarding the role and action of the nutraceuticals (glucosaminoglycans and chondroitinsulphate) as a part of the therapeutic EULAR protocol of osteoarthritis. A meta-analysis made by JAMA in 2000 evaluated the studies published between 1966 and 1999 selected only 15 studies rigorously written. *Results:* The studies presented are a strong evidence for the therapeutic efficacy, well defined joint protection role and very low side effects of the dietary supplements mentioned above. *Conclusion:* Glucosaminoglycans and chondroitinsulphate are safe and officially included in the therapeutic protocol for osteoarthritis.

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TONUS REDUCTION OF TRAPEZIUS MUSCLE BY MODULATED MIDFREQUENCY ELECTROTHERAPY ON PATIENTS SUFFERING FROM CERVICAL SPINE SYNDROME

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Introduction: Cervical pain syndrome is usually associated with high muscle tonus in the upper trapezius. This tonus can be measured by superficial electromyography (EMG). Modulated

midfrequency electrotherapy (MET) could be used to regulate muscle tonus and therefore reduce painful conditions. *Aims:* Our goal was to investigate if 20 min of modulated midfrequency electrotherapy has an immediate effect on muscle tonus in the cervical spine area. *Patients and Methods:* In this pilot study 20 subjects (mean age 49.85±17.05) received MET on the trapezius muscle. Before and after treatment, EMG of the trapezius was measured. Additionally subjective sensation of neck pain was evaluated by a visual analogue scale (VAS) with a range from 0 to 100. The inclusion criteria was chronic neck pain. Exclusion criteria included pregnancy, neuromuscular and neurological disorders, muscle atrophy and pacemaker. *Results:* We could observe a reduction of muscle tonus from 24.79±20.74 to 8.52±4.84 micro volt which is a reduction of 65.63% ($p<0.001$). The mean VAS-score could be reduced from 7.1±0.97 to 3.8±1.51 which is a reduction of 46.48% ($p<0.0001$). *Conclusion:* The MET seems to reduce pathological high muscle tone in the trapezius muscle. There is also an observable benefit regarding pain sensation evaluated by the patients themselves.

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SHOCK WAVE THERAPY IN SHOULDER TENDONITIS

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Introduction: The treatment of patients with tendonitis is typically conservative, including physical therapy, iontophoresis, deep friction, local or systemic application of non-inflammatory drugs and subacromial bursal steroid injection. Extracorporeal shock wave therapy (ECSWT) is an increasingly popular therapeutic approach to the treatment of a number of soft tissue complaints. Whilst benefit has been demonstrated in calcific tendinosis, evidence is lacking for benefit in the management of non-calcific rotator cuff disorders. *Aim:* To perform a study of the effect and the tolerance of the ECSWT, in patients with calcific and non-calcific tendonitis of shoulder. *Patients and Methods:* Between February 14, 2002 and January 21, 2008, we prospectively studied 127 consecutive adults patients with calcific and noncalcific tendonitis of shoulder, treated with ESWT, one session/week, during 4 weeks. All were assessed before each treatment and one month, after completion of therapy. *Results:* 127 subjects, 99 (78.0%) women and 28 (22%) men, of 48.8±7.9 years old. The side was right in 75 (59.1%), and left in 52 (40.9%). The mean duration of symptoms was 3.2±3.9 years. They had previously been treated with: medication 98 (77.2%), steroid injection 20 (94.4%), electrotherapy 68 (53.5%), sonotherapy 67 (52.7%), Cyriax 35 (27.5%), thermotherapy 36 (28.3%) and kinesiotherapy 62 (48.8%). The interval between the last treatment and the ECSWT was 5.3±13.8 months. The energy density was 0.88±0.22 mJ/mm² (1849.3±15.3 impulses). At one month after the ECSWT, the evaluation resulted in significant improvement in pain (67.9% activity) and articular rank (35.5° abduction). The limitations in daily living activity, sporting and working activity that existed in 127 (100%), persisted in 13 (10.2%) and 17 (13.4%), respectively. The calcifications that existed in 104 (81.8%), persisted in 45 (43.26%). The tolerance was good in 80 (70.9%), without secondary effects of interest. *Conclusions:* ECSWT in shoulder tendonitis are well tolerated, and shows a significant effectiveness for pain relief, functional restoration and calcifications, with a mean satisfaction of 8.3±1.9 (0–10).

Reference:

1. Mirallas-Martínez JA. Efectividad de las ondas de choque extracorpóreas basada en la evidencia. *Rehabilitación (Madr)* 2005; 39: 52–8.

P59

SHOCKWAVE THERAPY IN PLANTAR FASCIITIS

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Introduction: Plantar fasciitis pain is severe and can cause loss of time from work sometimes leading to total and/or partial disability. ESWT eliminates the risk factors associated with surgery and lets the patient resume a normal life. *Aim:* Is to study the effect and the tolerance of the treatment with extracorporeal shock wave therapy (ESWT) in plantar fasciitis. *Patients and Methods:* Between February 5, 2002 and January 21, 2008, we prospectively studied 60 consecutive adults patients with plantar fasciitis, treated with ESWT, one session/week, during 4 weeks. All were assessed before each treatment and one month, after completion of therapy. *Results:* 60 subjects, 37 (61.7%) women, and 23 (38.3%) men, of 50.0±11.4 years old. The side was left in 33 (55.0%) and right in 26 (43.3%). The mean duration of symptoms was 1.5±2.9 years. They had previously been treated with: medication 30 (55.0%), steroid injection 36 (60.0%), electrotherapy 16 (26.6%), sonotherapy 23 (38.3%), Cyriax 5 (8.3%), and kinesiotherapy 11 (18.3%). The interval between the last treatment and the ECSWT was 1.6±2.2 months. The energy density was 0.37±0.16 mJ/mm² (1175.0±377.6 impulses). One month after the ECSWT, the evaluation resulted in significant improvement in pain (84.0% activity) and articular rank (8.7°±2.3°). The limitations in daily living activity, sporting and working activity that existed in 60 (100%), persisted in one (1.7%). The calcifications that existed in 2 (3.3%) and fasciitis in 8 (13.3%) disappeared. The spur that existed in 18 (30.0%) persisted. The tolerance was good in 51 (85.0%), without secondary effects of interest. *Conclusions:* ECSWT in plantar fasciitis, are well tolerated, and shows a significant effectiveness for pain relief, functional restoration and calcifications lithotripsy, with a mean satisfaction of 8.8±2.3 (0–10).

Reference:

1. Mirallas-Martínez JA. Efectividad de las ondas de choque extracorpóreas basada en la evidencia. *Rehabilitación (Madr)* 2005; 39: 52–8.

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SHOCKWAVE THERAPY IN LATERAL EPICONDYLITIS

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Introduction: The lateral epicondylitis, in most cases is a result of repetitive movements that require the forearm muscles to be engaged. It is a common workplace or athletic injury. *Aim:* Is to study the effect and the tolerance of the treatment with extracorporeal shock wave therapy (ESWT) in lateral epicondylitis. *Patients and Methods:* Between May 28, 2002 and January 21, 2008, we prospectively studied 48 consecutive adults patients with lateral epicondylitis, treated with ECSWT, one session/week, during 4 weeks. All were assessed before each treatment and one month, after completion of therapy. *Results:* 48 subjects, 36 (75.0%) women and 12 (25.0%) men (mean age 46.3±6.3 years). The side was right in 41 (85.4%) and left in 7 (14.6%). The mean duration of symptoms was 11.0±12.6 months.. They had previously been treated with: medication 39 (81.2%), steroid injection 36 (75.0%), electrotherapy 30 (62.5%), sonotherapy 29 (60.4%), Cyriax 22 (45.8%), thermotherapy 9 (18.7%) and kinesiotherapy 17 (35.4%). The interval between the last treatment and the ECSWT was 2.1±2.9 months. The energy density was 0.22±0.11 (1106.9±000.0 impulses). One month after the ECSWT the evaluation resulted in significant improvement in pain (75.4% activity) and articular rank (5.7°). The limitations in

daily living activity, sporting and working activity that existed in 48 (100%), persisted in 2 (4.2%). The tolerance was good in 37 (77.1%), without secondary effects of interest. *Conclusions:* ECSWT in lateral epicondylitis, are well tolerated, and shows a significant effectiveness for pain and relief, functional restoration, with a mean satisfaction of 8.1 ± 2.3 (0–10).

Reference:

1. Mirallas-Martínez JA. Efectividad de las ondas de choque extracorpóreas basada en la evidencia. *Rehabilitación (Madr)* 2005; 39: 52–8.

P61

REHABILITATION MEDICINE – IMPORTANT THERAPEUTICAL SEQUENCE IN THE PLASTIC SURGERY PROTOCOL CASE REPORT IN LEWANDOWSKY-LUTZ SYNDROME

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Introduction: Lewandowsky-Lutz syndrome is a form of epidermodysplasia (the unique case reported in Romania and the third case reported in the world) with incomplete known etiopathogenic causes (genetic-autosomal recessive inheritance and papilloma virus infection). It consists of progressive growing of some keratin-like wart-lesions affecting the extremities and reaching enormous sizes and shapes, with major physical, psychological and functional impact and even with carcinomatous risk. *Aim:* The poster shows the clinical and functional evaluation using specific scales (articular mobility and muscular strength measurements, FIM) evoking the severe dysfunction for self-caring and ADL performing. It presents, also, the importance of rehabilitation programme as an essential therapeutical sequence after plastic surgery for epidermodysplastic lesions of the hands. *Material and Methods:* We present the case of a 39-year-old male patient who suffered of these rare disease since adolescence; it started at 14 years of age, with wart-type lesions on his hands and feet, with progressive keratinisation and growing with deformation and severe dysfunction for daily activities. He had reached multiple medical advices, but none of the performed treatments could stop the development. In June 2007 he suffered a laborious surgical intervention performed at Floreasca Emergency Hospital Bucharest, with excision of gigantic formations from the right hand and cutaneous graft from thigh; it was the first and the most difficult surgical step of four – proposed by famous professor doctor Lascar Ion. The patient reached Clinic II of PRM Department after two months postsurgery; the objectives of rehabilitation program were: maintenance and increasing the soft-tissue supplece after surgery, exercises for the intrinsic muscles of right hand by all types of prehension, increasing the functionality of recent operated dominant hand for ADL performing, preparation (physical and psychological) for the next steps. In January 2008 he began the rehabilitation programme for the left hand too, after it had been operated in September 2007, with complex plastic surgical techniques for pathological tissue removal and soft tissues reconstruction, with a very good postsurgical evolution. *Results:* We use all specific rehabilitation methods, such as: neurotrophic medication; electrotherapy for pain/vasculotropic effects/electrostimulation; profound thermotherapy; therapeutical massage; kinesitherapy, especially occupational therapy. With a sustained PRM treatment following the two complex and innovative plastic surgery interventions, the patient managed to increase the functional status for every day activities and the quality of life. *Conclusions:* Impressive medical case because of its rarity, enormous development of cutaneous lesions and with major functional impact upon the patient (severe dysfunction for ADL and for socio-professional life at a young male subject). 1) The extraordinary outcome and efforts of the plastic surgery- team; it was an innovative surgical procedure in the world; 2) The importance of rehabilitation programme as a sequential moment between surgical steps, necessary for the global therapeutical success, for increasing the quality of life and functional status of a young patient.

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P62

EVALUATION OF EFFECTIVENESS OF LOCAL INSULIN INJECTION IN NON- INSULIN DEPENDENT DIABETIC PATIENT WITH CARPAL TUNNEL SYNDROME

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Introduction: Carpal tunnel syndrome (CTS) is the most common type of peripheral nerve entrapment and is a significant cause of morbidity. CTS has more incidences in diabetic patients. It has been suggested that insulin has an effect on nerve regeneration similar to that of nerve growth factor (NGF). *Aim:* We aimed to evaluate the effectiveness of local insulin injection on the median nerve in patients with non-insulin-dependent diabetes mellitus (NIDDM) who have mild to moderate CTS. *Patients and Methods:* We carried out a prospective, randomized, single-blind, case-controlled study in these patients. We randomly selected 50 patients, 20 of whom had bilateral mild-moderate CTS. Therefore we had 70 hands and categorized them into two groups. At the baseline we injected NPH insulin (10 U) directly into the carpal tunnel in group 1 and performed physiotherapy for the other group (group 2). Two weeks later, NPH insulin (10 U) was injected into the carpal tunnel again and we continued physiotherapy for group 2. Electrodiagnostic study was performed for these two groups before treatment and 4 weeks after the last injection and physiotherapy. The patients were followed up for 6 weeks. *Results:* In both groups decrement of distal motor latency of the median nerve statistically was significant. In both groups, the increment of the sensory nerve conduction velocity was statistically significant. Also the decrement of pain, paresthesia, numbness, weakness/clumsiness and nocturnal awaking were statistically significant in both groups. But there was no significant difference between two groups. *Conclusion:* Local insulin injection is an effective and safe treatment for CTS in NIDDM patients as physiotherapy.

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STATOKINESIGRAM OF THE POSTURE AS A TOOL FOR CEREBELLAR ATAXIA REHABILITATION

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Introduction and Aim: According to Carlo Perfetti, after a cerebral injury, some cognitive exercises make the motor recovery easier. In practice, he suggests to subject the patients to cognitive tasks, which stimulate the sensory-motor system. Inspired by this concept, we suggest here a rehabilitative method based on reproduction of some graphic shapes by their footprint recorded by a statokinesigram. *Material and Methods:* Five patients, with cerebellar lesions and with static and dynamic instabilities, were assessed by a typical study of the posture with the help of a force platform (SATEL). The study was started in the 4 first weeks after stroke. The method consists in moving the finger around the edge of a shape in relief without the aid of the sight, in remembering its shape and then, in duplicating

the shape not only by a pencil drawing (on a paper sheet) but also by body movements (a statokinesigram was recorded on a force platform) as soon as the patient was able to stand. *Results:* After 3 months rehabilitation, carried out for 45 min/day, we observed a significant improvement of their static and dynamic instabilities not only for the clinical testing but also in their every-day-life activities. *Discussion:* In conclusion, even if still preliminary, these results lead us to propose the statokinesigram as an easy and playful tool for rehabilitating instabilities known as quite tricky.

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THE EFFECTS OF BALNEOTHERAPY ON ENDOTHELIAL FUNCTION IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Introduction: Rheumatoid arthritis (RA) is a chronic disease with an increased prevalence of coronary heart diseases (1). Endothelial dysfunction is a trigger of cardiovascular events and has been recently described in RA patients (2). Balneotherapy is one of the treatment choices when the disease is inactive. *Aim:* We aimed to examine the effects of balneotherapy on endothelial functions in RA patients. *Patients and Methods:* A total of 52 RA patients fulfilling the 1987 American College of Rheumatology criteria were participated. They were randomly assigned into two groups. Group 1 ($n=23$, mean age 52.7) received balneotherapy for 20 min, once a day, five times per week (15 sessions). Group 2 was accepted as control group ($n=29$, mean age 50.5). Assessment of the endothelial functions included Stiffness Index (SI, m/sn) and Reflection Index (RI, m/sn). After balneotherapy, group 1 was re-examined with the same method. *Results:* There were no statistically significant differences in age and gender between two groups. The mean SI and RI values of group 1 were 9.6 and 63.3. The mean results of SI and RI in group 2 were 10.3 and 58.6. No statistically significant differences were found in SI and RI values between two groups. After balneotherapy, SI and RI values of group 1 were 9.29 and 65.8, respectively. There were no statistically significant differences in SI and RI values after balneotherapy. *Conclusion:* SI and RI, the indirect indicators of endothelial dysfunction, are independent predictors of cardiovascular events. Although it was not in statistically significance level, we observed a decrease in SI values after balneotherapy. Further research with large patient population should clarify the effects of balneotherapy on endothelial function in patients with RA.

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TRAMADOL IONTOPHORESIS ADDING TO THE TREATMENT OF THE KNEE OSTEOARTHRITIS

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Introduction: The goals of physical therapy and rehabilitation in the treatment of knee osteoarthritis (OA) are prevention, relief of pain, restoration or maintenance of movement, offsetting function loss and physical impairment reduction. *Aim:* The objective of the present study were to investigate whether tramadol iontophoresis

added to therapy is superior therapy methods including TENS, hot pack and ultrasound and exercise therapy in patients with knee OA. *Patients and Methods:* A total 72 patients who admitted to the outpatient clinic of physical medicine and rehabilitation, were included this study. The diagnosis was based on the ACR criteria for the knee OA. The patients were randomly separated two groups. Group 1 received physical therapy and group 2 received tramadol iontophoresis addition to the therapy for a total of ten sessions in a 2-weeks period. Patients were evaluated according to pain and functional capacity was assessed by using visual analogue scale (VAS) and Western Ontario McMaster Universities Osteoarthritis Index (WOMAC) before and following the 10th session, 1 month and 3 months later. *Results:* The mean age and duration of the knee pain were and 58.53 (± 8.38), 5.00 (± 2.66) years in control and 58.15 (± 7.70), 4.71 (± 2.70) years tramadol iontophoresis groups. There were no significant difference between groups in the mean age and duration of the knee pain, BMI and VAS and WOMAC score. Following the 10th session, VAS and WOMAC scores were significantly decreased in both groups when compared with the values before the therapy ($p<0.001$). VAS score significantly decreased in tramadol iontophoresis group compared to controls in the following the 10th session ($p=0.000$). After 1 and 3 months, there were still significantly decreased WOMAC scores in both groups ($p<0.001$). However no significant difference in WOMAC scores of tramadol iontophoresis and control groups ($p>0.05$). *Conclusion:* We conclude that tramadol iontophoresis adding to physical therapy may be useful for relieving pain of knee OA during the treatment period.

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EFFECTIVENESS OF COMBINED PHYSIOTHERAPY IN PATIENTS WITH TEMPOROMANDIBULAR DISORDER

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Introduction: Temporomandibular disorders (TMD) are very common and cause important drawbacks in the daily lives of the patients since they affect important functions such as eating, speech etc. TMD are classified as a musculoskeletal condition resulting in craniofacial pain, functional limitations and disability (1). *Aim:* The objective of this study was to investigate, in a double-blind study design, whether home exercise program combined with phonophoresis, ultrasound and low level laser therapy (LLLT) in different modes were more effective than home exercise program (HEP) alone in the improvement of mouth opening and pain in patients with chronic TMD. *Patients and Methods:* Eighty nine patients with chronic TMD were included in the study. Vertical mouth openings (VMO) and protrusion openings (PO) were measured. Joint pain at rest and at motion were evaluated using visual analogue scale (VAS). All evaluations were made before the treatment and repeated after the treatment periods. Twenty-four patients were assigned to group-1 (phonophoresis + LLLT + HEP), 25 patients to group-2 (ultrasound + LLLT + HEP), 20 patients to group-3 (LLLT + HEP), and 20 patients to group-4 (HEP). *Results:* The main effects of the time course and the treatment type on VMO, PO scores and on VAS scores at rest and mobility were found to be significant. Group-1 was found to have significantly better effects on all parameters than group-4. For all parameters, a statistically significant difference was found when before-treatment values were compared with all after-treatment values. When the effect of each treatment group was assessed separately, time effect of all treatment groups on all parameters was found to be significant (except the effect of group-4 on VMO and PO). *Conclusion:* Though all combined treatment groups were found to be effective on mouth opening and pain, the combination

of phonophoresis + LLLT + HEP was determined to be the most effective treatment method.

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DIAGNOSTIC VALUE OF ULTRASONOGRAPHY IN THE EVALUATION OF THE ANTERIOR DISC DISPLACEMENT OF TEMPOROMANDIBULAR JOINT

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Introduction: Internal derangement (ID) is one of the most widely observed forms of temporomandibular disorders (TMD), which generally expresses the abnormal position of the articular disk with respect to the mandibular condyle and articular eminence (1, 2). *Aim:* The aim of the study was to evaluate the extent of agreement between the findings of ultrasonography (US) and magnetic resonance imaging (MRI) in the assessment of anterior disc displacement (ADD), ADD with or without reduction, and of effusion, and to assess the sensitivity, specificity and the accuracy of the US examination in establishing these pathologies. *Patients and Methods:* A total of 52 TMDs in 52 patients with chronic TMD pain was examined by US and MRI with respect to ADD, ADD with reduction, ADD without reduction and effusion of the TMD. The agreement level of US findings with MRI findings was evaluated. The sensitivity, specificity, ability to predict positive test and negative test, and the accuracy of US were calculated. *Results:* The sensitivity, specificity and the accuracy of US were found to be respectively 91%, 16% and 82% in the assessment of ADD; respectively 70%, 38% and 57% in the assessment of ADD with reduction, respectively 50%, 89% and 76% in the assessment of ADD without reduction and respectively 53%, 63% and 57% in the assessment of effusion. The findings of both methods were found to be in agreement with each other. *Conclusion:* Although the agreement between the findings of US and MRI examinations was quite satisfactory with respect to all parameters evaluated in this study, we can say that US method is fairly sensitive especially in detecting ADD, and it is very reliable in determining the absence of ADD without reduction. However, it was not found to be as quite effective in demonstrating ADD type and effusion.

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EVALUATION OF BONE MINERAL DENSITY IN FEMALE PATIENTS WITH RHEUMATOID ARTHRITIS TREATED WITH CORTICOSTEROIDES

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Introduction: As autoimmune, inflammatory arthropathy rheumatoid arthritis (RA) is characterized by progressive destruction of the affected joints, deformity, disability which required specific way of living and specific treatment which include usage of glikocor-

ticoides which may influenced on Bone Mineral Density (BMD) *Aim:* The aim of study was to evaluate effect of glikocorticoides on BMD in female patient with RA. *Material and Methods:* We examined 165 female patients 54.85 years old (20-74 years) who suffered from RA 3,32 years (0.5-10 years). Analysis of BMD was performed with 'Sahara' ultrasound osteodesitometry. We used the body mass index (BMI) scale, National Health Center Statistic Criteria. *Results:* Average body height was 1.67 cm (1.60-1.80) which pointed that our patients were globally short. Average body mass was 77.11 kg (56-98) and BMI was 27.65 kg/m² (21.84-33.15) which indicate that we had overweight patient (76.36% of patients had some of problem with overweight). Average T-score was -1.98 (-3.0 to 1.7) and Z-score was -0.71 (-2.1 to 1.2) which was shown high level of osteopenia. We found highly statistically significant correlation ($r=-0.36$, $p=0.007$) between BMI and T score which could indicate better result BMD in overweight patients. Stage or RA changes was classified with Stein-Brockers criteria and 58.18% of our patients were in Grade 1 anatomical classification and 50.91% were in Grade 1 functional classification. Average period of application of corticosteroids was 2.53 years and in 43.64% of patients applied dose was 5 mg/day and in 34.54% was 10 mg/day. We did not found any statistically significant correlation between BMI and period of application but we found highly statistically significant negative correlation ($r=-0.3590$, $p=0.007$) between T score and period of application and between T score and applied dose ($r=-0.3398$, $p=-0.011$). *Conclusion:* We can conclude that that long and high dose application could potential negatively influenced on BMD and for some patient antiresorptive drug has to be including as regular therapy of RA. Also, because of nature of disease, all prevention methods can be recommendable in prevention of reduction BMD.

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DIABETIC FOOT ULCERS – PRESENTATION OF THREE PATIENTS AFTER TREATMENT WITH LOW LEVEL LASER THERAPY (LLLT)

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Introduction: Because of biostimulative effects of LLLT we used it for healing acceleration of diabetic neuropathic foot ulcers. *Aim:* We wanted to see if LLLT with wavelength of 808 nm has effects on the healing course of diabetic neuropathic foot ulcers. *Patients and Methods:* We used The Fotona XD-1 diode laser system with 1000mW out power in continuous wave at the wavelength of 808 nm. Patients were treated three times per week. Dose of laser irradiation was 4J on each square centimetre of ulcer using non contact method. We treated two men and one woman; all three had type 2 diabetes. They carried special footwear and used crutches. We measured the size of the ulcers at the beginning of the treatment and every 2 months. 1) Woman, age 55, on oral therapy, had ulcer under first MTP articulation for almost 10 years. At the beginning the size was 2.7×1.7 cm, after 6 months the size was 1.8×1.2 cm. The last two months we did not see any improvement, we recommended her total contact cast application. 2) Man, age 58, on insulin therapy, had a bad healing wound after TMT amputation of the big toe. The wound size was 4×3.3 cm, after two months the size was 3×2 cm. After 4 months the wound was not healed but it was smaller. We will continue with laser therapy. 3) Man, age 64, on insulin therapy, had two bad healing wounds after TMT amputation of the big toe. The size of the first one was 0.5×0.5 cm and the second 3×2.5 cm. The smaller wound was healed after a month, but because of inappropriate wearing of special footwear he got the third 5.2×3 cm big ulcer. The second wound was healed after 2 month; the third ulcer was half the size from the beginning. *Conclusion:* LLLT in diabetic neuropathic foot ulcers treatment can be helpful but other therapies are also needed.

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CAPACITIVE-RESISTIVE ELECTRIC TRANSFER THERAPY IN THE TREATMENT OF CHRONIC ROTATOR CUFF TENDINOPATHY

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Introduction: Chronic rotator cuff tendinopathy (CRCT) is a common cause of shoulder pain and disability. High-frequency electrotherapy is frequently used for the treatment of musculoskeletal conditions. Capacitive-Resistive Electric Transfer (CET-RET) is a physical therapy modality that uses a current with a frequency between 0.45 and 0.55 MHz with thermal and non-thermal effects. **Aim:** To evaluate the effects of CET-RET in patients with CRCT concerning shoulder range of motion (ROM) improvement and pain intensity reduction. **Patients and Methods:** Ambulatory patients with the diagnosis of rotator cuff tendinopathy confirmed by ultrasound, for more than 6 months, and with symptoms of shoulder pain and limitation of shoulder ROM were selected. Those receiving other physical treatments or medication, or with contraindications for electrotherapy were excluded. Nine voluntary patients, 6 women and 3 men (mean age 66±13 years) mean disease duration of 2.4 years, started a 2 series program of 4 applications each, during 2 weeks. First CET and then RET were applied in the affected shoulder according to time and application guidelines. Intensity of pain using a Visual Analog Scale (VAS) and shoulder abduction ROM measured with a goniometer were evaluated before and after the treatment. **Results:** The mean pain intensity (VAS) improved from 7±1.9 before to 2.6±1.2 after the program (Wilcoxon test $p=0,008$). The ROM for shoulder abduction also improved from 116.7°±45.6 before to 153.3°±23.5 (Wilcoxon test $p=0,027$). No adverse reactions were noted. **Conclusions:** CRCT symptoms related to pain and shoulder ROM improved, showing that CET-RET can be useful in this pathology. More studies are needed to demonstrate the effect duration of this therapy.

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THE EFFECT OF PULSED ELECTROMAGNETIC FIELDS ON RANGE OF MOTION AND KNEE CIRCUMFERENCE IN PATIENTS WITH OSTEOARTHRITIS - A PILOT STUDY

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Introduction: Osteoarthritis (OA) is the most common joint disease, characterised by pain, deformity and restriction of movement. The most usually affected joint is knee. Some studies have suggested that pulsed electromagnetic fields (PEMFs) might be effective in treating symptoms and signs of OA, but their results are doubtful. **Aim:** To determinate the effect of PEMFs on range of motion in patients with OA of the knee. **Patients and Methods:** Thirty-two patients with knee OA, aged 69.0±8.83 years were enrolled in the study. Average duration of the symptoms were 6.52±6.45 months. The patients were randomized in two groups: in 16 patients PEMFs (6 mT; 12 Hz; 30 min) was applied (20 times, 5 days a week) while other 16 patients received placebo (machine turned-off). All patients were engaged in quadriceps muscle strengthening exercises. A range of motion in more affected knee (measured by goniometer) and

knee circumference (measured by centimetre tape) were obtained before the therapy, at the end of the therapy and one month after the therapy. Baseline values did not differ between groups. No change in analgetics/NSAIDs was allowed during the study. **Results:** There was no significant difference in knee circumference between therapy and control group ($t=-0,87$; $p>0,05$). Similarly, no statistically significant difference was found in flexion ($t=-1,49$; $p>0,05$) nor in extension ($t=1,58$; $p>0,05$; $df=28$) in index knee between two groups. **Conclusion:** In our group of patients with knee osteoarthritis there was no statistically significant effect of PEMFs on range of motion and joint circumference. The drawback of the study was the small number of subjects, by which non-systematic variable factor parameters might have masked differences between the groups, if they did exist at all. A larger study to confirm or contradict these results is warranted.

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COMPARISON OF ISOKINETIC EXERCISE VERSUS STANDARD EXERCISE TRAINING IN PATIENTS WITH CHRONIC LOW BACK PAIN: A RANDOMIZED CONTROLLED STUDY

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Introduction: Low back pain (LBP) is a common clinical condition in developed countries and regarded as one of the important health problems due to high treatment costs and disability it cause. Exercise therapy is commonly used for the treatment of LBP in the clinical practice worldwide, but exercise types show significant diversity. To our knowledge, there is no study on chronic LBP that compared the isokinetic exercise with a standard exercise program and assessed the muscle strength objectively. **Aim:** To compare the efficacy of isokinetic exercise program with the standard exercise program in the patients with chronic low back pain (LBP) in terms of pain, mobility, disability, psychological status and muscle strength. **Patients and Methods:** A total of 40 patients with LBP and forty healthy subjects without LBP were included in the study. The patients with LBP were randomly allocated into Group 1 ($n=20$, isokinetic exercises) and Group 2 ($n=20$, standard exercise). Outcome measures included a visual analogue scale (VAS) for pain, fingertip-to-floor test for spinal mobility, Modified Oswestry Low Back Disability Questionnaire (MOLBDQ), Beck Depression Inventory (BDI) and isokinetic muscle testing. **Results:** Assessment of isokinetic muscle strengths showed that patients in the control group had significantly higher values compared to the patients with chronic LBP ($p<0.05$). Isokinetic and standard exercise groups demonstrated significant improvement in VAS, fingertip-to-floor test, MOLBDQ, BDI scores and muscle strength compared to baseline which persisted until the 1st month ($p<0.05$). Comparison of both exercise groups in terms of these parameters obtained at the end of the treatment and at 1st month showed no significant difference ($p>0.05$). **Conclusion:** Isokinetic and standard exercise programs are efficient in the treatment of LBP. Statistically significant differences could not be found between the two programs. The standard exercise program, as it is cheaper, more easily performed and efficient, may be preferable for the treatment of LBP.

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EFFECT OF VESTIBULAR REHABILITATION ON SYMPTOMS, DISABILITY AND BALANCE: RANDOMISED CONTROLLED STUDY

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Objective: Vestibular rehabilitation (VR) is increasingly popular treatment option for patients with vestibular dysfunction. There are quite a few randomised controlled study that investigate the effects of VR in patients with chronic vestibular dysfunction. **Aim:** The purpose of the study is to investigate the effect of vestibular rehabilitation exercises in patients with chronic vestibular dysfunction. **Material and Methods:** Forty-nine patients were randomized into two groups either VR ($n=25$, mean age 52.46 ± 14.94 years) or control group ($n=24$, mean age 50.38 ± 18.59 years). VR group treated with custom designed physical therapy program for a mean of eight visits over four weeks. Each patient completed the Dizziness handicap Inventory (DHI) to obtain a measure of disability. Intensity of dizziness was measured with visual analog scale (VAS). Balance impairments were measured with computerized static posturography and Berg Balance Test (BBS). **Results:** VR group has shown a significant recovery in post-exercise VAS (preexercise 4.53 ± 2.16 , postexercise 2.09 ± 1.80 , $p<0.05$) and DHI- total (preexercise 62.66 ± 16.26 , postexercise 32.58 ± 24.35 , $p<0.05$). Additionally BBS (preexercise 52.5 ± 3.91 , postexercise 54.75 ± 2.60 , $p<0.05$) and all parameters in posturography improved in favor of VR group ($p<0.05$). No significant change was observed in any parameters of control group ($p>0.05$). **Conclusion:** A significant recovery was observed symptoms, disability and balance in VR group. VR is a simple, inexpensive and beneficial treatment for patients with vestibular disorder. This study provides that customised vestibular exercises promote best outcomes for patients with chronic vestibular dysfunction.

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LOW-INTENSITY LASER THERAPY AND EFFECTS ON MUSCULOSKELETAL PAIN

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Introduction: Musculoskeletal pain is one of the most incapacitating symptoms and one of the main reasons for absenteeism. Finding the most efficient method for treating this condition will help patients return to their normal level of function. **Aim:** To assess the effect of low-intensity laser therapy on pain reduction in patients with musculoskeletal pathology. **Patients and Methods:** 63 ambulatory patients evaluated in our service with musculoskeletal pain and indication for laser therapy were included, mean age of 41,4 years and female predominance. They were divided in 6 groups according to diagnosis and anatomical area of pain and according to duration of pathology (acute and chronic). Each patient was submitted to a 10 session program. Application was made at painful points with a GaAs laser with intensity according to dosage recommendations from World Association of Laser Therapy. They completed a questionnaire and pain was evaluated using the Visual Analog Scale before, after the 5th session and at the end of treatment. **Results:** Statistical analysis using ANOVA showed that in all groups, laser therapy was effective in reducing pain according to VAS. Although in acute conditions the effect was more evident than in chronic conditions, there was no statistical difference between these two groups. For each category of diagnostic, the decrease of pain was statistical significant (Friedman test $p<0.005$). **Conclusions:** Low-intensity laser therapy is an efficient technique for pain reduction in patients with musculoskeletal conditions. Long-term benefits of this therapy were not evaluated and they usually tend to decrease with time. Further studies are needed to assess the limitations and effect duration of this treatment.

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P75

COMPARISON OF THE INFLUENCE OF REHABILITATIVE TREATMENT AT REHABILITATION CLINIC AND UNDER HOME CONDITIONS ON CHARACTERISTICS OF GAIT AFTER UNILATERAL KNEE ARTHROPLASTY IN FEMALE PATIENTS WITH KNEE OSTEOARTHRITIS

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Introduction: Total knee arthroplasty has been widely used in end stage of osteoarthritis for relieving pain but the functional benefit of this surgical procedure is controversial (1,2). There is lack of randomised controlled trials concerning physical training after knee arthroplasty (3) and effectiveness of rehabilitative treatment on functional ability (1). **Aim:** compare influence of two exercise regimens – home exercise program versus controlled exercise therapy at outpatient rehabilitation clinic under physiotherapist supervision by estimating changes in gait cycle after total knee arthroplasty. **Patients and Methods:** 26 women were examined 3 and 6 months after unilateral knee arthroplasty. 3 months after arthroplasty patients were randomised in home exercise (HE) and controlled exercise (CE) therapy groups. Parameters of gait were registered by means of Footscan pressure plate (RsScan International, Belgium, $2\text{ m}\times 0.4\text{ m}$, 4 sensors/cm²). Patients walked at self-selected speed across the pressure plate, following gait parameters were registered: walking velocity, gait cycle time, step time, single support time, double support time, stance time, swing time, step length, stride length. **Results:** No differences were found between gait characteristics in HE and CE groups 3 months after arthroplasty. 6 months after surgery walking velocity was considerably faster in CE group (3.3 vs. 4.6 km/h, $p<0.05$). Lengthening of single support and swing time and shortening of double support and stance time of operated leg in CE group reached statistical relevance level. Shortening of double support and stance time and lengthening of swing time of contra lateral leg in CE group was also considerable. **Conclusion:** Both exercise regimens had positive influence on gait of knee arthroplasty patients but CE group gait improved more. Gait analysis is a valuable tool for assessing functional status after knee joint arthroplasty.

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AUTOTRACTION AND HYPERTHERMIA IN LOW BACK PAIN

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Introduction: Autotraction is a mechanical treatment for LBP syndrome of benign aetiology that uses a specially designed traction table divided into two movable sections. Hyperthermia has been introduced as a physical therapy modality for soft tissue injuries and LBP. **Study design:** This study evaluates the effectiveness of Autotraction (AT) with or without Hyperthermia (HT) in the treatment of LBP. **Materials and Methods:** 58 patients (21 Women, 37 Men), aged 18 to 78 years, were recruited from the PRM DH in Tor Vergata University General Hospital. Inclusion Criteria for the study were 1) LBP >7 weeks 2) age between 18–80 years 3) patients agreeing with the study protocol. Exclusion Criteria were 1) LBP <7 days 2) symptomatic therapy during the last 2 weeks 3) Absolute and Relative Contraindications for Autotraction and Hyperthermia.

Patients suitable for the study were interviewed and examined by a physiatrist. The patients were randomly divided into two groups. The first group underwent AT (30 min) and the second one underwent AT+HT (AT 30 min, HT 30 min). The patients underwent three treatment sessions a week. All interventions were undertaken for 4 weeks. Each group was further divided into two nosologic subgroups: 1) Radicular pain (RAD), 2) Mechanical pain (M-LBP). *Results:* The observed outcomes resulted statistically significant for the evaluation scale Backill both for patients treated with AT ($p < 0.02$) and for those treated with AT+HT ($p < 0.000$), in patients affected by radicular pathology ($p < 0.001$) and for those with a mechanical LBP ($p < 0.000$). There has been a trend of greater effectiveness both in patients with radicular LBP and in patients with mechanical LBP. In particular, there is a major efficacy trend in combined treatment AT+HT for the radicular pain and in AT treatment for the M-LBP. *Conclusions:* The study confirms that AT with or without HT represents a valid help in the treatment of low back pain.

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QUALITATIVE ANALYSIS OF PHYSIOTHERAPIST'S COUNTERTRANSFERENCE REACTIONS TO PATIENTS

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Introduction: Countertransference (CT) refers to a therapist's emotional reactions to a patient and/or the patient's circumstances. Countertransference among health practitioners has primarily been studied in psychologists, nurses, and physicians (1). These unconscious emotional reactions also influence physiotherapists' behavior and impact success of patient/therapist relationships, as well as the quality and equity of care (2,3) *Aim:* This study's aim was to identify triggers initiating physiotherapists' countertransference responses and resulting behaviors impacting quality of patient care. *Participants and Methods:* Participants included 38 physiotherapists (mean experience 10.3 years) attending a patient/therapist relationships course. Brainstorming sessions had participants identify patient triggering characteristics associated with both successful and uncomfortable interactions. Small group discussion yielded a behaviors list resulting from emotional responses to patients. Responses were entered into QSR N6 Non-numerical Unstructured Data Indexing, Searching and Theorizing software and coded a priori using pilot study generated codes. Responses were then subjected to code/recode process by four raters. New codes were generated according to distinct content of responses. Final themes were displayed in hierarchical organization. *Results:* Frequently recurring triggering themes included therapist's perception of the patient, patient motivation, compliance, and associations the therapist made between the patient and his/her own family members. Frequently reported behavioral response themes were personal openness, limiting interaction to professional issues, effort invested in the patient, avoidance behaviors, treatment time, and body language. *Conclusions:* Physiotherapists manifest CT responses to their patients triggered by patient characteristics, or by internal associations the therapist projects onto the patient. Behavioral responses associated with successful interactions resulted in therapists providing personal approaches to treatment including increased treatment time, effort, and quality of care. Uncomfortable interactions led to decreased treatment time, effort, and personal involvement.

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THE INTERRELATION OF GLUTATHIONE REDUCTASE, CATALASE, GLUTATHIONE PEROXIDASE, SUPEROXIDE DISMUTASE, AND GLUCOSE-6-PHOSPHATE IN THE PATHOGENESIS OF RHEUMATOID ARTHRITIS

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Rheumatoid arthritis (RA) is the most common form of inflammatory arthritis, a systemic autoimmune disease characterized by chronic inflammation of the synovial joints, ultimately leading to joint destruction and permanent disability, affecting 1% of the world population. Oxidative stress in rheumatoid inflammation, due to the fact that antioxidant systems are impaired in RA and caused by free radicals, might have an essential role in etiology of RA. This review includes the interrelation of antioxidants against free radicals in RA patients. There is much evidence that antioxidant team that covers glutathione reductase, catalase, glutathione peroxidase, superoxide dismutase, and glucose-6-phosphate destroy reactive oxygen species and other free radicals through enzymatic as well as nonenzymatic means. The change in relative levels of antioxidants vis-à-vis free radical formation and level could be used as indicators for effective and earlier diagnosis of RA. PMID: 17912575 [PubMed - as supplied by publisher]

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EFFICACY OF A FLEXIBLE ORTHOTIC DEVICE IN PATIENTS WITH OSTEOPOROSIS

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Objective: To study the efficacy of a flexible orthotic device in patients with osteoporosis. *Design:* Open observational study. *Patients:* Fifty patients with osteoporosis. *Methods:* An open observational study was performed on 50 patients with osteoporosis in order to investigate the efficacy of a new osteoporosis orthotic device, which is an elastic back support with paravertebral air chamber pads. The outcome parameters were pain, activities of daily living, individual compliance and comfort. The observation period was approximately 2.5 months, and the orthotic device was worn continuously during daytime. *Results:* There was a highly significant reduction in pain under exertion from mean 6.1 (SD 1.7) to 4.5 (SD 1.4) ($p < 0.00001$), pain when driving from 5.2 (SD 2.4) to 3.8 (SD 1.9) ($p < 0.00001$), and pain at rest from 4.1 (SD 2.4) to 3.1 (SD 1.9) ($p < 0.0001$). About 50% of the patients judged their ability to perform everyday activities as 'much better' or 'better'. If physiotherapy was interrupted upon onset of orthosis treatment, the results were significantly worse than in patients with continued physiotherapy. *Conclusion:* This orthotic device could be a useful addition to the medical care of patients with osteoporosis and a complement to drug treatment and physiotherapy with regular exercises, which should be continued.

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TREATMENT OF DYSPHAGIA IN PATIENTS WITH BRAIN DAMAGE

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Introduction: 51–57% of all stroke patients may have swallowing problems. The initial treatment of the dysphagic patient is usually provided by the swallowing therapist in cooperation with other specialists. Swallowing therapy comprises active exercise, sensory

stimulation and compensatory strategies. Decision making about therapy must be based on diagnostic procedures and not only on screening. Definitive diagnostic procedures are fluoroscopy (MBS=Modified Barium Swallow), ultrasound and manometry, while screening procedures are cervical auscultation and tests measuring swallowing speed. Swallowing therapy is divided into direct therapy (diet, postural techniques, swallow manoeuvres) and indirect therapy (increasing sensory input including thermal-tactile stimulation, TTS – vertically rubbing the anterior faucial arch firmly, 4 or 5 times, with ice. It is not a large-used method, but very effective). TTS should be done when a delay in triggering the pharyngeal swallow has been defined radiographically on at least two consecutive swallows. Studies of TTS in the Clinic of Sports Medicine and Rehabilitation of Tartu University have shown the effectiveness of improving the speed of triggering of the pharyngeal swallow and vomit reflex after the procedure. *Aim:* To introduce one of the therapeutic methods – thermal-tactile stimulation – as an effective method to improve the speed of triggering of the pharyngeal swallow in patients who have been identified from assessment of previous swallows as having a delay in triggering the pharyngeal swallow. The aim of TTS-method is heightening sensory awareness before the swallow attempt (to heighten the sensitivity for the swallow in the central nervous system and to alert the central nervous system so that when the patient voluntarily attempts to swallow, one will trigger a pharyngeal swallow more rapidly). *Patients and Methods:* The patients have suffered from stroke or head injury and the method used in therapy is thermal-tactile stimulation. *Results:* The effectiveness of improving the speed of triggering of the pharyngeal swallow is about 84% and vomit reflex 96%. *Conclusion:* A decision to provide therapy for a patient with dysphagia should be based on diagnostic assessment to examine most effective rehabilitation strategies: compensations, diet modifications and therapy strategies/manoeuvres (etc. TTS-stimulation).

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THE EFFECT OF INTRATHECAL BACLOFEN ON THE CLINICAL OUTCOME AND GAIT PATTERN IN PATIENTS WITH CEREBRAL PALSY

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Introduction and Aim: Intrathecal baclofen (ITB) has been used to reduce spasticity due to Cerebral Palsy. Because of lack in literature we aimed to reported the effect of ITB on clinical and functional outcome measures, administered in a multidisciplinary setting. *Patients and Methods:* In this retrospective study 24 ITB patients were included. Disposition and frequency of orthopaedic surgery and botuline toxin A (BTX-A) treatment were listed. Range of Motion (ROM) and modified Ashworth Scale (MAS) were measured pre and at an average of 3 to 6 and 9 to 18 months post implantation. Gross Motor Function Measure (GMFM) was investigated before and 3, 6, 9 and 12 months after post implantation and gait analysis at an average of 4.9 months before and 10.8 months after pump implantation (subgroup of 11 patients). Statistics included mean, SD, minimum/maximum, P50/P25/P75, frequency distributions, repeated measures analysis to examine the effect of intrathecal baclofen on ROM and MAS (proc mixed procedure) and Wilcoxon signed ranks test for analysis of the gait parameters. *Results:* ROM for hip exorotation, global adductors, hamstrings, elbow extension and glenohumeral abduction significantly improved ($p < 0.01$). MAS scores for hip adductors, hamstrings, knee extensors, gastrocnemius, soleus and tibialis anterior significantly decreased ($p < 0.01$). Global GMFM scores slightly initially decreased (3 months post) but then slightly increased at 6 and 12 months. Gait analysis showed

significantly increased range of coronal hip angle and maximum hip rotation in stance ($p < 0.01$). Trends ($p < 0.05$) towards increased ankle dorsiflexion, pelvic stability and hip velocity in swing were found. A negative outcome of gait analysis was the development of a crouch gait. After ITB more patients received orthopaedic surgery and fewer patients received BTX-A. *Conclusion:* We concluded ITB has good clinical effects (ROM and MAS) but poor objective functional effects (GMFM and gait pattern).

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A CONSERVATIVE MANAGEMENT OF A PATIENT WITH A LARGE POST-PARTUM SYMPHYSIS PUBIS DIASTASIS

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Introduction: Mild separation of the symphysis pubis during pregnancy is considered physiological. The reported incidence of peripartum pubic separation varies from 1 in 300 to 1 in 30,000 deliveries (1,2). Separations of more than 10 mm are usually pathological and associated with tenderness and difficulty walking (3). Interpubic gap confirms diagnosis but does not predict outcome (4). *Aim:* We will report a very large symphysis pubis diastasis associated with sacroiliac joint separation managed conservatively in an acute rehab setting. *Patients and Methods:* Following a 7-h vaginal delivery of her 8 lbs 14 oz, third child, with an epidural anesthesia, a 39-year-old female complained of pubic and low back pain associated with movement of her legs. The delivery was complicated by a child's shoulder dystocia, with subsequent Erb's palsy. The patient had tenderness over her perineum, pubic, and bilateral sacroiliac region, symmetrical reflexes, no sensory deficit, and no vaginal lacerations. X-rays demonstrated a 5 cm symphysis pubis diastasis and 7 mm left sacroiliac joint separation. *Results:* Initially, the patient remained in the semi reclined position with her legs abducted at 70 degrees for comfort. Gradually, she was able to adduct her legs and progressed to a gentle physical therapy and ambulation with a walker, while wearing a pelvic stabilizing belt. Within two weeks, the patient was discharged home with a walker and a follow-up therapy. *Conclusion:* Even a severe, vaginal delivery induced pubic diastasis may be managed without strict, prolonged bed rest or an operative intervention.

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INTENSIVE REHABILITATION PROGRAM IN ANKYLOSING SPONDYLITIS (AS) PATIENTS

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Introduction: Rehabilitation programs in AS patients have shown some beneficial effects on pain and mobility (1). However, there is no established rehabilitation program for AS patients that has proven its efficacy on trunk strength and spinal mobility. *Aim:* We investigate the efficacy of a 12 week intensive rehabilitation pro-

gram (IRP) on trunk strength, spinal mobility, back pain, disease activity and functional questionnaires in AS patients. *Patients and Methods:* 12 AS patients (9 men, 3 women 37±11 years, duration of symptoms: 10±6 years) participated to this study. 10 patients were on anti-TNF α -therapy (and 2 treated with NSAID only) since at least one year and were clinically stable. IRP consisted in 2 sessions/week during 12 weeks. Each session consisted of 30 min of manual therapy combined with 30 min of trunk muscles isotonic strengthening with Tergumed® system. Before and after the 12 week IRP, assessments were performed for each patient. Trunk strength assessment consisted in isometric measurement in the sagittal, frontal and horizontal planes (Tergumed® system). Functional parameters such as mobility and motion velocity were computed for cervical and lumbar spine using an electrogoniometer (CA6000). In addition, back pain (VAS), disease activity and functional questionnaires (BASDAI, BASFI, HAQ) were collected. *Results:* Trunk strength at baseline was statistically significant lower (21–43%) ($p<0.001$) in AS patients compared to normative data, except for lateral bending. At 12 week, trunk strength improved (18–53%) in all patients, and reached the level of trunk strength of the normative population so that we didn't found any statistically significant difference with the normative data. Spinal mobility tend to increase in each plane, but only lateral bending was statistically significant ($p<0.01$). Pain (VAS), BASDAI and BASFI were statistically significant improved ($p<0.05$). *Conclusion:* A 12 week intensive rehabilitation program improved significantly trunk strength, back pain, BASDAI and BASFI.

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P84

NEUROSENSORY TRAINING AFTER SIMULTANEOUS ARTHROSCOPIC RECONSTRUCTION IN PATIENTS WITH COMPLEX LIGAMENOUS INSTABILITY

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Introduction: The ligament and muscular system injury of in the knee region leads to proprioceptive disorders which negatively affect movement control, the static of a limb and postural balance. *Aim:* The aim of the study was the evaluation of knee function in patients with complex instability of the knee joint treated with simultaneous arthroscopic reconstruction. *Patients and Methods:* 9 patients (aged 23–36 years) with complex instability of the knee joint (5 with anterior and posterior ligament injury; 2 with anterior, posterior ligament and fibular ligament injury; 2 with anterior, posterior ligament and tibial collateral injury) participated in this study. The therapy (ligament reconstruction and physiotherapy with neurosensory training) was performed to increase the joint stability. The surgery was conducted at the latest one year after injury. The evaluation was made 24 h before operative treatment and 3 and 6 months after it. The knee joint function was evaluated with Static and Dynamic Riva Test (Delos Postural Proprioceptive System) as well as the assessment of muscle strength of hamstrings and quadriceps with the Biodex System 3 isokinetic dynamometer at a speed of 60 degrees/sec. *Results:* Proprioceptive control of the trunk and the median indicator of trunk deviation improved 6 months after reconstruction in comparison to the preoperative conditions. 3% and 1.2%, respectively. The decrease in muscle strength and the incorrect hamstring-to-quadriceps strength ratio was observed 3 months after operation in comparison to the preoperative assessment. The extensors torque-to-body-weight ratio increased and the hamstring-to-quadriceps ratio improved from 81% before therapy to 76% after 6 months of the therapy. *Conclusion:* 1) The therapy including neurosensory training improve the postural

balance and stability of the knee joint. 2) Although the strength of muscles increased 6 months after operation, the hamstring-to-quadriceps strength ratio remained incorrect.

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P85

COMPARISON OF THE EFFICACY OF IONTOPHORESIS WITH DEXAMETHASONE AND ULTRASOUND THERAPIES IN CONSERVATIVE TREATMENT OF CARPAL TUNNEL SYNDROME

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Introduction: Carpal tunnel syndrome (CTS) has become an epidemic syndrome because of fast industrial development in last decades. So the management of CTS is a problem for many clinicians. Iontophoresis of dexamethasone sodium phosphate has been used for years in the treatment of many musculoskeletal inflammatory disorders and clinicians have reported using this modality in the treatment of CTS. *Aim:* To compare the efficacy of iontophoresis therapy with dexamethasone and ultrasound therapy in conservative treatment of mild CTS. *Patients and Methods:* Fifty-eight patients with mild CTS confirmed by electromyographic examination were divided randomly (1:1) into three groups: 1) iontophoresis with dexamethasone group ($n=20$) 2) ultrasound group ($n=18$) or 3) sham iontophoresis ($n=20$). The number of session was 15, one per day. All the groups underwent combined physiotherapeutic procedures like tendon and nerve gliding exercises, night splints and activity modifications for three months. Pain was evaluated with visual analogue scale (VAS). Wrist range of motion (flexion and extension), muscle tests of wrist flexors, extensors and abductor pollicis brevis, handgrip, sensorial evaluation with monofilament test, Phalen, reverse Phalen, Boston questionnaire and electrophysiological evaluations were done at baseline and at the end of the therapies and 3 months follow-up. *Results:* At the end of therapies, significant improvement was seen in all clinical evaluations in all groups. Iontophoresis of dexamethasone revealed a success rate comparable with sham and ultrasound groups. In follow-up of CTS, iontophoresis group had significant improvement in some clinical measurements like monofilament test, Boston functional capacity subscale and the strength of muscle abductor pollicis brevis ($p<0.001$, $p<0.0001$, $p<0.001$, respectively). The ultrasound group had improvements in some evaluations at 3 months too. Especially Boston symptom severity subscale was revealed significant improvement ($p<0.0001$). Two procedures (ultrasound and iontophoresis) were shown some significant changes in some electrophysiological evaluations. Improvements were significantly more pronounced in actively treated groups than in sham treated. *Conclusion:* Results suggest there are satisfying short to medium term effects of iontophoresis treatment in patients with mild CTS. Findings need to be confirmed in large groups.

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THERAPEUTIC ULTRASOUND - TREATMENT IMPACT ON BAKER CYST ASSOCIATED WITH PRIMARY GONARTHROSIS

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Introduction: Baker cyst is encountered in about 65% of patients with primary gonarthrosis in different stages of evolution. Patients had knee pain and/or tightness behind the knee associated with the presence of Baker cyst. **Aim:** To evaluate the effect of therapeutic ultrasound on patient's symptoms and on cyst dimensions. The patients were evaluated at admission and after 10 days of treatment by sonographic examination. **Patients and Methods:** In this study 62 patients were included, aged between 45 and 75 years, mostly women (80%), admitted for knee osteoarthritis with various degrees of decompensation, in Rehabilitation Clinic III of INRMFB. These patients were selected among patients with osteoarthritis, after performing a sonographic examination and detecting the presence of Baker cyst. Measurements were done to evaluate the dimensions of the cyst. The patients were divided in two groups, group A and group B. The patients from group A underwent a treatment consisting of local application of therapeutic ultrasound for ten days. We used pulsed ultrasound at a frequency of 1 MHz and intensity of 0.8 W/cm². The US probe was applied for 3 min on the popliteal fossa over the Baker cyst. Patients from group B received oral therapy with nonsteroidal anti-inflammatory agents for ten days. At the end of the treatment, measurements were done by sonographic examination to evaluate the dimensions of Baker cyst. Patients were also clinically evaluated. **Results:** All data were submitted to statistical analysis. The results showed that local application of therapeutic ultrasound had a significant effect on remission of clinical symptoms and on popliteal cyst dimensions. The results were similar to group B regarding clinical symptoms but patients from group B have a moderate diminution of cyst dimensions compared to group A. **Conclusion:** Therapeutic ultrasound is an efficient method of treatment for Baker cyst associated with knee osteoarthritis regarding clinical symptoms and cyst dimensions.

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SHOULDER TRIGGER POINTS PHYSICAL THERAPY

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Introduction: The first research having to do with what we know as trigger points was published in Germany in 1843 (Froriep 1843). Since then, interest in muscle pain accelerated during the first half of the twentieth century, although researchers continued to work in isolation. At this point, we know that we can objectively visualize microscopic modification of a trigger point as contracted sarcomeres. Also, there are different trigger point types in terms of their importance and their location within the muscle. **Patients and Methods:** We conducted a study on 20 patients with painful shoulder and trigger points. They had neurological and vascular symptoms (numbness, tingling, hot and swollen hand) as well as symptoms of physical dysfunction (weakness and discoordination, joint stiffness, joint disarticulation, distorted posture, excessive muscle response, delayed relaxation, delayed recovery and decreased endurance). We treated the trigger points with ultrasounds 0,8 W/cm² at 3 MHz, for 12 sessions. We applied ultrasounds for 5 min at each trigger point and we followed the evolution of 4 parameters: pain, range of motion, posture, tricked movements. **Results:** The parameters improved as follows: pain in 83%, range of motion in 87%, posture in 90% and the tricked movements disappeared at 18 patients. **Conclusion:** Treating the trigger points offered a rapid and prolonged time of pain free and normal range of movement for our patients.

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APPLICATION OF ELECTROMYOGRAPHIC BIOFEEDBACK IN REHABILITATION AFTER TOTAL KNEE ARTHROPLASTIES

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The benefits of total knee arthroplasties (TKA) are the result of technological advances coupled with the skills of orthopedic

surgeons, postoperative acute care teams and rehabilitation specialists. Associating electromyographic biofeedback to classical rehabilitation methods in recovery program after TKA improve the quality of rehabilitation. Our study was made on 56 patients after TKA. The electromyographic biofeedback has been associated to classical rehabilitation protocol (meaning physiotherapy and physical therapy) on a study group of 26 patients. The efficiency of this method was evaluated by comparison with a control group of 30 patients who benefited only from classical rehabilitation. An electromyographic biofeedback device – Myomed 134 was used by applying 9 protocols for three months. The followings parameters were monitored monthly, for one year: the knee's active range of motion, the strength and surface EMG parameters of thigh muscles and KOOS scale. The assignment of biofeedback EMG to the rehabilitation program has significantly changed, in all the rehabilitation phases, the recovery of the knee range of motion, the muscular force recovery in direct and strong correlation with muscular electrical potentials as compared to classical rehabilitation ($p < 0.05$) and considerably changed the capability to perform sport and recreation activities (at 6 and 12 postoperative months, $p < 0.05$). The advantages of electromyographic biofeedback are: its objectivity and possibility of application in any rehabilitation phase, the quantified progressivity; the surface electromyography becomes the patient's immediate response to the program and used like electromyographic biofeedback, significantly improves the knee parameters immediately and in long term, even if the EMG biofeedback had been applied only in the first 3 postoperative months.

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THE BENEFIT OF INTERVAL EXERCISE TRAINING PROGRAMME ON PATIENTS WITH METABOLIC SYNDROME

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Aim: The aim of this study was to investigate the haemodynamic and pulmonary effect of interval training exercise upon patients with metabolic syndrome (MS). **Material and Methods:** A total of 21 sedentary adults with MS and without clinical history of diabetes or cardiovascular disease were studied. Each of the 21 adults performed a maximal effort test on cycloergometer and completed a spirometric evaluation in the beginning and after 16 weeks of physical training. During the study, interval exercise training (5 times 8±2 min at 75–90% of maximal heart rate separated by 4±1 min active pauses, three times/week) was the only intervention performed. **Results:** After 16 weeks of interval exercise training the subjects had significantly higher cardio respiratory fitness level (mean difference (MD) of VO₂max: 4.2±0.8 ml/kg/min, $p < 0.001$), lower body weight (MD: 6.3±1.9 kg, $p < 0.001$) and waist circumference (MD: 1.9±0.3 cm, $p < 0.001$). The effort test at the end of the study showed lower peak heart rate (HR) (MD: 7±2 beats/min, $p < 0.001$) and systolic blood pressure (SBP) (MD: 8.5±4.5 mmHg, $p < 0.01$) at the same workload of the cycloergometer. Even there were modification regarding resting blood pressure and spirometric values (FVC, VEMS, PIF, PEF) they were not statistical significant ($p > 0.05$). **Conclusions:** Interval exercise training programs for 16 weeks at 75–90% of maximal HR reduced markers for MS and increase fitness level with influence on other haemodynamic parameters such as peak HR and SBP at the same level of effort.

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FINDINGS FROM STUDYING THE IMPACT OF ELECTROMAGNETIC FIELDS ON MEDICAL STAFF**Vesselinova L.***Military Medical Academy, MMDER, Dept. of PRM, Sofia, Bulgaria*

As an inter-disciplinary science, physical medicine has wide opportunities in the prophylaxis, treatment and impacting on illnesses from the whole of the medical spectrum through its natural and preformed factors, most of them well studied and the mechanism of impact - scientifically recognized. Nowadays, the technocratization of lifestyle has set the individual in a practically new bio-environment, diverging from the phylogenetic one. This has created a certain biological, biochemical and psychological stress and has set the adaptive mechanisms of the organism in a state of distress. The superposition of various new or changed natural, chemical and physical factors has unlocked practically new, not familiar enough mechanisms of response. This has been the justification for our study to attempt to evaluate the impact of the basic preformed factors of physical medicine in the conditions of the changed bio-ecological aura. Our attention was directed towards the so far not studied professional group from the physical medicine wards performing their duties in a specific occupational environment. A special individual survey card comprising most of the possible adverse effects described in the literature was created. After our opinion, additional, non-correlative in former studies questions, were also included. The formulation aims at avoiding subjective and suggestive conclusions, carried information of defined as 'sensitive' to electromagnetic exposure organs and systems. We suppose that this research, publicized here for the first time, besides contribution to the WHO database would also serve for the creation of a programme for prevention and prophylaxis of medical staff and a re-evaluation and development of new therapeutic schemes and prescriptions to our patients.

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TREATMENT OF SWALLOWING DISORDERS BY ELECTROSTIMULATION USING VOCASTIM APPARATUS**Almoniene R., Sirvydaite E.***Center for Rehabilitation, Physical and Sport Medicine, Vilnius University Hospital Santariskiu Klinikos, Vilnius, Lithuania*

Aim: to estimate electrostimulation using VocaSTIM for treating swallowing disorders. **Patients and Methods:** In the study there were involved 30 patients who suffer from swallowing disorders of different levels that has been estimated by videography. All patients took part in speech sessions. Electrostimulation with VocaSTIM apparatus was performed on 15 patients. To remove speech disorders there are individual speech sessions, speech practice sessions in groups of patients, speech practice sessions together with relatives, and electrostimulation procedures using the VocaSTIM apparatus. Electrostimulation is performed during speech practice, thus all methods with stimulation and form swallowing functions are used (modification of body position, proper mouth hygiene, correction and intensification of articulation motions, thermal, ethereal, sensual, phonic, kinaesthetic and visual stimulation). **Results:** For all patients we noticed positive dynamic. More positive dynamic was observed for patients who received electrostimulation with VocaSTIM apparatus. After repeated estimation of swallowing

level was noticed more significant positive dynamic of in a group of patients whom were used electrostimulation using VocaSTIM apparatus. **Conclusions:** Electrostimulation using VocaSTIM apparatus is a good treatment method in speech therapy practice. In patients group whom electrostimulation with VocaSTIM apparatus was used positive changes were more significant.

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PHYSICAL IMPAIRMENT AND PSYCHOLOGICAL TRANSFORMATION AMONG ELDERLY CANCER SURVIVORS**Kahana B.¹, Deimling G.², Kahana E.², Sterns S.²**¹*Cleveland State University, Psychology, Cleveland, OH;* ²*Case Western Reserve University, Sociology, Cleveland, USA*

Introduction and Aims: Cancer survivors have been found to demonstrate effective coping skills to deal with physical and psychological challenges of this life threatening illness. Indeed, recent studies have shown long term positive transformation, termed Post Traumatic Growth (PTG) among cancer survivors (1,2). This study explored the relationship between long term physical sequelae of cancer and diverse self-reported changes in life outlook among elderly survivors of three common cancers. **Methods:** The sample was selected from the tumor registry of a large Midwestern university-based hospital. We selected 288 older long-time survivors of breast, colorectal and prostate cancer. Linear correlations were conducted to determine associations between Gotay's post traumatic growth measure (3), indices of post traumatic transformation, and selected indices of health, including IADL limitations and physical symptomatology. **Results:** Results indicated that there are no significant correlations between PTG and IADL disabilities or current symptoms due to cancer. In contrast, we observed consistent significant relationships between three indicators of complex and value neutral transformations and physical functioning. Those reporting more functional limitations (IADL) and more current symptoms due to cancer were more likely to indicate that their general lifestyle changed due to cancer ($r=0.13$; $p<0.05$ and $r=0.26$; $p<0.001$, respectively). Similarly, those with more IADL limitations and those with more symptoms indicate that being a cancer survivor is important to their identity ($r=0.24$ $p<0.001$ and $r=0.15$; $p<0.01$, respectively). **Conclusion:** These findings emphasize the relationship between the long term physical sequelae of having had cancer and self reported transformation affecting life outlook of elderly cancer survivors. Even survivors who show limited psychological distress after their cancer experience report greater transformation in the presence of residual disability or continuing symptoms. Our findings call for ongoing psychological as well as medical follow-ups of cancer survivors.

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REGRESSION OF A LUMBAR DISC HERNIATION – A CASE REPORT**Nikolik-Dimitrova E.***Institute of Physical Medicine and Rehabilitation, Dept. of Rheumatologic Diseases, Skopje, Macedonia*

Aim of the study is to present a case of regression of a herniated disc at a lumbar level. **Patient and Method:** A female patient, age 46 at admission, nurse, was treated conservatively for sciatica due to lumbar disc herniation as inpatient. CT scan and MRI confirmed

disc herniation at L5–S1 level. The outcome was assessed by Japanese Orthopedic Association Scale. The Modified Zung Depression Inventory and Fear Avoidance Beliefs Questionnaire were also used. *Results:* After the physical therapy treatment, which consisted of ultrasound, some currents (interferential, diadynamic, galvanic), education, exercises, there was significantly decreasing of low back and radicular pain. Two years later, the patient had decreased pain and better functional outcome than at discharge, and continued to work at the same workplace full-time. On follow-up MRI studies there was an evidence of regression of the lumbar disc herniation. *Conclusion:* Although the phenomenon of spontaneous decreasing in size of lumbar disc herniation is known, the exact mechanism underlying this process remains unclear.

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WATER ENVIRONMENT IN THE THERAPY OF THE PATIENTS WITH HIP JOINT DEGENERATIVE CHANGES

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Introduction: Degeneration of the hip joint are a often reason of the decrease physical activity our patients. The modern rehabilitation still searches for new therapy methods to effectively fight with this problem. *Aim:* The authors have proposed a scheme of rehabilitation behavior, in which exercises in water were an important element in the treatment patients with hip joint degenerative changes. *Material and Method:* Diagnosis was given for persons with the pain hip joint region, based on interview and clinical and radiological research. In first group we used only kinesitherapy and physical therapy. In second group of patients apart from kinesitherapy and physical therapy we added exercises in water. *Results:* Kinesitherapy, physical therapy and exercises in water show therapeutical effectiveness in the treatment of patients with hip joint degenerative changes. There was a statistically significant effect between the group treated with only kinesitherapy and physical therapy and the group with added exercises in water. *Conclusions:* Patients with hip joint degenerative changes treated with the method combined with exercises in rehabilitation pool a positive therapeutic effect was proven. During the treatment we have not noticed any complications in the form of ailment escalation, which proves the safety of the method used.

*The experiment has been performed within the scope of statutory (Ds-81) financed from the Warsaw University of Physical Education funds.

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P95

WATER-BASED EXERCISE PROGRAM FOR CHRONIC RENAL PATIENTS – A 5-YEAR FOLLOW-UP

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Introduction: Most chronic nephropathies lack a specific treatment and progress relentlessly to end stage renal disease which prevalence is increasing worldwide. Studies have shown that exercise in a water environment could improve renal functioning, and

even slow the renal failure progression rate. There is still much effort needed to find out the best possible rehabilitation strategies to combine drug interventions and lifestyle changes because the chronic renal disease patients belong in the highest risk group for subsequent atherosclerotic complications. The aim was to evaluate the impact of aerobic water-based exercise therapy in chronic renal patients in 5-year follow-up study. *Patients and Methods:* 8 patients with moderate renal failure participated in exercise group, that had regular water-based exercise for 12 weeks having exercising course 2 times a year. 9 matched patients formed a control group. The study group exercised at low-intensity vertically in the pool with total immersion to the shoulder twice a week with sessions lasting 30 min. *Results:* During the 5-year follow-up GFR of the exercising patients had an ameliorating tendency, the proteinuria level of the exercising group had not worsened significantly, as in control group the worsening was significant. There was no change observed in the BMI of the group mean or among the individuals neither in the exercise nor in the control group. No significant change was observed in blood lipids. *Conclusion:* Rehabilitation therapies, like aquatic exercise, should not be overlooked in treatment of chronic renal patients to postpone further decline of renal function and prevent physical inactivity with all its pathophysiological consequences.

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DYSFUNCTION OF THE SACROILIAC JOINT AND ITS ROLE IN THE LOW BACK PAIN SYNDROME

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Introduction: The sacroiliac joint dysfunction (SIJ) is responsible for many of the non-specific low back pain, as in modifications of the mechanical posturology. *Aim:* Show from a case report, the need to perform with a global exploration, and a combined treatment in response to abnormal biomechanical factors derived from the SIJ dysfunction. *Methods and Patient:* We present a case of a 24-year-old man who presented mechanical low back pain, right chest pain and an apparent right lower limb dysmetria. A global exploration revealed a right sacrum blockage that was detected with the test of Gillet. The clinical assessment showed an increase of pain in both SIJ with the Fortin Finger Test and the Gapping test. All test were contrasted with radiological exploration. The treatment combined different Osteopathic techniques, Kabat method and home exercises. *Results:* Pelvic girdle mobilization effectiveness unblocking the SIJ. The training of the oblique, abdominal and rectum muscles gave good results in rebalancing pelvis, improvement of pain as well as gluteal muscle relaxation. *Conclusion:* To comprehend low back pain etiology and treatment is important to have in mind the biomechanical models that study the patterns of muscle coordination and the forces of the pelvic structures involved in the transfer of weight from the trunk to pelvis.

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SHOCK WAVE THERAPY IN CHRONIC PLANTAR FASCIITIS

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Introduction: Plantar fasciitis is one of the most common painful foot conditions. The use of traditional methods will alleviate the situation in most patients, however, they are a number of them resistant to therapy who need a new answer. **Aim:** To determine the effectiveness of shock wave in plantar fasciitis resistant to conventional rehabilitation. **Patients and Methods:** The study was planned with a group of 31 patients with chronic plantar fasciitis for more than 8 months. All them have received conservative treatment before. We recorded subjective, functional, radiological and echographic findings before and three months after treatment. The patients received five applications of 2000 impulses of an energy flux density 0,43 mJ/mm², at monthly intervals. **Results:** 16,12% Excellent results: No pain, full movement, full activity. 54,83% Good results: Occasional discomfort, full movement, full activity. 22,58 % Acceptable results: Some discomfort after prolonged activities. 6.45 % Poor results: Pain limiting activities. **Conclusion:** The shock wave therapy should be considered a good treatment option for chronic plantar fasciitis.

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RANDOMISED CONTROLLED TRIAL OF EXERCISE TRAINING IN HAEMATOPOIETIC STEM CELL TRANSPLANT RECIPIENTS: MUSCULOSKELETAL, PHYSICAL ACTIVITY AND QUALITY OF LIFE OUTCOMES

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Background: Patients with haematological and lymphatic malignancies often undergo peripheral blood stem cell transplantation (PBSCT). These malignancies and their treatment are associated with a range of physical and psychological symptoms and side effects. Physical exercise has been proposed as a promising strategy for the treatment of some of these symptoms, and various exercise interventions are currently available after cancer treatment. Promising preliminary results in terms of increased physical performance and reduced fatigue have been reported from small studies of exercise programmes for PBSCT recipients. Data are lacking with regard to the impact of such interventions on musculoskeletal outcomes. **Purpose:** The current randomised clinical trial is evaluating the effect of a physical exercise intervention on musculoskeletal, physical activity and health-related quality of life (HRQL) outcomes among patients with haematological malignancies treated with PBSCT. **Methods:** 128 adult PBSCT recipients are randomly allocated to a 12-week ambulatory, su-

pervised endurance and repetitive strength exercise programme (minimum 3 h/week) or a usual care control group. Assessments take place before randomisation, and at 3 and 6 months. Primary outcomes include musculoskeletal performance (knee extension and grip strength), 6-minute walk test and 15-m walking speed, and self-reported physical functioning. Secondary outcomes include self-reported HRQL and fatigue, self-reported and objectively assessed physical walking activity, and whole body composition. **Current Status:** Patient recruitment began in January, 2005. To date, 106 patients have been randomised into the study, of whom 76% have completed the 3-month and 70% the 6-month follow-up assessment. Four patients did not complete the exercise programme due to cancer recurrence. **Planning:** Patient recruitment should be completed by December, 2008, with follow-up continuing until approximately the end of 2009.

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THE POSSIBILITIES OF PULSING ELECTROMAGNETIC FIELD IN TREATMENT OF PATIENTS WITH TRAUMATIC PERONEAL NERVE LESIONS

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Introduction: In the past 30 years significant results were obtained by using electromagnetic therapy, especially in the domain of orthopaedics and traumatology. **Aim of the Study:** The goal of this research is the objective evaluation of the therapeutic effects of different modalities of low frequency electromagnetic field (LF-PEMF) and classical physical procedures in treating patients with peroneal nerve injuries. **Patients and Methods:** This examination was made as randomised, controlled open type clinical trial, and included 40 persons (25 males, 15 females). According to the type of physical treatment and different parameters of the procedures all patients were divided into 4 groups. The first (control) group of 10 persons was composed of patients treated with classical physical procedures- stable galvanisation and electrostimulation. The second group of 10 persons included patients treated with LFPEMF (B=10 mT, f=50 Hz, t=30 min). The third group was made of 10 patients treated with LFPEMF (B=5 mT, f=25 Hz, t=30 min) and the fourth group had 10 patients treated with LFPEMF (B=1.5 mT, f=5 Hz, t=30 min). All tested persons had also therapeutic exercises. These procedures were used for 20 days. As observing parameter before and after therapy was used active movement of dorsal flexion in the ankle joint. For the statistical analysis of the acquired data was used Student's *t*-test. **Results:** After therapy all patients had considerably improved active dorsal flexion in the ankle joint, but the therapeutic effects of LFPEMF in the second group (parameters of the electromagnetic field- 10 mT, 50 Hz, 30 min.) are statistically the most important ($p < 0.001$) in comparison with other groups (first group- $p < 0.05$, third group- $p < 0.01$, fourth group- $p < 0.01$). **Conclusion:** According to the results of this study it can be concluded that using LFPEMF, especially modality with following parameters B=10 mT, f=50 Hz, t=30 min, represents a very efficient therapeutic procedure in treating patients with traumatic peroneal nerve lesions.

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BIOMECHANICAL COMPLICATIONS OF ACHILLES TENDON LENGTHENING

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Background: Achilles tendon lengthening is one of the commonly performed operations for children with neurological disabilities. The operation aims at ensuring a satisfactory range of movement of the ankle joint to maintain adequate dorsi-flexion with subsequent heel strike during the early stance phase and a good clearance of

the foot during the swing phase. *Case Report:* We are reporting a case of Becker's muscle atrophy affecting a 19-year-old man. The patient had satisfactory mobility with mild bilateral foot drop. The patient had bilateral Achilles tendon lengthening when he was 16. Immediately following the operation. The patient lost his ability to walk completely and was confined to a wheelchair for the following 3 years. He was assessed at that stage and was found to have extremely weak quadriceps muscles bilaterally, which explained the inability to walk. Following a lengthy rehabilitation programme including casting of the knees and strengthening exercises, the patient managed to mobilise independently using a KAFO and crutches. *Comments:* Our case demonstrates two important issues. The first is the importance of a detailed examination including gait analysis before embarking on an irreversible surgical procedure such as Achilles tendon lengthening. Before the operation, our patient was walking on tiptoe resulting in a creation of extensor moments around the knees assisting the weak quadriceps and helping him to maintain his upright position. The operation helped the patient to achieve heel strike. Subsequently, the ground reaction force moved posteriorly and flexion moments were created around the knees, which in conjunction with the weak quadriceps made it impossible for the patient to maintain his upright position because of knees buckling. Secondly, we have demonstrated that despite having 3 years post-operatively, an appropriate rehabilitation programme succeeded in achieving independent mobility.

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TOTAL HIP ARTHROPLASTY CASES IN SONOGRAPHIC PRESENTATION

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Purpose: The distance between the anterior surface of the neck of the prosthetic stem and the anterior joint capsule, the 'capsular distance', is increased in total arthroplasty (THA) with synovitis. We evaluated the potential of ultrasonography (US) in measuring the "capsular distance" in THA hips one year after insertion. *Materials and Method:* We compared the measurements of the capsular distance using a ruler with those performed with US. A plastic pelvis and femur model with a prosthetic hip and paper tape to stimulate the joint capsule were used. We also evaluated the intra- and interobserver agreements between 3 examiners of the US measurements of the anterior capsular distance in 27 patients with THA. The effect of experience in such type of examination was estimated. *Results:* There was high correlation when measuring the anterior capsular distance in the prosthetic hip model with a ruler as compared with US. The interobserver agreement in the US measurements was good and became better after examiners gained experience in this procedure. The intraobserver agreement was always better than the interobserver agreement and also improved with increasing numbers of examinations. *Conclusion:* Ultrasonography is a reliable method to measure the anterior capsular distance in THA, especially if performed by an experienced examiner.

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THE INCIDENCE OF CLINICAL SUBGROUPS OF PSORIATIC ARTHRITIS IN A STUDIED LOT

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Objective: To establish the incidence of clinical subgroups of psoriatic arthritis in a studied lot and to compare them to those published in literature. *Patients and Methods:* This study included 16 patients (10 men, 6 women) with psoriatic arthritis, hospitalized at the clinics of Rheumatology, Dermatology and Rehabilitation Medicine of the Emergency Hospital Craiova between November

2006–June 2007. All five clinical subgroups of psoriatic arthritis proposed by Moll and Wright were identified clinically and using radiographs. *Results:* 8 of the 16 patients (50%) had asymmetrical pauciarticular arthritis, 2 patients (12.5%) had arthritis of distal interphalangeal joints, 1 patient (6.25%) had arthritis mutilans, 3 patients (18.75%) had symmetrical arthritis; 2 patients (12.5%) had exclusively ankylosing spondylitis and 6 patients (37.5%) had ankylosing spondylitis with peripheral arthritis. *Conclusion:* The incidence of clinical subgroups of psoriatic arthritis in the studied lot was similar to data communicated in other clinical studies.

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P103

FUNCTIONAL RESTORATION OF LOW BACK PAIN PATIENTS USING DOCUMENTATION-BASED CARE TREATMENT CONCEPT

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Introduction: Back pain is one of the most common reasons why patients seek physicians and secondary referrals are required. It is postulated that the presence of persistent low back pain causes patients to avoid daily activities, which may lead to physical deconditioning, both generally as specifically (e.g., loss of strength and endurance of paraspinal muscles). *Aim:* The aim of this study was to evaluate effect of documentation based care (DBC) programme on range of motion and isometric muscular strength of the lumbar muscles during flexion and extension. *Patients and Methods:* 30 low back pain patients with the mean age 39.5 \pm 13.9 years attending to functional restoration programme were included in the study. The mean duration of treatment was 77.7 \pm 34.9 days. The mean duration of pain was 78.5 months. Measuring and training units (DBC International, Vantaa, Finland) are used to measure the maximum isometric strength of the trunk muscles and mobility during flexion and extension of the lumbar spine. *Results:* Functional restoration led to significant increase of motion in flexion and extension ($p=0.0001$). Increase of trunk muscle strength during flexion and extension was observed ($p=0.0001$). *Conclusion:* We have demonstrated the efficiency of using DBC functional restoration programme on low back pain patients with a wide range of pain duration. Task specificity of training is important when considering exercises for treatment of low back pain.

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P104

REHABILITATION OF A PATIENT WITH OSTEOCHONDRITIS DISSECANS INVOLVING THE LATERAL FEMORAL CONDYLE SUBMITTED TO AUTOLOGOUS OSTEOCHONDRAL MOSAICPLASTY: CASE STUDY

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Successful management of osteochondral defects of weight-bearing joint surfaces has always been a challenge for orthopaedic surgeons and rehabilitation specialists. Autologous osteochondral mosaic transplantation technique was developed and perfected by L. Hangody in the early 1990s and is one of the recently evolved methods to create hyaline or hyaline-like repair tissue in the pathologic area. Osteochondritis Dissecans is a rare occurrence. The past and current status of Osteochondritis Dissecans suggests that there is still no clear cut etiology. In the knee, the most common localization is the lateral region of the medial femoral condyle. Involvement of the lateral condyle only occurs in 15% of cases, but its features are such that the situation is an entity in itself. Recent studies showed that autologous osteochondral mosaicplasty appears to be a promising alternative for the treatment of small and medium-sized focal osteochondral defects of the weight-bearing surfaces of the knee and other weight-bearing synovial joints. The rehabilitation program respects a period of non-weight-bearing that depends on the size and position of the cartilage defect. The return of weight bearing is gradual. Throughout this time, the knee can be mobilized without putting the grafts at risk. The authors present a clinical case of a young man with Osteochondritis Dissecans of the lateral femoral condyle that was submitted to autologous osteochondral mosaicplasty and describe his evolution throughout the rehabilitation program.

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REHABILITATION OF A PATIENT WITH SNAPPING HIP SYNDROME SUBMITTED TO Z PLASTY: CASE STUDY

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Snapping hip syndrome is characterized by an audible snap or click that occurs in or around the hip. This syndrome is well recognized but poorly understood and may be due to an external cause or an internal cause. It occurs most often in individuals aged 15–40 years and affects females slightly more than males. During the acute phase of treatment for patients with pain associated with snapping hip syndrome, the initiation of relative rest, the application of ice, and a short course of nonsteroidal anti-inflammatory drugs along with physical therapy rehabilitation program, is the treatment of choice. Corticosteroid injection is indicated for patients with prolonged symptoms despite an adequate course of rehabilitation. In the cases in which an adequate non-surgical treatment has failed, a surgical intervention may be necessary. The Z plasty of the iliotibial band is one of the surgical approaches that can be used in the surgical treatment of external snapping hip syndrome.

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Once symptoms have decreased and the patient is able to return to daily and athletic activities, a maintenance program of stretching and strengthening can be initiated and is important to reduce recurrences. The authors describe a case study of an 18 year-old female, non professional basketball player and dancer, with a left snapping hip syndrome that was refractory to conservative treatment. The syndrome was diagnosed clinically and confirmed with a dynamic sonography. The patient was submitted to Z plasty of the iliotibial band and undergone a rehabilitation program.

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P106

OSTEOPOIKILOSIS, A RARE BONE DYSPLASIA

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Introduction: Osteopoikilosis is an uncommon sclerosing bone dysplasia of unknown aetiology, transmitted in an autosomal dominant fashion. It is asymptomatic, benign and usually detected as a coincidental finding at radiographic examination. Radiological findings showed symmetric, well-defined, homogeneous sclerosing areas in several bones of the body. The involvement is symmetrical, and there are predilected locations: long bones, phalanges of the hand, carpal bones, metacarpals, foot phalanges, tarsals, tarsal bones, ileum, femur and sacrum. Males and females are equally affected. **Patients:** In this study we report a 33-year-old man that visited Rehabilitation Department because of chronic low back pain. Previous history: no other medical history of note. Clinical Examination: no other musculoskeletal symptoms were found. Radiological Exploration (Radiograph and CT): multiple, small, well-defined, variably shaped sclerotic areas in ileum, femur and sacrum. **Conclusion:** Osteopoikilosis is benign and asymptomatic bone dysplasia; the diagnosis is usually made incidentally from radiographs which show multiple sclerotic areas in several bones of the body. It may simulate other diseases as osteoblastic bone metastases, so it is important the diagnosis; we must know this pathology to avoid unnecessary interventions and treatments.

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P107

THE INDIVIDUAL FEATURE OF COORDINATED HEAD AND EYE MOVEMENT COULD BE A CAUSE IN NECK AND SHOULDER PAIN

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Introduction: Investigations have shown individual differences in the proportion of eye movement relative to head movement.

The individual relationship between head and eye movement may influence the development of painful symptoms in neck and shoulder muscles if the individual relation (e.g. occupation-related) cannot be realized. On the other hand, painful muscles in the shoulder and neck may cause changes in the individual relationship between head and eye movement and as such initiate a vicious circle. *Aim:* To endorse this hypothesis, initial preliminary investigations were carried out. *Patients:* 72 patients (adults) with a diagnosis of 'neck-shoulder-syndrome'; 17 children (6 or 7 years) and 23 children (12 years) clinically and subjectively free of symptoms. *Methods:* The relation between head and eye movements (Head-Eye-Quotient) during gaze shift were analysed using the VisionPrint System™ of the company VARILUX®-ESSILOR [1]. Subject was required to look for a visual target (at a distance of 40cm, visual angle of 50 degrees to the left and right). *Results:* In the age group of 6 and 7 year old children, only head-movers (part of head movement >50% of gaze shift) were present. In the group of 12 year old children only 52% were head-mover, 48% shows a eye movements > 50% of the gaze shift. We found a distribution of head-mover and eye-mover of 18%: 82% in the patients. *Conclusion:* With regards to distribution of the control mechanisms in both children groups and patients, it is conceivable that increasing the visual fixation (e.g. at computer workstations) would result in an altered modus of gaze movements which may be accompanied by the typical symptoms. On the other hand it is plausible that eye- movers generally tend to develop neck and shoulder complaints in later years.

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STUDY OF THE RECOVERY OF WALK PERFORMANCE AMONG STROKE PATIENTS

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Introduction: Stroke is one of the leading causes of disability in the population and can significantly affects aspects of a person's physical, emotional and social life. Gait disorder affects a large proportion of stroke survivors and limits their ability to ambulate in the community. *Aim:* The purpose of our study was to evaluate gait performance improvement in stroke patients and to determine the predictive factors of these recuperate. *Patients and Method:* Fifty right-handed patients were included, and examined on average 48 h after stroke as well as 1 and 3 months follow-up stroke. The outcomes measurements are: Demeurisse Index, Ashworth scale, PASS (Postural Assessment Scale for Stroke), Bourges Index (EPA, EPD), FIM (Functional Independence Measure), NFAC (New Functional Ambulation Categories), MMSE (mini mental status Examination), RNLI (Reintegration to Normal Living Index) and walking speed (10-m walk test). *Results:* Eighteen of the stroke patients participating in our study were able to walk unassisted during the first month follow-up stroke onset and sixteen of these participants showed increases in their daily home and community step activity after 3 months. Patients who had a functionally significant improvement in walking speed and gait performance have a lower score of NIHSS (National Institutes of Health Stroke Scale) and the best score of balance and strength evaluated by PASS and Demeurisse Index. They are also characterized by a significant improvement of cognitive (MMSE) and emotional (HAD) impairments. *Conclusion:* Improvement in standing balance and leg strength is important to achieve improvement in walking ability. Rapid and optimal improvement of locomotor capacity in patients with stroke is essential to their independence, social participation and general health.

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SUBACROMIAL SYNDROME: EFFECTIVITY OF A SHORT REHABILITATION EXERCISES PROGRAM

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Introduction: Shoulder pain is one of the most common problem in our department, affecting nearly 50% of general population every year. It means that over 40% of these patients will be referred to a Rehabilitation Department to treat them. *Aim:* To demonstrate the efficacy of a selected exercise program in group. *Patients and Methods:* We designed a short training program with the following objectives: to maintain range of motion, to control pain, to improve strength and to improve proprioceptive work. We evaluated 62 patients in two training groups: Group 1 (n=32), received a 30 min daily session; group 2 (n=30) received 60 min session, 3 sessions per week, both had 9 sessions to practice the exercises. Patients were referred to the program by medical staff with the following inclusion criteria: free range of motion, positive subacromial manoeuvres. The outcomes measures were Visual Analogic Scale for Pain and Manual Dynamometry to evaluate internal and external rotator muscle at the beginning and at the end of the program. The dates were analyzed with a general lineal model for repeated measures with statistic package SPSS12.0 for windows. *Results:* There were no significant differences between both groups after 9 sessions. Both groups had significant improvements in shoulder strength based on dynamometry and VAS. Women seem to improve their internal rotator strength more in alternative sessions than in a daily program in a significant way. *Discussion:* A short program in selected patients is useful and enough to improve strength and control pain. It is not necessary to establish long shoulder exercise programs. *Conclusion:* Short training shoulder exercises program provide benefit in selected patients affected by subacromial syndrome. A few sessions and good indications in the way of practice them seems to be enough in these group of patients.

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P110

EFFICIENCY OF THE LOW BACK BELT THUASNE LOMBA-CROSS ACTIVITY® IN SUBACUTE LOW BACK PAIN

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Aim: To evaluate the effects of an elastic lumbar belt in low-back pain treatment on clinical criteria (functional capacity and pain intensity) and the benefice on medical cost. *Patients:* 197 patients with subacute low back pain evaluated by 44 general practitioners with a 90 days follow-up. *Methods:* A randomized, multicentric controlled study with two groups: a patient group treated with a lumbar belt

Lomba-Cross Activity® (TG) and a control group (CG). The main criteria of clinical evaluation was the physical restoration assessed with the Eifel scale, the main economical criteria was the overall cost of associated medical treatments. *Results:* A decrease in Eifel score was higher in TG than CG between days 0 and 30 (5.4 ± 4.16 in TG versus 4.0 ± 4.32 in CG, $p=0.022$) and days 0 and 90 (7.6 ± 4.48 versus 6.1 ± 4.73 , $p=0.023$). A similar effect was noticed in Visual Analogic Scale (VAS). A significant decrease in pharmacological consumption was obvious in TG versus CG at days 30 and 90 with a similar effect on non-pharmacological consumption and overall medical cost. *Conclusion:* Using a lumbar belt Lomba-Cross Activity® in subacute low back pain may improve significantly the functional status assessed by the Eifel score, decrease the pain level assessed by VAS and decrease the pharmacological consumption and the overall medical cost after 30 and 90 days. This study may be useful to underline the interest of a non pharmacological approach beside the classical approach in low back pain treatment.

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3-YEAR FOLLOW-UP RESULTS IN A GROUP OF PATIENTS TREATED CONSERVATIVELY

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Introduction: Low back pain and its resulting disability have become a huge and epidemic health and socioeconomic problem (1). *Objectives:* To determine clinical and radiological differences in patients with low back pain and/or sciatica who were treated conservatively for three years. *Material and Methods:* 26 patients without any progressive neurological deficits were hospitalized in our clinic due to low back pain and/or sciatica and followed an average of three years. The evaluated variables at beginning and after three years indicated: 1) Physical examination (lumbar schober, finger tip to floor distance, lumbar extension); 2) Neurological examination (straight leg raising test, femoral nerve stretch test, deep tendon reflex, motor and sensory evaluation); 3) Magnetic resonance imaging (MRI) findings (disc, annular tear, facet joint, spinal stenosis, other pathologies) were scored between 0 to 30 according to the system described by Arana et al. (2). *Results:* Physical examination findings revealed no significant change in lumbar schober, lumbar extension and femoral nerve stretch test ($p>0.05$), on the contrary finger tip to floor distance and straight leg raising test improved significantly ($p<0.05$). Deep tendon reflex, motor and sensory evaluation findings at the end of the follow-up period were not significantly different from the pretreatment values ($p>0.05$). As for MRI findings while the severity of annular tear and total scores have improved ($p<0.05$), other categories have not changed significantly ($p>0.05$). *Conclusion:* In a group of patients who were treated conservatively due to low back pain and/or sciatica for three years, finger tip to floor distance, straight leg raising test and MRI findings improved without any deterioration in the neurological findings.

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PARSONAGE-TURNER SYNDROME: CASE REPORT

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Introduction: Parsonage-Turner syndrome (PTS) or brachial neuritis is a neuromuscular disorder associated with abrupt onset of shoulder pain followed by profound weakness involving the shoulder girdle

musculature a few days after onset of symptoms (1). The exact cause of PTS is unknown. Men are affected twice as frequently as women. In approximately one third of cases the shoulders are affected bilaterally (2). Electromyography (EMG) is the most valuable method for diagnosis. Recovery is usually complete and occurs within months but in some cases it can take a few years (3). *Case Report:* A 49-year-old man complaining of sudden left arm and shoulder pain and weakness applied to our clinic. Our examination on the second month of his complaints revealed atrophy and weakness of shoulder girdle. Deep tendon reflexes were normal but hypoesthesia in C5 was observed. The results of laboratory investigations were normal and cervical and shoulder magnetic resonance imaging did not present any abnormality. EMG examinations showed partial axonal loss at upper trunk of brachial plexus. As per these findings patient was diagnosed with PTS. An exercise program was started together with the administration of analgesic treatment. Exercise program aimed at strengthening the patient's shoulder girdle muscles and at providing the stabilization of scapulae. No significant changes were observed in the EMG examination at the sixth month. During our 18-month follow-up we observed reduction in pain however continued weakness in shoulder girdle musculature. *Conclusion:* PTS should be considered for differential diagnosis of intensive pain and weakness of shoulder and arm.

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THE EFFECT OF FIBROMYALGIA ON DISEASE ACTIVITY IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Introduction: Rheumatoid arthritis (RA) is characterized by chronic inflammation involving connective tissues throughout the body. *Aim:* We aimed to evaluate the effect of fibromyalgia (FM) on disease activity, functional capacity, and depression in patients with RA. *Patients and Methods:* Seventy-five patients with rheumatoid arthritis (RA) were enrolled to the study. FM was diagnosed by the American College of Rheumatology criteria. Disease activity was assessed according to disease activity score including 28 joints (DAS28). For evaluation of the patients, Beck depression scale (BDS), health assessment questionnaire (HAQ) and fibromyalgia impact questionnaire (FIQ) were used. *Results:* Of the 75 patients 12 (16.0%) had fibromyalgia. RA patients with FM have higher tender joint counts, patient global assessment, DAS28 and FIQ values than other RA patients $p=0.025$, $p=0.019$, $p=0.048$, $p=0.042$, respectively. There was no significant difference between the groups in respect to disease duration, BDS and HAQ ($p=0.85$, $p=0.066$, $p=0.332$, respectively). *Conclusions:* We found that coexistence of FM in RA patients may lead to high disease activity.

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THE RELATIONSHIP BETWEEN FALLING RISK AND FOOT MUSCULOSKELETAL DISORDERS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Introduction: Rheumatoid arthritis (RA) is a systemic disease that involves the diarthrodial joints and associated soft tissues.

Aim: To investigate the relationship between falling risk and foot musculoskeletal disorders (FMDs) and heel pad atrophy in patients with RA. **Patients and Methods:** Eighty-nine patients (75 female, 14 male) with RA were enrolled to the study. Patients who had neurological disease, or symptoms and findings of atlantoaxial involvement or history of drugs causing a balance disorder were excluded. Foot, ankle, knee, hip, and low back pain of the patients were evaluated using visual analogue scale (VAS). The foot musculoskeletal disorders (FMDs) in the study included hallux valgus (HV), hammer toe (HT), mallet toe (MT), claw toe (CT), overlapping toe (OT), pes cavus (PC), pes planus (PP), metatarsalgia (MA) and plantar fasciitis (PF). The diagnoses of FMDs were based on the clinical appearance of the foot and on radiographic evaluation under standardized weight bearing conditions. Disease activity was assessed according to disease activity score including 28 joint (DAS28). Heel pad thickness was measured as weight-bearing and nonweight-bearing by high resolution ultrasound. Participants' falls risk was assessed using The Performance-Oriented Mobility Assessment (TPOMA). **Results:** Of the 89 patients 12 (13.5%) had falling risk. The number of FMDs was higher in RA patients with falling risk than others ($p=0.001$). Also, foot pain (VAS) was higher in RA patients with falling risk ($p=0.044$). There was no significant difference between two groups (with and without falling risk) in ankle, knee, hip and low back pain (VAS) and DAS28 ($p>0.05$). There was a negative correlation between the number of FMDs and TPOMA total scores ($r=-0.457$, $p=0.000$). There was no significant difference between two groups in nonweight-bearing and weight-bearing heel pad thickness ($p>0.05$). **Conclusions:** We found a significant relation between FMDs and falling risk in RA patients. Also, as the number of FMDs increases, falling risk becomes higher in RA patients.

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PREVENTION OF THE LOW BACK PAIN IN PATIENTS AFTER UNILATERAL ORTHOPEDIC INTERVENTION OF THE INFERIOR LIMB

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Aim: Evaluation of the effectiveness of a complex physical therapy and rehabilitation program for the prevention of the low back pain and accelerating functional recovery in patients after reconstruction of the anterior cruciate ligament for traumatic rupture. **Material and Methods:** Subject of the study were 64 patients, divided into two groups. The rehabilitation program in both groups included orthotic immobilization and standard physiotherapy program (including analytic exercises for the knee extensors and for abdominal muscles; postisometric relaxation of rectus femoris of the quadriceps muscle; stretching for paravertebral muscles; mobilizations and manipulations for sacro-iliac joints). The patients from the second group received besides the exercise program physical agent modalities: low-frequency pulsed magnetic field in the lumbar region, therapeutic ultrasound (phonophoresis with non-steroidal anti-inflammatory drug) and electrical stimulations of the muscles: vastus medialis and vastus lateralis of the quadriceps muscle. For statistical evaluation we used *t*-test (ANOVA) and Wilcoxon rank test (non parametrical correlation analysis). The analysis of the results shows improvement of the symptoms of the patients, concerning pain relief in the low back, static and mobility of the lumbar spine and the knee joint, reduction of the periarticular edema, increased strength of the extensor muscles of the knee joint and abdominal muscles, which were more significant in the patients from the second group. **Conclusion:** We could recommend the complex program for accelerating functional recovery

and prevention of the low back pain in patients after reconstruction of the anterior cruciate ligament.

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PREVENTION OF THE UPPER BACK PAIN IN PATIENTS WITH UNILATERAL SHOULDER FUNCTIONAL INSUFFICIENCY AND SHOULDER INSTABILITY

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Aim: Evaluation of the effectiveness of a complex physical therapy and rehabilitation program for the prevention of the upper back pain caused by the muscle dysbalance in patients with unilateral shoulder functional insufficiency and shoulder instability. **Material and Methods:** Subject of the study were 102 patients (divided into two groups): 34 of them with humero-scapular periartthritis, 21 - with adhesive capsulitis, 26 - with shoulder subluxation and 37 - after shoulder surgical intervention. The rehabilitation complex includes positional treatment, kryotherapy, massages and standard physiotherapeutic program for the shoulder instability. The patients from the second group received too physiotherapeutic procedures for correction of muscle dysbalance and static of the cervical region (isometric exercises, post-isometric relaxation; tractions, mobilizations and manipulations; relaxing massage techniques) and pre-formed physical modalities (phonophoresis with non-steroidal anti-inflammatory drug for the shoulder joint and electrical stimulations of the muscles: m.supraspinatus, m.infraspinatus, m.pectoralis major, m.deltoides). For statistical evaluation we used *t*-test (ANOVA) and Wilcoxon rank test (non parametrical correlation analysis). The comparative analysis of the results shows improvement of the symptoms of the patients, concerning pain relief in upper back and in shoulder, stability and functional mobility of the cervical spine and the humero-scapular joint, reinforcement of muscles of the rotator cuff of the shoulder joint and of paravertebral muscles, recovery of scapulo-humeral rhythm; which were more significant in the patients from the second group. **Conclusion:** We could recommend the complex program for recovery of the shoulder arthro-kinematics and prevention of the upper back pain.

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BURULI ULCER REGARDING A CLINICAL CASE

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Introduction: Buruli ulcer, a tropical disease caused by *Mycobacterium ulcerans*, is the world's third most common mycobacterial disease. It occurs predominantly in developing countries and affects the skin and the bone, resulting in deformity and functional limitation. **Aim:** To present a clinical case of a 20-year-old patient with Buruli ulcer on both lower limbs and right transfemoral amputation. **Case Report:** A black female 20-year-old patient from São Tomé and Príncipe with personal history of sickle cell disease developed an ulcer in the left lower limb in 2002. She was admitted to a local hospital and a transfemoral amputation was performed due to lesion extension and bone involvement. She started ambulation with crutches. A new ulcer in the right lower limb presented in 2006. The patient was admitted to hospital and then transferred to Portugal some months later. She initiated antibiotherapy with rifampicin, amikacin and clindamycin, and enoxaparin injection.

tions for eight weeks with gradual improvement of the lesion. A prescription of lower limb prosthesis was made and she started gait training with independent ambulation. *Conclusion:* An early diagnostic and effective treatment can prevent further interventions and disabilities. Most patients do not seek medical care until lesions and destruction of tissues are extensive, leading sometimes to amputation with a negative social and economic impact. There is an increase of cases of this pathology in Portugal due to patient transfer from Portuguese speaking African countries.

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DYSFUNCTION OF THE SACROILIAC JOINT AND ITS ROLE IN THE LOW BACK PAIN SYNDROME

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Introduction: A great part of the low back pain diagnosed as an idiomatic chronic low back pain is related to a sacroiliac joint dysfunction (SIJ), the prevalence is estimated between 10% and 27% (1, 2). This dysfunction is responsible of many secondary morphological and structural changes (3), as in modifications of the mechanical posturology (4, 5) *Aim:* Show from a case report and a literature review, the need to perform with a global exploration, differential diagnosis and a combined treatment if suspecting of a SIJ dysfunction, in response to abnormal biomechanical factors derived from the SIJ dysfunction. *Methods and Patients:* We present a case of a 24-year-old man who presented mechanical low back pain, right chest pain and an apparent right lower limb dysmetria. In the initial assessment an scoliotic attitude was observed, right hemithorax muscle tone increased, left posterior superior iliac spine (PSIS) higher than the right PSIS, right pelvis anteriorized and slightly inwards and left pelvis posteriorized and slightly outward, sacrum twisted to the left and tilted to the right, right leg in external rotation and left neutral, left calcaneus neutral and right in varus. A right sacrum blockage was detected with the test of Gillet applied bilaterally. The clinical assessment showed an increase of pain in both SIJ with the Fortin Finger Test and the Gapping test. The radiological exploration revealed an obliquity between the lines that cut the iliac crests and the femoral head and a parallelism between them. Based on the exploration results a global treatment was opted which will combine different techniques such as; pelvic girdle mobilization while seated, sacral pumping (osteopathic technique), Kabat Method in right lower limb, rhythmic mobilization of the pelvic girdle, overall muscle stretch of the posterior right-chain, gluteus maximus neuromuscular massage, muscle-energy (osteopathic technique) in left rectus muscle to descend pelvis and home exercises to strengthen the abdominal muscles. *Results:* Effectiveness in pelvic girdle mobilization to unblock the SIJ contrasted with Saulicz et al studies (6). The training of the oblique, abdominal and rectum muscles gave good results in rebalancing pelvis, improvement of pain (7) as well as Gluteal muscle relaxation (5). *Conclusion:* To comprehend low back pain etiology and treatment is important to have in mind the biomechanical models that study the patterns of muscle coordination and the forces of the pelvic structures involved in the transfer of weight from the trunk to pelvis (5). It is difficult to make a proper diagnosis because of the anatomic and biomechanical complexity, and the limited evidence from clinical trials (6), it is therefore necessary to contrast them with other imaging test or measurement studies (5).

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GORHAM-STOUT SYNDROME – AN UNCOMMON CASE & A REHABILITATION CHALLENGE

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The Gorham-Stout Syndrome (GSS) is a rare disorder of the musculoskeletal system, characterized by uncontrolled, destructive proliferation of vascular channels within bone that results in destruction and resorption of osseous matrix. New growth does not occur even when the osteolysis ceases to progress, but depleted areas may be replaced by fibrous tissue. The precise aetiology and pathophysiology are poorly understood. The first case was described in 1838 by Jackson. In 1955, Gorham & Stout defined it as a specific disease entity. The GSS presents as a progressive idiopathic osteolysis of one bone or contiguous bones, without respect for joint boundaries. It can affect any part of the skeleton, and occur at any age. The clinical presentation is variable and depends on the site of involvement. Diagnosis is, essentially, one of exclusion, based on clinical suspicion, combined with radiological and histopathological findings. GSS natural history is unpredictable; the vital prognosis is generally good, but it may result in severe deformity and disability. The principal treatment modalities are surgery and radiotherapy. The purpose of this case report is to make the medical community aware of this entity, allowing better evaluation and management of this unusual disorder. The authors describe a case of a 19-year-old male, previously healthy, who suffered a sports injury with left sub-trochanteric fracture. He was submitted to osteosynthesis and biopsy of the lesion. Pseudoarthrosis occurred, with need for reoperation. The biopsy was then repeated along with bone scan, that arose the suspicion of GSS. The osteolysis progression was very fast and surgical intervention was no longer possible. By this time, the patient was proposed for radiotherapy and rehabilitation. At our first observation, patient was deambulating with 2 crutches, with no weight bearing on the left leg. He had significant global muscle atrophy of the left lower limb with diminished strength on the hip and knee, and preserved ROM. The patient was immediately proposed for multidisciplinary rehabilitation treatment.

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ACUTE REHABILITATION OF YOUNG ADULT WITH OPERATED TRAUMATIC HIP FRACTURE

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Fractures of the femoral neck in patients under age of 50 are only 10% of all proximal femoral fractures. Orthopedic therapeutic

approach for young adults is different of those for elderly. As we try to postpone implantation of endoprosthesis, we use internal fixation which consists of minimum 3 cannulated screws convergently applied towards the center of the femoral head, although avascular necrosis (AVN) of the femur head is a potential complication. We present 45-year-old male who had a traffic accident in which he sustained femoral neck fracture. During the first 12 h, surgical treatment is performed in general anesthesia, with lateral approach and intraoperative X-ray control in two directions. As there is no weight bearing on operated leg in first 6 months, rehabilitation treatment (RT) includes preventing complications, preserving muscular strength and range of motion. RT first postoperative day includes breathing exercise, exercise for improving perypheral circulation and isometric exercises for *m. quadriceps* and *mm gluteii*, supported active exercises for operated limb, active exercises for none operated limbs and verticalisation in bed. Second postoperative day includes sitting in bed while preparation and teaching for standing position while walk in armpit walker starts next day. RT continues with teaching a walk with crutches without foot-hold on the operated limb. Patient is dismissed on the 12th day from the operation, enabled for walk with crutches without foot-hold. RT continues in a specialized rehabilitation health center. During the two years of follow-up, there is no sign of AVN.

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RARE SUBCAPITAL HIP FRACTURE – A CASE REPORT OF A PREGNANCY ASSOCIATED OSTEOPOROSIS

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Introduction: Osteoporosis during pregnancy is a rare disorder in which bones lose density and can more easily fracture. Its pathophysiology is being discovered in the last decade, with very few cases reported in literature. **Aim:** To report a case of pregnancy-related osteoporosis in a 34-year-old primiparous patient diagnosed because of a subcapital hip fracture in the third trimester of pregnancy. **Case Report:** At the 38th week of pregnancy, while walking, this patient felt an acute pain in her right hip with no associated trauma. Standard radiographs, a computed tomography and a magnetic resonance revealed a subcapital hip fracture. Femoral neck mineral density was measured by osteodensitometry with a T-score of -2.4 and a Z-score of -2.3, and osteoporosis was diagnosed. She was submitted to surgery with placement of screws at the hip and started oral medication with calcium, alendronate and calcitonine. The patient had a good functional outcome after the surgery. **Conclusion:** Pathologic fractures are a very serious complication of pregnancy-related osteoporosis. Rehabilitation with exercises, TENS for pain and hydrotherapy, can help recovery of these patients.

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SEVERE MALE OSTEOPOROSIS WITH A L5 FRACTURE: A CASE REPORT

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Introduction: Osteoporosis is characterized by increased susceptibility to bone fractures. Its prevalence is about 3% to 6% in men older than 50 years. Males account for approximately 20% of symptomatic vertebral fractures, commonly in low dorsal and high lumbar vertebrae. Androgen levels decrease with advancing age in men, leading to bone loss; this effect being potentially mediated via oestrogen receptors. Secondary causes are responsible for about half of the cases of bone loss in men. **Aim:** To report a case of severe osteoporosis in male. **Patients and Methods:** The authors describe a case of a 77-year-old man that had an acute and disabling low back pain radiating to the right lower limb, after a flexion trunk effort. Clinically, the patient presented a severe lumbar paravertebral contracture and tenderness, without neurological signs. The first lumbar X-ray and a lumbar scan were both inconclusive. Bone scanning, DEXA, bone biochemical and tumours markers and routine blood exams were also done. Although under medication, the pain became worse and a new lumbar X-ray was made. The patient has a personal history of previous D12 and L1 body impact fractures and a familial history of severe osteoporosis. **Results:** The lumbar MRI showed a L5 vertebral body vertebral image leading as possible diagnosis an osteoporotic fracture, metastasis or osteomyelitis. Bone scanning excluded a bone tumour and metastasis. Blood cells counts, CRP and ESR were normal; DEXA showed severe osteoporosis; bone resorption markers were raised. The second lumbar X-ray showed a L5 vertebral collapse, due to a compression fracture. He started Teriparatide, resulting in significant pain remission. **Conclusion:** This is an unusual case of an osteoporotic L5 fracture in men. In men, osteoporotic fractures are associated with more significant morbidity and mortality. In elderly men with no identifiable secondary causes, the diagnosis of age-related, rather than idiopathic osteoporosis seems appropriate. Some of this age-related osteoporosis reflects genetic acquisition of low peak bone mass. Despite an increased recognition of osteoporotic fractures in men, the disease remains neglected in males.

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INFLUENCE OF CUSTOM MADE INSOLES FOLLOWING PEDOBAROGRAPHY FOR FOOT DEFORMITIES

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Aim: To compare the influence of specially prescribed insoles, in relieving pain and improving static postural sway of patients with foot deformities. **Patients and Methods:** Seventy-seven subjects (56 women, 21 men), with pain, burning sensation, fatigue and callus formation referred to the pedobarograph laboratory participated in the study. Patients were referred from rheumatologists, orthopedics and internal pathologists both from our hospital and the community. Pain was estimated using the Optical Analog Scale, before and 3 months after the prescription of the insoles. Static postural sway was recorded at the first examination of the patient and 3 months later. After the acquisition of the static and dynamic pedobarography, special insoles were prescribed in order to support the longitudinal arch, to relieve pressure from the metatarsal heads and strain of the

plantar fascia. *Results:* Compared to their initial evaluation, patients decreased their static postural sway, in a percentage of 58%. The Optical Analog Scale score was decreased in a percentage of 66%. *Conclusion:* Patients with a variety of foot deformities can really be relieved from pain and improve their postural sway using specially constructed soles. This can be of great importance, taking into consideration the high risk for falls, in people of this age.

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KNEE PAIN AFTER MENISCECTOMY, SECONDARY TO LUMBAR AND PELVIC BIOMECHANICAL DYSFUNCTION

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A 52-year-old patient was operated arthroscopic for internal meniscus rupture. For 7 weeks postmeniscectomy she have claimed intensive right knee pains with functional gait impotency. The pains started 10 years ago, being associated with frequent episodes of lumbago, elbow and ankle pain. Also, she had a diagnosis of irritable bowel syndrome and gallbladder dyskinesia. At clinical exam, we found: an osteopathic dysfunction also called "anterior iliac" on the right side and the contracture of its muscle triad: ilio-psoas, quadriceps, square lumbar muscle, associated with flexion of the right knee; pain at palpation and knee mobilizing; hyposensitivity on the right L5 dermatome; sensitivity at profound palpation at the right iliac fossa, supra-pubic and right upper quadrant. The radiological findings were tilt of the pelvis, lumbar scoliosis and minor knee arthritis. We applied five session of structural osteopathy for unblocking of the sacroiliac and lumbar sacral joint and two visceral osteopathy sessions for the spasm removing of ilio-caecum and diaphragmatic muscle. No procedure was performed over the knee. The pains and the knee flexion have ceded. The patient has taken over her daily activities after almost 2 months postoperative break and the good health status has maintained until the 6 months check up. *Conclusions:* Sacroiliac and lumbar-sacral joints dysfunctions offer a certain explanation for the unsatisfactory results on knee pain management in short and medium terms, after arthroscopic internal meniscectomy.

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COMPARISON OF INTRAARTICULAR HYALURONIC ACID AND SHORT WAVE DIATHERMY ON THE TREATMENT OF KNEE OSTEOARTHRITIS

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This study has been conducted on 40 patients who consulted to Haydarpaşa Numune Hospital Physical Medicine and Rehabilitation Clinic with the complaint of knee pain, to investigate and compare the effectiveness of the intraarticular sodium hyaluronate (HA) and short wave diathermy which stand as two high-valued treatment options in knee osteoarthritis (OA). In this single-blind, prospective

and randomized study, the 40 patients were divided into two groups. While 20 patients in one group were received with 2 ml intraarticular 1% HA once a week for a total of 3, shortwave diathermy was applied to the other group 5 times a week for a total of 15. In addition, both groups were informed of the protective precautions and they were made to practice isometric knee exercises after a hot-pack application of 20 min. The patients are evaluated in terms of VAS, WOMAC OA index, Lequesne index, range of joint movement measurement and analgesic usage need, for a total of 6 times; one in the beginning and the others on the 1st, 2nd, 3rd, 7th weeks and on the 3rd month, and the groups were compared. In the end of the study, in the patients of the HA group a significant improvement on all parameters was achieved at the end of the 1st week, which stayed steady until the 3rd month. On the other hand, in the patients of the short wave diathermy group, although this improvement was dominant in the first two weeks, it is observed that the average point of the VAS and WOMAC Osteoarthritis Index were lower than in the HA group. As a result it is concluded that patients with knee OA intraarticular HA and short wave diathermy are effective and reliable methods.

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PIRIFORMIS SYNDROME: A FORGOTTEN ENTITY

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Introduction: Piriformis syndrome is a common cause of low back pain. However, it is often not included in the differential diagnosis of back, buttock, and leg pain. As such it is generally underdiagnosed and estimates of frequency of sciatica caused by piriformis syndrome vary from rare to approximately 6% of sciatica cases seen in a general family practice. *Aim:* Describe a clinical case of piriformis syndrome, its diagnosis and management. Improve the familiarity with the common elements of the syndrome, increasing its recognition, which in turn allows an adequate treatment. *Clinical Case:* LFSA, female, 49 years old with complaints of low back pain and sciatica in the right leg for several months. She had been evaluated by an orthopaedic surgeon and was subjected to a lumbar magnetic resonance (MRI) and lower limb electromyography (EMG) which excluded radiculopathy. Evaluation by PRM was then requested. The patient presented on physical examination with pain on piriformis deep palpation, and pain was reproduced with both the Pace and Freiberg tests. A rehabilitation program was started which included heat, ultrasound, hip joint mobilization, hip abductor strengthening, piriformis stretching and vertebral kinesitherapy, with complete resolution of symptoms. *Conclusion:* This case illustrates the importance of keeping piriformis syndrome in mind when evaluating a patient with back, buttock or leg pain, with or without sciatica, and the significance of clinical examination. If an adequate treatment is not promptly started patients may enter a chronic pain phase, possibly hindering the prognosis and increasing health costs.

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CONSERVATIVE APPROACH OF COMPLEX PROXIMAL HUMERUS FRACTURES

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Proximal humerus fractures represent about 5% of all fractures, with increasing incidence with age. Most of them present with

slight or no displacement at all, being efficiently managed with conservative treatment. Yet, in complex, displaced proximal humerus fractures, surgical treatment is usually performed, as it improves prognosis concerning shoulder functionality. However, in patients without surgical conditions or that refuse surgical approach, a conservative treatment imposes. In the present study, the authors pretend to discuss the conservative approach in complex proximal humerus fractures, comparing the results of some cases ($n=10$) treated conservatively or surgically and characterizing pain and function at 18-months post-fracture. A rehabilitation programme is proposed.

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REHABILITATION OF EXUBERANT GOUT

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Gout is a common disorder of the uric acid metabolism that can lead to recurrent episodes of joint inflammation, tissue deposition of uric acid crystals, and joint destruction if left untreated. Early diagnosis and treatment have made a significant impact in this disorder. However tophaceous gout may occur due to misdiagnosis, poor management, and poor patient compliance. The authors present a clinical case of a 56-year-old man with chronic polyarticular tophaceous gout diagnosed ten years ago. The initial symptoms were classic podagra with progressive involvement, over the years, of other articulations such as elbows, knees, metacarpophalangeal, proximal interphalangeal, other metatarsophalangeal and intertarsophalangeal joints developing chronic arthritis and exuberant tophi. At presentation at our Rehabilitation Center he had a nine years evolution disease with polyarticular acute arthritis, multiple spontaneous draining tophi and limited range of motion (ROM) conditioning severe loss of function, especially in the hands and elbows. Plain radiographs of the affected joints show erosions and accessory signs in different stages of evolution consisted with gout. The physical medicine rehabilitation (PMR) program was initiated to treat arthritis sequelae and improve performance in activities of daily living (ADL). It was necessary to adjusted it according to the phase of the disease (acute or chronic). Besides he was oriented for better metabolic control of the disease and advised dietary modifications, alcohol avoidance, weight reduction and healthful lifestyle. At this time the patient present a slight improvement in ROM of all joints affected and reports functional gains especially in ADL. This case illustrates that aggressive treatment of gout should be initiated as soon as possible to prevent severe sequelae. When that is not possible the rehabilitation program can reduce the impact of the disease by improving quality of life.

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PSORIATIC ARTHRITIS

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Psoriatic arthritis is an autoimmune, chronic, systemic inflammatory disorder characterized by the association of arthritis with psoriasis. Patient with psoriatic arthritis have a heterogeneous and variable clinical course (1). Psoriatic arthritis is distinct from psoriatic skin inflammation. (2). *Aim:* The aim of this study was to evaluate the efficacy of physical therapy in the treatment of psoriatic arthritis. *Methods:* Ten patient suffering from psoriatic arthritis entered to this study. Patients were evaluated before and

at the end of treatment and after 6 weeks of follow-up. The study was comprised of a 2-week (10-session) intervention. Therapy included kinesitherapy and electrotherapy with analgesic effects. *Results:* Five patients had complete improvement, significant post-treatment improvement for same active and passive movements and significant improvement in pain, in four cases only partial improvement was found. In one patient treatment failed. *Conclusions:* These results show that physical therapy is both effective and safe in the treatment of psoriatic arthritis.

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COCCYDYNIA FOLLOWING TOTAL KNEE ARTHROPLASTY

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A number of coccydynia etiologies causing altered anatomical appearance has been described including direct trauma, prolonged sitting, and childbirth (1). Obesity and trauma have also been identified as risk factors for coccyx luxation (2). Until now, colonoscopy has been reported as the only direct iatrogenic cause of coccydynia (3). We present a case of a total knee arthroplasty as a trigger for coccydynia. A 50-year-old obese female presented with a 9 months history of pain in the coccyx and surrounding gluteal region subsequent to a left total knee arthroplasty. Although admitting to several falls in the remote past, she denied any prior incidents of coccyx pain, trauma, childbirth complications or sexual assault. She regained her knee function within a range (ext -5 to flex 110), and ambulates in a community with a straight cane and mildly antalgic gait. The strength of the lower extremities was good. The lower sacral, coccygeal and the gluteal region were tender to palpation. The rectal exam revealed immobile sharp posterior angulation of the distal coccygeal segment fixed in an extended position which did not allow for manual mobilization. This position was confirmed by a sacral radiology with an estimate of 45 deg of extension and 40 deg of the right deviation. A total knee arthroplasty is unlikely to cause a direct traumatic injury to a patient's coccyx. However, we believe that the timing of the symptoms, radiological findings, and no previous history of coccydynia suggest that the patient's knee surgery caused de-novo symptoms or triggered a pre-existing asymptomatic coccyx pathology possibly via subsequent altered body mechanics, position, muscle tone, or gait pattern.

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PARTICULARITIES OF BACK PAIN REHABILITATION THROUGH MCKENZIE METHOD

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There are 50–80% of adult populations that will experience back pain at some point in their life. In natural history is a considerable variability but recurrence, episodes and persistent symptoms

are common. Back pain is one of the commonest causes of disability in working population and the medical costs represents 7% to 34% of all societal costs. Medication (NSAID, SAID) and electrical modalities (TENS, ultrasound, laser and electrical stimulation) provide short-time pain relief. In contrast with other treatment approaches, McKenzie method uses repeated movements for assessment and management, emphasizing on patient independence. The therapist dependency is avoided and the exercises are used for pain relief. McKenzie identifies two lifestyle factors predisposing to back pain: bad sitting posture and frequency of flexion. When combined, these 2 predisposing factors lead to a loss of extension. The therapy is preceded by mechanical diagnosis characterized by recognizing the derangement, the dysfunction and the postural syndromes. The major treatment principle is that involving extension; forces listed under flexion and lateral are used less frequently. Many of the procedures listed under extension and flexion principles involve purely sagittal plane forces. However, certain procedures use a combination of sagittal and lateral plane forces, and those are also listed under extension and flexion.

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PALMAR FASCIITIS AND POLYARTHRITIS AS A PARANEOPLASTIC SYNDROME ASSOCIATED WITH OVARIAN CARCINOMA: A CASE REPORT

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Introduction: A 49-year-old white woman with palmar fasciitis and polyarthritis (PFPA) as a paraneoplastic syndrome associated with ovarian carcinoma. **Aim:** The patient was admitted to our service in December 2007, with the suspicion diagnosis of complex regional pain syndrome type I (CRPS-I), complaining a progressive painful swelling and stiffness of both hands, especially the palms, which were noted by the patient to have thickened progressively since September 2007. Pain and reduced range of motion gradually extended to involve shoulders and knees with no improvement after initial nonsteroidal anti-inflammatory and corticosteroid treatment. She denied any previous joint diseases, Raynaud's phenomenon, skin tightening, or trauma. **Results:** Physical examination on admission was remarkable for symmetrical swollen hands and fingers, painful on active and passive movement, and palmar fascial thickening with erythema. The fingers of the patient showed flexion contractures; making a fist was impossible. Exam also revealed markedly limited bilateral shoulder ROM to 45° of abduction and 50° of flexion and limited knee flexion to 90° bilaterally. No evidence of skin sclerosis or arthritis in other locations was found. The patient's symptoms were orally treated with a cyclooxygenase (COX)-2 inhibitor, a transdermal delivery system for buprenorphine, and local ointments with diclofenac, and with a program of comprehensive rehabilitation. The immunological laboratory investigation failed to show any specific abnormalities (rheumatoid factor, antinuclear antibodies, antistreptolysin titre, antineutrophil cytoplasmic antibodies, complement CH50 and C3d). Radiography of both hands showed no signs of acute arthritis or osteoarthritis. Technetium-99m bone scan showed a slight increased uptake in both shoulders, wrists, hips, knees, and ankles. Computed tomography scans of the abdomen revealed a pelvic solid mass next to the uterus, suggesting an ovarian tumor. After the patient underwent total hysterectomy and anexectomy, the polyarthritis of the palms, shoulders, and knees showed a gradual spontaneous improvement but the contractures in both hands persist despite extensive physiotherapy. **Conclusions:** The characteristic hand deformities of PFPA should alert the clinician to search for an underlying malignant disease.

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PHYSICAL THERAPY IN PATIENTS WITH GONARTHROSIS

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Introduction: Gonarthrosis is one of the most common and costly medical conditions, which leads to the chronic disability especially among older population. Different physical therapy procedures are directed toward minimizing pain and swelling, maintaining joint mobility and associated disability due to gonarthrosis. **Aim:** to compare results of two different physical therapy procedures. **Patients and Methods:** Prospective clinical study included 32 patients (22 female and 10 male), 47–69 years of age (average age 63.4) with clinical and radiological features of gonarthrosis. Range of motion, muscular strength of m. quadriceps femoris and hamstrings, as well as pain score on Visual Analogue Scale (VAS) were measured before and after series of twenty therapies. All patients were included into kinesitherapy program, but the first group of patients was treated with combination of low frequency pulsed electromagnetic field and interferent electrotherapy (frequency 90–100 Hz), while the second group received magneto therapy and low level laser therapy (30 J per treatment, frequency 600 Hz). **Results:** Before treatment 15 patients had full range of motion in the affected knee (46.78 %), while 17 patients had decreased flexion for 20–60 degrees. Reduction of the muscular strength for m. quadriceps and hamstrings was registered in all the patients and varied between grade 3- and 4, using manual muscle testing (MM-t). Average of VAS score before therapy was 4.9. After 20 therapies both group of patients had significantly better outcome results, range of motion increased for 20–30 degrees, as well as muscular strength for ½ to 1 grade by MM-t, and average pain score on VAS became 3.4. The difference before and after applied therapy was statistically significant for both groups of patients, but there were not significantly different results between two groups. **Conclusion:** Kinesitherapy in addition to magneto therapy combined with electrotherapy or laser, provide good clinical effects in treating gonarthrosis, although we could not conclude which one of those two physical procedures is more beneficial for patients.

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TOTAL HIP REPLACEMENT – PATIENTS PERCEPTIONS

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Introduction: Total hip replacement (THR) is one of the most important accomplishments of the modern orthopedic surgery. Except fractures, the most common indications for THR are advanced primary and secondary coxarthrosis. **Aim:** to determine an importance of early postoperative rehabilitation treatment in patients with THR and their perceptions before and six months after operation. **Patients and Methods:** Prospective study included 36 patients, 37–72 years old. After clinical and X-ray examination 16 of these patients were diagnosed as having advanced osteoarthritis (44.44 %), 15 had secondary osteoarthritis (41.67%), 3 patients had previous inflammatory osteoarthritis (8.33 %), and 2 patients had problems due to conservative treatment for fractures of the neck of the femur (5.5%). All patients were evaluated by completing Oxford 12-item hip questionnaire before and 6 months after operation. All patients had THR and were involved afterwards in 4 weeks rehabilitation program which included kinesy and occupational therapy, low frequency pulsed magnetic field and interferent electrotherapy. **Results:** 12-item questionnaire provided information about usual level of hip pain, sudden severe pain and walking time before it's appearance, pain on standing up from sitting, difficulties going up stairs, pain in bed at night, work in-

terference due to pain, trouble with washing and drying, putting on clothes, doing household shopping, trouble with transportation and walking disabilities as limping. The scores ranged from 12 (least) to 60 (most difficulties). Before operation the summed score for the questionnaire had a median value of 46 (15–56), and 6 months later a median value of 24 (13–48). Questionnaire showed significantly better outcome results for all the patients 6 months after the surgery in sense of minimizing pain, increasing range of motion, mobility and active participation in daily living activities and self care. *Conclusion:* Physical therapy and rehabilitation after THR helps patients overcome problems like pain, functional limitation and achieve range of motion essential for every day activities. Usage of 12-item hip questionnaire provides reliable results for monitoring functional status after THR, straight from the patients' viewpoint.

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INFECTION? TUMOR? – CHRONIC RECURRENT MULTIFOCAL OSTEOMYELITIS

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Introduction: Chronic recurrent multifocal osteomyelitis (CRMO) is a rare, inflammatory, skeletal disease of unknown origin that occurs mainly in children and adolescents being characterized by a prolonged fluctuating course with recurrent episodes of pain. CRMO is most often seen in tubular bones, clavicle, and less frequently in spine or pelvic bones. Histopathological and laboratory findings are non-specific and bacterial cultures are negative. *Case Report:* A 10-year-old girl, without relevant past medical history, presented with recurrent lumbar pain that persisted at rest. She denied a traumatic event. On examination, she presented a limitation on lumbar flexion; otherwise the clinical exam was normal. The Magnetic Resonance disclosed a L5 vertebral body and sacral lesion. A Computer Tomography guided biopsy of L5 vertebral body was negative for infection or tumoral cells. A duly diagnosis of CRMO was made. The patient began anti-inflammatory therapy with resolution of symptoms. *Conclusion:* CRMO is an exclusion diagnosis thus bacterial infection and tumoral lesions should be ruled out. We discuss the clinical features, radiological presentation, differential diagnosis and treatment of CRMO. The importance of an early diagnosis avoiding unnecessary diagnostic procedures and proper treatment are debated as well.

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SPINAL CORD INJURY AFTER MINOR CERVICAL TRAUMA ‘OS ODONTOIDEUM’

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Introduction: Os odontoideum is a rare craniocervical junction anomaly characterized by a disconnection between the dens and the axis body. The exact incidence is unknown and the aetiology is debated, between a traumatic or congenital origin. *Case Report:*

The authors report a case of a young girl that developed a tetraparesis after a minor cervical trauma. The conventional radiological studies disclosed an os odontoideum and the magnetic resonance imaging showed on T2-weighted sequence a high-signal in spinal cord consistent with acute contusion. The patient was submitted to surgical corrections and rehabilitation therapy with partial deficit resolution. *Conclusion:* Os odontoideum can lead to instability of the atlantoaxial joint and places the spinal cord at significant risk for acute catastrophic events after minor trauma or chronic neurological change. Incorporating assessment of dens integrity into the evaluation algorithm for all pediatric cervical spine studies should lead to early detection of os odontoideum lesions and allow referral to appropriate clinical spinal services for evaluation, surveillance and possible surgery to prevent future complications. The authors discuss the aetiology, the radiological features and treatment with emphasis on physiatric rehabilitation.

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CHILDREN AND ADOLESCENTS WITH SPONDYLOLISTHESIS/SPONDYLOLYSIS – WHAT TO DO?

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Introduction: Spondylolisthesis is the slipping forward of one vertebral upon another. Spondylolysis is characterized by the presence of a bony defect at the pars interarticularis, which can result in spondylolisthesis. Spondylolisthesis and spondylolysis are commonly diagnostic in children and adolescents. They have a history of activity-related low back pain and the presence of painful spinal mobility and hamstring tightness without radiculopathy. Plain radiography, computed tomography, and single-photon emission computed tomography are used for diagnosis. *Discussion and Classification:* The Classification system most commonly used in spondylolisthesis was originated by Wiles et al. in 1976 and subsequently modified by others. The Spondylolisthesis Type I is the dysplastic form (congenital defect); type II – isthmic form; type III – degenerative form; type IV – traumatic form; type V – pathologic form. Type I and II are most commonly seen in younger patients. In the isthmic spondylolisthesis, the radiographic examination shows the defect on lateral view, with the percentage of slippage measurable from this view. The Meyerding Classification is the most commonly used. Grade I is 1–25% slippage; grade II is 26–50% slippage, grade III is 51–75% slippage and grade IV is 76–100% slippage. *Conclusion:* Spondylolysis and low grade spondylolisthesis (< or =50%) often responds to brief periods of activity restriction, immobilization, and rehabilitation. Symptomatic high-grade spondylolisthesis (>50%) responds much less reliably to nonsurgical treatment. The growing child may need a clinical and imagiologic follow-up. Surgical intervention is appropriate when pain persists, displacement increases or a progressive neurologic deficits are present.

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P138**EFFECTS OF BALNEO-THERAPY ON MOBILITY OF LUMBAR SEGMENT OF SPINAL COLUMN****Djordjevic M.***Rehabilitation Hospital 'Agens', Mataruska Banja, Serbia*

Introduction: Lumbar syndrome is ranged as one of the most widely spread diseases of humans. Dominant symptom is pain which leads to deteriorated posture, stiff, forced position and reduced spine mobility. **Objective:** Comparative analysis of the effects of complex application of balneo-physical procedures to lumbar segment mobility with lumbar syndrome patients in relation to isolated application of balneo-factors and administration of medicaments, respectively. **Method:** Three groups of patients were formed. First group patients were treated with balneo-factor of thermal mineral water bathing; to second group patients complex balneo-physical-medicament therapy was applied, while third group patients were treated with physical therapy. **Results:** Before the application of therapeutic procedures, 15 or 16.7% of patients were taking stiff position, and expressed limitation of mobility was evident with 35.6% of patients. There were no statistically significant differences between these symptoms in the observed groups ($p=0.32$). Upon finished treatment, with 58.9% of patients mobility of lumbar segment was within physiological limits, 30% of them still had strongly reduced mobility, and 11.1% had lumbar segment of spinal column blocked. By comparative analysis of 1st and 3rd group no statistically significant results were obtained ($p=0.858$). Notable therapeutic effects were obtained with group II ($p<0.01$), compared to the group of patients treated with balneo-factor of thermal mineral water bathing, but also with third group patients who were treated with physical therapy ($p>0.05$). Analgesic effects can be explained with more complex influence of balneo-factors which induces multiple changes in organism, like tissue hyperemia, reduced nociceptive irritation and reduced spasm of musculature. Fast achievement of analgesia is of outstanding significance in postural deformations prevention and spine mobility improvement. Synergic application of therapeutic procedures had most favorable effects. **Conclusion:** Thermal mineral waters, applied in form of hydro-therapy, reduce lumbar syndrome symptoms. This is most effective when applied by means of complex balneo-physical-medication-wise procedures.

P139**RHEUMATOID ARTHRITIS: CASE REPORT****Sousa P.¹, Silva A.J.¹, Alves A.¹, Cabete S.¹, Lopes I.¹, Borges G.²***¹Physical Medicine and Rehabilitation Dept., Hospital São João, Porto; ²Physical Medicine and Rehabilitation Dept., Hospital da Prelada, Porto, Portugal*

Introduction: Rheumatoid arthritis (RA) is a chronic systemic inflammatory disease of undetermined etiology involving primarily the synovial membranes and articular structures of multiple joints. The hallmark feature of the disease is persistent symmetric polyarthritis that affects the hands and feet, although any joint lined by a synovial membrane may be involved. The disease is often progressive and results in pain, stiffness, and swelling of joints. In late stages deformity and ankylosis develop. Optimal care of patients with RA requires an integrated approach of pharmacologic and nonpharmacologic therapies. Surgical procedures for rheumatoid arthritis can often help correct deformities, relieve

and improve function. A number of surgical procedures are available including excisions and reconstructions, as well as joint fusion and joint replacements. **Clinical Case:** J.A., 50-year-old woman with a severe form of rheumatoid arthritis, with multiple episodes of joint inflammation and arthritic destruction involving large joints, treated in the last twenty years with many different immunosuppressant agents. During this period, deformity and pain were so severe that joint replacement surgery was required in many different locations: right hip (1994), left knee (1995), right knee (1999), left shoulder (2000), right shoulder (2003) and right elbow (2004). The patient is in a daily and individualized rehabilitation program since the beginning of the manifestations. She has now an efficient deambulation using two canes and is independent to her daily living activities. **Conclusion:** Careful selection of patients for surgery is mandatory and a very accurate preoperative assessment of both the functional and social implications of the patient's problems should be performed. The rehabilitation program in this patient played a fundamental role. Its goals included pain relief, increased range of motion (ROM), increased strength and endurance, prevention and correction of deformities, and provision of various counseling and educational services. This case is a good example of the importance of a well planned and individualized rehabilitation program in order to get good functional results.

P140**THE EFFICACY OF A NEW PROTOCOL FOR GAIT ANALYSIS TO DETECT CHANGES AFTER FUNCTIONAL SURGERY OF THE FOOT****Manca M.¹, Benedetti M.G.², Ferraresi G.¹, Marchi P.¹, Leardini A.²***¹Movement Analysis Laboratory, Az. Ospedaliero Universitaria, Dept. of Neuroscience and Rehabilitation Medicine, Ferrara; ²Movement Analysis Laboratory, Istituti Ortopedici Rizzoli, Bologna, Italy*

Introduction: Clinical gait analysis protocols are usually utilized to provide information about the ankle motion only in the sagittal plane (dorsiflexion and plantarflexion). Recently Leardini et al [1] proposed a new protocol of 3D motion gait analysis in order to measure foot deformities in stroke patients. This protocol "Total 3DGait" (T3DG) provides a description on coronal and transversal plane of the ankle deviation like inversion/eversion and adduction/abduction respectively. **Aim:** The aim of the present work was to verify the sensitivity of T3DG protocol to evaluate ankle joint kinematic changes in hemiplegic patients with ankle deformity submitted to functional surgery of the foot. **Patients and Methods:** Seven hemiplegic patients with equinus-varus foot deformity were analysed with T3DG protocol for gait analysis before and after functional surgery of the foot. All the patients had foot-ankle complex deviations on all planes and received appropriate orthopaedic surgery. Markers were placed on the calcaneal tuberosity, internal and external malleolus, on the first, second and fifth metatarsal head. Markers on internal malleolus and second metatarsal head were used only for anatomical calibration. A stereophotogrammetric system of 6 infrared cameras (Vicon 460, Vicon Motion System Ltd., UK) was used for data acquisition. In addition, in order to verify the efficacy of surgery, the walking ability was assessed by the evaluation of walking velocity and disability. **Results:** All patients showed a reduction of the plantar flexion on sagittal plane and reduction of the previous excessive inversion and adduction of the foot. The trend of the kinematic improvement has been confirmed by the spatio-temporal parameters of gait analysis and of the walking ability results. **Conclusion:** The T3DG protocol was found sensitive on describing kinematic changes in all space planes following surgical treatment of the patients examined.

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POLITRAUMATIZED PATIENT REHABILITATION MANAGEMENT - THE IMPACT ON THE QUALITY OF LIFE

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Introduction: Politraumatized patient management must include well standardized therapeutic algorithms, covering all the aspects: lesional, functional and psychosocial. **Aim:** Assessment of the quality of life in politraumatized patients, in the early phases of the rehabilitation program, as soon as the vital signs are stable, the visceral lesions solved surgically and the fractures were stabilized. **Patients and Methods:** It was a hard task to realize statistically comparable homogeneous groups, because of the heterogeneity of the lesions and the functional deficiencies developed. To be followed easier and more correctly, the politraumatized patients were divided in two study groups: politraumatized patients with multiple osteoarticular lesions, AIS 1 and 2, without significant functional impact (group I), and patients with osteoarticular and visceral lesions, with AIS ≥ 3 , with significant functional impact (group II), which followed all the rehabilitation phases, and a control group which started the rehabilitation later, just in the secondary or early rehabilitation phase. The statistical study was realized on 109 politraumatized patients: 29 patients were included in a control group (26.61%), which started the rehabilitation treatment just in the chronic early phase, according to our protocol; 80 patients were included in a study group (73.39%) which followed all the rehabilitation steps, according to our algorithm. **Results:** We tried to make some correlations between the ISS lesional score and the functional score, task partially completed, because the ISS score does not evaluate the brain trauma, cause of majored functional deficiencies. Instead we observed a longer rehabilitation period, and a slower evolution of the SF-36 score in patients who necessitate repetitive surgical interventions, with impact on the dependence grade and quality of life. **Conclusions:** Without regarding the gravity of the politrauma, medical rehabilitation has his well established role in the therapeutic algorithm, with his limits and imposed possibilities, according to each case, and not forget the concept 'quality of life is equally important like his length'.

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HIP ARTHROPLASTY IN PATIENTS OVER 75 YEARS OF AGE WITH FRACTURE OF FEMORAL NECK

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Introduction: The fracture of femoral neck Garden III and IV are treated by hemiarthroplasty (HA) or total hip arthroplasty (THA) because of terminal circulation and the impossibility of healing if treated conservatively or surgically with internal fixation. **Aim:** The aim of this study was the evaluation of the hip function in patients with acute fracture of the femoral neck, managed by HA or THA. **Patients and Methods:** The study has included 32 patients aged over 75 (on the average 79), 17 female and 15 male, who sustained a femoral neck fracture Garden II and III. They are managed on Orthopaedic clinic from 2001. to 2003 and had a primary rehabilitation on Physical medicine and rehabilitation clinic. 21 of them were managed with a HA „Austin Moore“ and 11 of them with a THA because of simultaneously severe hip arthrosis. Pain and the hip function were evaluated by a modified Harris hip score (max 91 points). The modification means that 9 points were excluded from the original score (5 for motion and 4 for absence of deformity).

Results: The best results on discharge from the primary rehabilitation (on average 41 postoperative days) are related to pain. Most of the patients (27) were without or with mild pain. On the follow up examination 1 year after the operation (taken by 25 of all the patients included in the research) good results were also noted in relation to gait and activity of daily living. **Conclusion:** The results of functional outcome were satisfactory having in mind the ages of patients. HA or THA are effective methods for treatment of acute femoral neck fracture in patients over 75 years of age.

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FUNCTIONAL RECUPERATION IN A PATIENT WITH ALMOST COMPLETE RUPTURE OF THE QUADRICEPS TENDON

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Introduction: The quadriceps tendon is highly resistant. Tears usually occur in obese subjects older than 60 years. Predisposing risk factors often exist; diabetes, gout, rheumatoid arthritis, renal insufficiency, collagen degeneration... Tears in younger patients are produced due to a violent and uncoordinated contraction of the quadriceps. It is a rare lesion that can go undiagnosed in the initial physical examination. The regular treatment for it is surgery. **Aim:** To describe the case of a patient with almost complete rupture of the quadriceps tendon. We made the diagnosis, the treatment and the follow-up until the patient's condition improved and he could return to normal life activity. **Patients and Methods:** A 64-year-old man without relevant personal medical history, suffering from left knee pain for the last 3 months after a stress movement of the limb. The physical examination was suggestive of quadriceps tendon rupture. MRI was performed: Degenerative changes in the internal meniscus, retropatellar bursitis, complete rupture of the quadriceps tendon leaving only few posterior fibres uninjured, partial tearing of the lateral retinaculum. **Treatment:** 25 sessions of physical therapy, 15 sessions of electrostimulation. **Results:** The clinical outcome was favourable at 6-month follow-up; the pain disappeared, the patient was able to walk normally. It was not possible to obtain complete knee extension. A -10° knee extension was obtained, which did not present a disability for the patient. **Conclusion:** Although the recommended treatment for this pathology is surgery, some patients could avoid it with rehabilitation.

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BIOMECHANICAL CHANGES OF FOOT IN PLANTAR FASCIITIS PATIENTS

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Introduction: Plantar fasciitis is the most common cause of dorsal heel pain. Excessive tension at the origin of plantar aponeurosis

is thought to be the etiology of plantar fasciitis [1]. Biomechanical abnormalities of lower leg might lead to increase of tension at plantar aponeurosis. *Aims:* The purpose of the study was to evaluate the lower limb biomechanics and establish the etiological factors of heel pain syndrome. *Patients and Methods:* 31 patients (age range: 14–65 years) suffering from painful heel syndrome were asked to walk at self-selected speed along 12 m walkway. A Footscan pressure plate (RSscan International, Belgium, 2 m×0.4 m, 16,384 sensors, 4 sensors/cm²) was mounted to the middle of walkway. Diagnosis of painful heel syndrome was made by history and physical examination. Distribution of pressure between medial and lateral part of forefoot was evaluated. Balance between medial and lateral part of forefoot was calculated using formula ((M1+M2)–(M3+M4+M5)). M is pressure under metatarsal joint 1 to 5. *Results:* All examinees had significant displacement of the pressure from medial to lateral part of forefoot. Foot biomechanics and forefoot balance are important intrinsic risk factor in development of plantar fasciitis. *Conclusion:* Evaluation of leg biomechanical disturbances may allow to prevent and treat plantar fasciitis. The methods described above have good possibility to assess the status of lower limb and biomechanical risk factors. Measurement of plantar pressure provides the indication of foot and ankle function during the gait as well as other functional activities.

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INJURIES AMONG US ADULTS WITH DISABILITIES

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Background: Injury prevention among individuals with disabilities is under studied. We compared the patterns of medically treated injuries among U.S. adults with and without disabilities for clues to prevention. *Methods:* We used nationally representative data from the 2004–2005 National Health Interview Survey (NHIS) to compare medically attended injuries within the past 3 months among non-institutionalized adults in the United States with no disabilities, moderate disabilities, and severe disabilities. The association between disability and injuries was examined in the logistic regression analysis, taking into account sociodemographic factors. *Results:* The 3-month cumulative incidence of injuries was 2.3% (95% confidence interval [CI] = 2.2%–2.4%) among adults with no disabilities, 3.8% (3.4%–4.2%) among adults with moderate disabilities, and 5.6% (4.9%–6.3%) among adults with severe disabilities. Falls were the leading mechanism of injury regardless of disability status, and were even more common in the severely or moderately disabled adults (68% and 47% compared with 28% among those without disabilities). The setting of the injury also differed with disability status. For the severely disabled, 57% (95% CI = 52%–62%) of injury episodes occurred at home, compared with only 32% (28%–37%) for the moderately disabled and 23% (21%–25%) for adults with no disabilities. *Conclusions:* Adults with disabilities are at an increased risk for injury. Programs specifically directed toward injury prevention may benefit adults with disabilities.

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OSTEOPOIKILOSIS – A CASE REPORT

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Background: Osteopoikilosis is an asymptomatic osteosclerotic dysplasia of unknown pathogenesis seen in both men and women.

It may either be inherited in an autosomal dominant way or occur sporadically. Clinical manifestations usually are absent or mild. Roentgenographic findings are diagnostic. Numerous small, well-defined, homogeneous circular or ovoid foci of increased radiodensity are clustered in periarticular osseous regions. A symmetric distribution is observed, with a predilection for the epiphyses and metaphyses of long tubular bones, carpus, tarsus, pelvis, and scapulae; involvement of the ribs, clavicles, spine, and skull is rare and, when present, is less marked. *Aim:* We present a clinical case of Osteopoikilosis with the purpose of making a brief review of the diagnosis and treatment of this clinical entity. *Case Report:* 21 yo Caucasian male, entered the ER with low back pain after a fall, with no other complaints. He had no important limitation in ROM. X-rays of pelvis, lumbar spine and bilateral hip joint were made. They showed multiple juxta-articular small, round, oval, dense lesions in symmetric distribution, comprehending the hip and sacroiliac joints, although sparing most of the lumbar vertebrae. *Discussion and Conclusions:* There were radiological diagnostic criteria for Osteopoikilosis. We diagnosed Osteopoikilosis considering the radiological presentation in the absence of axial lesions. He was treated with NSAID's for pain.

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HEREDITARY MULTIPLE EXOSTOSES – CLINICAL CASE WITH AN UNUSUAL PRESENTATION

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Introduction: Multiple Hereditary Exostoses (MHE) is an autosomal dominant inherited trait with an incidence of at least one in 50,000, which makes it one of the most common inherited musculoskeletal conditions. Multiple cartilage capped exostoses develop during childhood and adolescence in the metaphyseal region of long bones, resulting in short stature and deformity, often requiring corrective surgery. Although any bone can be affected, the long bones (legs, arms, fingers, toes), pelvis and shoulder blades are the most common, while the face and skull are generally unaffected. Most lesions stagnate and ossify when skeletal growth is complete, but occasionally one might grow more aggressively or reactivate as a chondrosarcoma. The severity of disease in MHE varies considerably and is probably associated to genetic differences. *Aim:* To present the rehabilitation role in a case of HME with nasal bone exostoses and respiratory complaints. *Clinical Case:* A 35-year-old woman with HME (diagnosed at 3 years old) was admitted at our department with nasal obstruction complaints and tiredness in the daily living activities. Imagiologic evaluation (CT scan) of nasal bones was performed. Nasal bone exostoses was identified as the cause of nasal septum deviation. ORL surgery for exostoses removing was performed. Resolution of permanent nasal obstruction was obtained with great improvement in tiredness complaint and quality of life. *Discussion:* To our knowledge this is the first published case of HME with nasal bone exostose presentation. Since HME can affect all bones, carefully evaluation of these patients must be done and close correlation with clinical manifestations established.

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EVALUATION OF GROUP EDUCATION IN REHABILITATION MEDICINE DURING THE BACHELOR PHASE

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Introduction: Approximately 440 medical students enter medical education at the University Medical Center Groningen every year. In the 2nd year of the Bachelor phase a personal education programme of 10 days in a period in 10 weeks is given. An introduction in Rehabilitation Medicine and the ICF model and rehabilitation treatment in Stroke or Spinal cord patients is offered. In education self assessment and student satisfaction is of increasing interest for student and medical faculty. **Aim of the Study:** To investigate the outcome of Rehabilitation Medicine education in three groups of under graduate medical students. **Methods:** In the period September 2005–March 2007 35 medical students were offered a group-wise personal education programme. It included classes; ICF model education; group sessions and individual presentation of study assignments. Home visits to patients and a written exam after 10 weeks of study was included. An evaluation Questionnaire was used to investigate student's views and wishes for education. **Results:** All 35 students completed the educational programme. The ICF model was well understood and home assignments were rated as interesting and informative. The E-learning modules in Nestor (Blackboard®) 2 were of benefit for the students. In the electronic learning environment presentations, self-tests and web site info was given. Special interest was observed towards the home visit and the work of the rehabilitation physician. The overall rating of the students for the education was 8. The total teacher- student contact time in 10 weeks was 20 h. Self study and group assignments counted for 60 h of education. **Conclusion:** Education of Rehabilitation Medicine is informative for bachelor students and offers a broad view of Rehabilitation Medicine. The ICF model can be used easily. Group education and individual assignments are informative to medical students as future rehabilitation physicians.

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VIDEO-REGISTRATION AS AN INSTRUMENT FOR DOCTOR'S SELF-EVALUATION IN COMMUNICATION DURING RESIDENCY TRAINING - A PILOT STUDY

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Introduction: During residency training communication with patients is of major importance. Structured training should be implemented during residents training and communication skills are to be evaluated on a regular basis. Direct video-observation of communication is better than training sessions with simulation patients. Can-Meds (1) advocates self-reflection on own communication skills and improvements to be made. **Research Question:** Can Rehabilitation Medicine residents value their communication skills of video-observed patient contacts? **Methods:** 5 residents

are invited to video-record each 4 regular patient contacts during 20 minutes sessions. All patients give informed consent for the recordings. After the recording the residents use the SEGUE communication observation list (2) to rate their communication skills. Five levels are observed: Set stage; Elicit information; Give information; Understand patient beliefs; End encounter. In total 25 items are evaluated with a two point score: yes/no. Afterwards all sessions are evaluated independently by two senior staff members. Analysis of data is performed to evaluate and compare communication scores. **Results:** The individual recordings were separately evaluated by resident and 2 observers. This resulted in 60 SEGUE lists to be analysed. In total 1500 items were scored. Agreement between staff members over all items: $\kappa=0,75$; Agreement over subsets between resident and observers: Set stage: $\kappa=0,82$; Elicit information: $\kappa=0,65$; Give information: $\kappa=0,53$; Understand beliefs: 100%; End encounter: $\kappa=0,79$. Quantitative measurements showed fair to very good agreement between observations. Qualitative evaluation showed remarkable differences in handling doctor-patient communication. **Conclusion:** Direct video-observation give residents structured evaluation of their communication skills. They are capable to self-evaluate their performance. Compared to staff standards improvements are to be made about communication skills.

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P150

REHABILITATION OUTCOMES AFTER LOWER LIMB AMPUTATION

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Introduction: In Rehabilitation medicine the relationship between quality of life and physical function is obvious. Rehabilitation medicine does not focus on a singular body system, but rather takes into consideration the whole person, in interaction with their physical and social environment. **Aim:** To investigate the quality of life and prosthetic function in persons with an established lower limb amputation. **Patients and Methods:** 20 participants with amputation surgery who did lower limb prosthesis in Rashid Hospital in the period of 2005–2007 were involved in the study. Amputation Rehabilitation Questionnaire Form with general data and specific questions was design to get information about the function of prosthesis, quality of life and patients' mobility. **Results:** All participants were called to fill up questionnaire about quality of life, mobility and possible reasons why not using the prosthesis. The results of Rehabilitation score were compared and correlated with pre-prosthetic mobility grade, level of amputation, reason for amputation, body mass index and attendance to pre and post prosthetic physiotherapy treatment. **Conclusion:** Using the quality of life outcome measurement in the field of prosthetics is important for holistic assessment of patient. A coordinating approach of all rehabilitation team members is required to ensure complete treatment and outcome measurements in all aspects of patient life.

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PHYSICAL CAPACITY AND BALANCE ABILITY AFTER LOWER LIMB AMPUTATION

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Aim: Of the study was to evaluate the effect of comprehensive rehabilitation program on physical capacity and functional independence in patients after lower limb amputation. **Analysed Material and Applied Methods:** 10 patients were analyzed after lower limb amputation: 4 patients underwent amputation above the knee, 6 patients – below the knee; the mean age 47.3; male were dominated; time after amputation was in the interval from 2–4 months. All patients were applied basic complex rehabilitation program. A lower extremity prosthesis fitting was made to all patients. The patients physical capacity was measured by muscle strength, balance and walking ability. The patients functional independence was evaluated by FIM instrument, version 4.0. Patients primary evaluation was made on arrival, repeated evaluation – after 4 weeks. **Results and Discussion:** Applied individual comprehensive rehabilitation program significantly increase patients muscle strength (approximately 1–1.5 points above initial points) and functional independence (approximately 20–27 points above initial points), particularly ability to transfer and to move ($p < 0.05$). Properly selected and fitted lower limb prosthesis improves patients balance ability: improves static and dynamic balance, their transfers from one position or surface to another; and ability to walk ($p < 0.05$). **Conclusions:** 1) Applied individual comprehensive rehabilitation program increase lower limb amputees physical capacity and functional independence. 2) Properly selected and fitted lower limb prosthesis improves patients balance and walking abilities.

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MYOELECTRIC PROSTHESIS ON THE DOMINANT LIMB AND SEVERE DYSFUNCTIONAL CONTROLATERAL LIMB POSTELECTROCUTION - CASE REPORT

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Introduction: Electrocutation might be defined as a plurivisceral lesional syndrome; electrocutation lesions are the result of the conversion of the electric energy to thermic energy and the physico-chemical effects of the electric energy on the tissues. After primary-care which involves a very good reanimation and an aggressive, radical, precocious and correct surgical treatment, the following period consists of a long-term and continuous treatment, where the rehabilitation program has a major importance. **Aim:** The presentation shows the clinical and functional evaluation using specific scales (articular mobility and muscular strength measurements, FIM) evoking the severe dysfunction for self-caring and ADL performing. It presents, also, the importance of rehabilitation programme as an essential therapeutical sequence after plastic surgery for severe dysfunctional sequelae postelectrocution. **Material and Method:** We present the case of a 33years old patient who suffered a work-related accident by electrocutation at high voltage, two years ago, with affection of both upper limbs. After emergency stabilization in Regional County Hospital, followed serial plastic surgeries in Bucharest Emergency Hospital, aimed to repair the severe defects of soft tissues (loss of 5% of corporeal surface on the right limb and 3% on the left side), with severe aggression of vasculo-nervous structures (ulnar/median/radial on both sides) and ulnar bone exposure on the right forearm. After 14 days posttrauma the plastic surgeons decided to amputate, by necessity, the right

proximal forearm; in the meantime, the left forearm and arm suffered multiple surgical interventions with cutaneous prelevation from iliac fosa. The patient has begun using a right myoelectrical prosthesis after several months and on the left side there was another two surgical procedures for cicatricial blockage solving. During these two years and a half after electrocutation, our patient had a continuous and sustained rehabilitation programme, with periodical hospitalizations in our clinic. **Objectives and Results:** With specific rehabilitation methods (medication, electrotherapy, termotherapy, kinesitherapy, ergotherapy) and a sustained PRM treatment following each plastic surgery intervention, the patient managed to increase the functional status for every day activities and the quality of life. The goals of the rehabilitation programme must be established depending upon the clinical and functional status at periodical evaluation; at the last evaluation these objectives were: improving the proximal motor control at both superior limbs; minimize the retracture-contracture of distal left limb scars; growing the muscular strength and coordination of the blunt and improving the functionality of myoelectrical prosthesis; social reinsertion. **Conclusions:** 1) The complex rehabilitation program had good results in adapting the stump to prosthesis, in improving the general status of the operated limbs and increasing the functional independence of the patient, with higher quality of life; 2) To achieve these goals it was important to have a good team-work between patient and his family, plastic surgeon, PRM specialist, kinesitherapist, ergotherapist, psychotherapist.

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UPPER LIMB AMPUTEE AND HIV: REINTEGRATION INTO SOCIETY

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Introduction: Upper-extremity amputees face new challenges concerning function restoration of the lost limb. They must adapt to basic activities and sometimes demonstrate vocational limitations to perform a new job. Prosthesis and an integrative rehabilitation program can contribute to obtain maximal function. **Aim:** To report a clinical case of an upper limb amputee with HIV infection and drug addiction, and his reintegration into society. **Case Report:** The authors present a clinical case of a 27-year-old patient with intravenous heroin dependence and HIV-positive, submitted in 2000 to transhumeral amputation of the left arm due to a severe wound infection and sepsis. The patient started antiretroviral medication. He then entered a therapeutic community program for the treatment of patients with substance abuse. At our service, a prosthesis of the left upper limb was prescribed and a rehabilitation program with activities of daily living training was initiated. In 2003, at the completion of the therapeutic community program, he was referred to a professional rehabilitation center where he took a gardening course. He returned to our service for follow-up evaluations of the prosthesis and check up of HIV-related disabilities. In 2007, he was hired as gardener in a public botanical garden where he now works. He maintains long-term HIV viral load suppression and feels physically and psychologically fully integrated. **Conclusion:** With antiretroviral drugs, HIV infected patients have now longer life expectancy but some related disabilities may require intervention. This case demonstrates that rehabilitation of an upper limb amputee is more than the prescription of a prosthetic device. It is crucial to these patients to have a prosthesis that is functional and adequate to their needs and expectations. Vocational rehabilitation, teaching of new skills and the integration in professional programs give them the possibility of financial independence and personal fulfilment.

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PREVALENCE AND RELATIONSHIP OF MYOKYMIC MOVEMENTS FOLLOWING LIMB AMPUTATION

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Introduction: Phantom pain and jactitation (jerky movements of the remnant leg) are common and disabling complications following amputation (1, 2). We observed some patients with lower limb amputation had localised or generalised fasciculations (visible muscle twitching). **Aim:** To identify the prevalence of observed myokymia in subjects following lower limb amputation and establish its correlation with jactitation and phantom pains. **Patient and Methods:** Withington DSC, Manchester is a subregional amputee rehabilitation center. 24 consecutive subjects with lower limb amputation were selected during outpatient visits. Verbal consent was obtained. Demographic details, level, year and indication for amputation, history of phantom pain and jactitations was obtained. Subjects were examined supine, arms and legs were carefully observed for presence and location of fasciculations for 15 min. Association between fasciculations, jactitation, phantom pains and diabetes was determined. **Results:** of 24 subjects, age range was 20–90 years, level of amputation: 18 below knee, 4 above knee and 2 bilateral below knee. 14 of 24 subjects (58%) had presence of fasciculations. Distribution of fasciculations was 8 (57%) generalised, 6 (43%) localised. Duration of amputation vs. fasciculations: 0–6 years (10/14), 30–60 years (3/14), 12 years (1/14). In subjects with fasciculations: 6/14 (43%) jactitation present 8/14 (57%) no jactitation. In subjects without fasciculations: 4/10 (40%) jactitation present 6/10 (60%) no jactitation. In subjects with phantom pain: 8/12 (66%) had fasciculations present, 4/12 (34%) had none. In subjects without phantom pains: 6/12 (50%) had fasciculations present, 6/12 (50%) had none. In subjects with diabetes: 4/6 (66%) had fasciculations, 2/6 (33%) had no fasciculations. Non-diabetic category: 10/18 (55%) had fasciculations, 8/18 (44%) had no fasciculations. **Conclusion:** Fasciculations were more prevalent in first 6 years post-amputation and there was a significant (positive and negative) association with jactitation, phantom pains and diabetes. We are uncertain whether this is a chance finding and further tests i.e. EMG/NCS studies are needed to identify underlying pathophysiology.

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EVALUATION OF HEALTH-RELATED QUALITY OF LIFE IN PATIENTS WITH LOWER LIMB AMPUTATIONS

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Introduction: The lower limb amputation is associated with physical, psychological and social distress for elderly patients and their families. **Aim:** This study aimed to assess Health-related quality of life (HRQOL) in patients with lower limb amputation (LLA). The relationship between HRQOL and demographic, clinical, social and functional evaluation was also studied. **Patients and Methods:** Observational study. 56 in-patients were recruited in

the Physical Medicine and Rehabilitation Department. Variables registered: Demographic: family support, monetary incomes; Clinical and functional: time to deambulation/day (Tdd), Barthel score and Houghton; Geriatric depression scale (GDS); Cognitive Pfeiffer score, Charlson Comorbidity index; Quality of life: Short Form-36; SF-36 and subjective score of health (visual analogical score of health; Health-VAS). **Results:** Mean age: sixty-seven years old, forty-nine male and seven female. Forty-two percent amputations being associated with diabetes, seventy-three percent with unilateral lower limb amputation and ninety percent prosthetic fitting. The SF-36 outcomes were lower to general population but no significant differences were obtained. The quality of life correlated positively with Health-VAS ($p=0.001$), Barthel score ($p=0.002$) and Tdd ($p=0.001$), and inversely with Yesavage score ($p=0.004$), Charlson score ($p=0.017$), Pfeiffer score ($p=0.001$) and living home circumstances ($p=0.035$). **Conclusions:** The HRQOL was satisfactory in patients with better functional scores (Barthel and Tdd). The HRQOL outcomes were worse in older patients and in subjects with depression, higher comorbidity index, affected cognitive score and/or worse living home circumstances.

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THE POST-ACUTE REHABILITATION AMPUTATIONS OF THE LOWER LIMB: PRESENTATION OF A CLINICAL PROTOCOL

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We present a clinical case studies in the period between September 2004 and December 2007, for which we cared under intensive rehabilitation in hospital 20 patients (14 males and 6 females), affected by the outcome of amputation of limb (12 transfemoral and 8 transtibial amputations). The patients ranged in age from 34 to 78 years (mean age 65.7±) and the cause of amputation was 12 vascular patients (8 of these was the association with diabetes) and the remaining 8 traumatic patients. All patients followed the same protocol post-operative rehabilitation, and the average length of stay was 41.6±23.5 days. Time of admission to hospital the following parameters were evaluated: trophism muscle of the limb, range of motion of the stump, degree of autonomy in ADL and walking (with and without aids). The constant monitoring of the results has been achieved through the use of the following options: The scale of assessment Barthel Index; Card rehabilitation: it collect all the information and all evaluations concerning the patient, the rehabilitation team (medical physiatry, physiotherapist, professional nurses, occupational therapist, psychologist, etc.) evaluates the patient the 1°, 15°, 30°, 45° and 60 day by objectives in the medium (30 day.) and long term (60 day.); FIM™ (Functional Independence Measure): objective instrument recognised in the international scientific quantification for disability; administered at the beginning and end of treatment it measures the overall functional recovery of the patient and indirectly the success of rehabilitative treatment. The model of intensive rehabilitation for the leg amputation presented appears to be correct because develops in itself operational resources, involving several professionals. We observed that the age alone should not be decisive for prosthetic rehabilitation; comorbidities and general health are important determinants; the shortened longevity emphasizes the need for timely rehabilitation to enhance the quality of the remaining years; the geriatrician can add to the presurgical care and preprosthetic phase of rehabilitation by attention to the problems common to the older patient, i.e., multiple comorbidities, polypharmacy, immobility, and depression; postoperatively, early mobilization is crucial to avoid the deleterious effects of immobility in the older person.

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DYNAMIC COMPUTERIZED POSTUROGRAPHY IN THE ASSESSMENT OF BALANCE IN A TRANSFEMORAL AMPUTEE

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Introduction: Postural stability depends on interaction between sensorial system, motor reactions and the nervous system. Computerized Dynamic Posturography assesses sensory impairments to balance control and functional limitations of patients. Amputation is a cause of balance impairment. **Aims:** To study the balance impairment in an amputee. **Patient and Methods:** A 33-year-old woman with a left transfemoral prosthetized amputation was tested for sensory interaction on balance (SIB), to evaluate sensory impairment, limits of stability (LOS), rhythmic weight shift (RWS), weight bearing/squat (WBS) and walk across (WA). **Results:** In the SIB test there was normal Centre of Gravity (COG) sway with eyes closed standing on foam. The LOS test showed increased reaction time in all directions and normal movement velocity to the back, as well as reduction of end point and maximal excursions forward and to the left, with impaired forward directional control. The RWS test showed an impairment of the directional control for all velocities in left/right and front/back directions. The WBS test showed a clear asymmetry, with weight shifted to the right side. The WA test showed low speed, large step width and step asymmetry. **Discussion/Conclusions:** The results suggest an impaired proprioceptive system caused by the amputation and by a probably associated visual impairment. Weight bearing shifted to the non-affected side. There was probably a compromise of the ‘ankle strategy’ on the affected side. The gait was asymmetrical, with a shorter step of the prosthetic limb. This data provides useful information for the rehabilitation programme in amputees.

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STATIC NIGHT UPPER EXTREMITY SPLINTING AND BOTULINUM TOXIN A INJECTIONS IN HEMIPLEGIC CHILDREN WITH SPASTIC CEREBRAL PALSY

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Introduction: Botulinum toxin A (bt-A) and orthotics are widely used to manage upper extremity spasticity in hemiplegic cerebral palsy (CP) children. **Aim:** To investigate the effectiveness of static night splinting following bt-A treatment in children with upper limb spasticity. **Patients and Methods:** Twenty children with spastic CP of the upper extremities were treated with bt-A injection; static night splinting was done in half of them. Upper limb function was assessed at baseline, at 2 and 6 months after bt-A injection using the Quality of Upper Extremity Skills Test. **Results:** All children improved on their previous functional level of the injected upper extremity. At 2 months, children in which the night splint was applied (group A) showed a 15.4% difference

from baseline; children in which a splint was not applied (group B) had an average 12.2% improvement (not statistically significant). At 6 months, group A still maintained a 15.9% improvement in function compared to group B which differed only by 4.2% from pre-treatment baseline (statistically significant, student's t test). Complications related to the bt-A injection were not observed. The static night splints have been well tolerated by the hemiplegic children. **Conclusions:** Upper extremity static night splinting combined with bt-A reduces spasticity and improves function in children with upper limb spasticity.

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SELECTIVE PERCUTANEOUS MYOFASCIAL LENGTHENING OF THE LOWER EXTREMITIES IN CHILDREN WITH SPASTIC CEREBRAL PALSY

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Introduction: Spastic cerebral palsy (CP) children commonly acquire musculoskeletal deformities that need orthopaedic surgery. However, this type of surgery is associated with increased surgical trauma, patients and family inconvenience. **Aim:** To present an outpatient procedure named selective percutaneous myofascial lengthening (SPML) that yields the merits of same-day physical therapy, and to assess the effect on functional improvement of CP children. **Patients and Methods:** Fifty-eight children with spastic CP underwent SPML of the hip adductors, and the medial and/or the lateral hamstrings. All patients were spastic diplegics, hemiplegics or quadriplegic. Indications for surgery were primary contractures that interfered with the patients walking or sitting ability, or joint subluxation. Gross motor ability and gross motor function were evaluated using the GMFCS and the GMFM-88, respectively. **Results:** Mean surgical time was 14 min (range, 1–27 min). Surgical wound was minor (multiple stab wounds). All patients were discharged from hospital the same day. There were no infections, overlengthening, nerve palsies, or vascular complications. Three patients required repeat procedures for relapsed hamstring and adductor contractures at 8, 14, and 16 months, postoperatively. At 2 years, all children improved on their previous functional level; 34 children improved by one, and 5 children by two GMFCS levels. Overall improvement in mean GMFM scores was from 71.19 to 83.19. **Conclusions:** SPML enhanced by same-day initiation of physical therapy and rehabilitation is a safe, minimally invasive outpatient procedure with excellent results in spastic children with adequate cognition and emotional status to comply with postoperative rehabilitation.

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CEREBRAL PALSY: MEDICO-ECONOMIC POSSIBILITIES FOR EARLY DIAGNOSIS AND COMPLEX NEUROHABILITATION – THE BULGARIAN MODEL

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Cerebral palsy (CP) is a well-known disease consisting of many specific problems in different fields of brain activities and the whole body. Solving all these problems is a delicate matter that depends on the acquired medical knowledge and experience, the available technical aid and devices and social-economic environment in every single country, which is hinting the answer there is no widespread or universal model. The goal of this paper is to introduce the Bulgarian Model. The Specialized Hospital for Children with Cerebral Palsy was established in 1989. In 2003 a Medical Centre for Children Neuro-Habilitation was founded. A consensus paper for diagnosis, therapy, rehabilitation and service of children with CP was published in 2006. The first step of CP-prevention in post-natal time, is organized by observation of the high-risk groups of newborns (pre-matured, very low-birth weight, birth asphyxia, brain haemorrhage, twins) with screenings by early Neuro-Kinesiological Diagnosis according V. Vojta (defining the group of 'CP-risk infants') and if necessary an early intervention is started within first trimenon using the methods of Physical Medicine and Rehabilitation, including physiotherapy, magnetic field, hyperbaric oxygenation, feeding-therapy and others. The second step is the time-border zone for confirmation of CP as a 'fixed' diagnosis by one year and six months of age. A team of professionals developed the strategy of complex medico-pedagogical rehabilitation according to the form, clinical picture and severity of CP and the personal needs of the child. The National Health Insurance Fund (NHIF) renders a payment to the hospital for treatment of CP for 10 consecutive days (3 therapeutic procedures daily) on a monthly basis for 'CP-risk infants' aged 0 to 1.5 years and for 'fixed' CP aged 1.5 to 18 years. As far as children over 18 years old are concerned, NHIF pays 4 courses per year with a 10-days duration consisting of 3 procedures daily. Speaking of CP-children under 18 years old from the Sofia city, it is the Sofia Municipality that pays to the hospital for the rest of the days of the month, during which these children have been treated in the hospital. The model of CP-service (facilities, staff and payment) in Sofia is used for the establishment of similar models in Bulgaria.

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EFFECTS OF MUSCLE STRENGTHENING AND ELECTRICAL STIMULATION ON LOWER LIMB KINEMATICS IN CHILDREN WITH PARAPLEGIC CEREBRAL PALSY

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Introduction: In children with cerebral palsy muscle imbalance have been suggested to be a major component of gait disorder. **Aim:** The purpose of this prospective study was to determine if strengthening and electrical stimulation (ES) of the gluteus maximus, rectus femoris and plantar dorsiflexors would improve lower limb kinematics measured by motion analysis in children with paraplegic cerebral palsy. **Patients and Methods:** 12 children (aged 7 to 14 years) with spastic paraplegia received ES therapy applied to the gluteus maximus, rectus femoris and tibialis anterior muscle, 20 min sessions bilateral for each muscle, bipolar

technique, intensity sufficient to produce the desired movement, and a strengthening exercise program, daily, for six weeks, followed by a two month control period. The children were video recorded before (pre-test) and after rehabilitation (post-test), one and two months later. Data were collected and analysed with SIMI Motion and we looked for biomechanical parameters which are relevant for the improvement of the walking movement. **Results:** After the treatment the kinematic analysis showed an increase in bilateral hip and knee extension, ankle dorsiflexion but no improvement of hip internal rotation throughout the gait cycle. Popliteal angle, knee flexion at initial contact was decreased and statistically significant improvement ($p < 0.05$) occurred in ankle dorsiflexion at initial contact, midstance and midswing between the first and the subsequent tests. There was no significant correlation between plantar extension or flexion and hip internal rotation and pelvis kinematics before and after the rehabilitation program. **Conclusion:** This study demonstrates that muscle strengthening exercise program combined with ES is useful in improving gait in children with paraplegic cerebral palsy and may allow them to walk more efficiently. Also suggests that children with spastic paraplegia with significant internal rotation gait should have a more comprehensive analysis and other therapeutic options (orthotic and surgical) besides a muscle rehabilitation training program.

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APPLICATION OF MANUAL MASSAGE IN PAIN THERAPY IN CHILDREN

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Introduction: Manual massage therapy is one of the oldest and most appropriate methods of applying mechanical energy onto the human body. From a therapeutic point of view, it is aimed at pain relief, improvement of circulation and metabolic processes, as well as recovery of impaired functions. Massage dose is individually adjusted; however, numerous factors are to be taken into consideration, above all the age of the patient. Young patients and elderly, exhausted individuals are more sensitive to massage effects, thus the time required for achieving positive effects is shorter. **Aim:** The aim of this study was to confirm the positive effects of manual massage in the pain therapy in children. **Patients and Methods:** Twenty patients, aged 12 to 18 years, with pain in a lumbosacral region, were monitored at the Clinic. The patients were distributed into two groups. Group 1 (10 patients) was subjected to electrotherapeutic procedures (interference current) because of heavy pain. Group 2 (10 patients) received IF electricity along with the daily massage applying Fastum gel (Ketoprofen). Patients from both groups were treated during ten days, receiving one procedure daily (interference current or combination of electrotherapy and massage). The procedure was applied in the painful paravertebral musculature of the lumbosacral region. The pain intensity was monitored using McGill Pain-Questionnaire and Scott-Huskisson Visual Analog Scale. **Results:** After ten-day therapy considerable analgesic effect was noticed in 60% of patients from the Group 1. Significant pain relief was observed in patients from Group 2 yet after five days of therapy and after last treatment (on Day 10) complete pain relief was observed in 80% of patients. **Conclusion:** Clinical monitoring of 20 patients at the Clinic of Child Habilitation and Rehabilitation and the obtained results revealed that manual massage, combined with other therapeutic procedures, proved effective method in the pain therapy.

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P163**EFFECTS OF CLONAZEPAM ON MOTOR FUNCTION AND QUALITY OF LIFE IN ATHETOID CEREBRAL PALSY PATIENTS**

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Objective: To evaluate the effect of low dose clonazepam in patients with athetoid cerebral palsy in improving motor function and quality of life (QoL) without significant side effects. **Methods:** Thirty patients with athetoid cerebral palsy (men 16, women 14, 20.4±11.4 years old, 36.2±15.8 kg) were included in this study. Low dose clonazepam were taken to all subjects within the range not to cause significant side effects with careful observations of their responses and not to exceed the ordinary dosage. Patients or their caregivers were answered the questionnaire about their subjective QoL as Satisfaction Score (SS) and checked Block & Box test, Gross Motor Functional Measure (GMFM) at the beginning and the end of the study. **Results:** The average dosage of clonazepam was 0.02±0.01 mg/kg and duration of medication was 9.3±7.0 months. Nineteen cases of 30 kept up clonazepam until the end of this study and the rest 11 patients discontinued clonazepam. More than half of the patients (17 of 30) were satisfied with clonazepam and showed improvement of subjective QoL and Block & Box test score after medication ($p<0.05$). No statistically significant improvement in GMFM ($p>0.05$). A few side effects were reported to some patients, but were not so severe in most of the cases. **Conclusions:** Low dose clonazepam could improve subjective QoL and fine motor function in patients with athetoid cerebral palsy without significant side effects.

P164**THERAPEUTIC PROGRAMS FOR TREATMENT WITH DYSGRAPHIC CHILDREN**

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Objectives: The paper is a result of a continual observation of 20 children with dysgraphia, aged from 8 to 11 years. Dysgraphia is characterized by the following symptoms generally illegible writing, letter inconsistencies, mixture of upper/lower case letters or point/cursive letters, irregular letter sizes and shapes, unfinished letters, struggle to use writing as a communicative tool. Some of the underlying shortcomings that interfere with handwriting performance are poor motor skills, faulty visual perception of letters a words, and difficulty in retaining visual impressions. Treatment of disorder of written expression is more difficult, as less is known about the condition than about other learning disorders. **Material and Methods:** A multidimensional approach to the evaluation and diagnostics from the neurological, neurophysiological, psychological, linguistic and logopedic aspects has indicated that the following must be taken into account in devising the therapeutic programs for dysgraphic children: the level of ability which the dysgraphic children exhibit and which is required for successful reading and writing; the capability of phonemic perception and the analysis and synthesis of words; the level of graphomotoric abilities and a complete level of psychomotoric development; the role of the audio-visual motoric coordination in the speed and quality of reading and writing. **Results:** The results indicate that the present difficulties in reading and writing resulted from a audio-visual and motoric perceptive deficiency. The deficiency on this, or some of these levels determined the clinical picture of dysgraphia (subtype) and also the type of stimulation and the duration of the therapeutic program. The deficiency in the phonemic

hearing, analysis and synthesis, which by a selective frequency emission, influenced the auditory perception and memory. On the level of visual perception, the deficiency called for a stimulation of visual perception and visual memory according to the child's visual perception, and not according to his age. On the level of graphomotorics, however, a stimulation of psychomotorics was required. **Conclusion:** The differences in the rapidity of progress during the therapeutic program, although depending on the type and degree of dysgraphia have shown that all aspects of the child's development, his individual speech and language abilities as well as his cognitive and general psychomotoric abilities must be taken into account in devising and establishing therapeutic programs for dysgraphic children.

P165**LOGOPEDIC TREATMENT IN CHILD WITH MORBUS LITTLE**

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Little is characterized by spastic parapheresis of down extremities, easy physically handicap of hands and often strabismus. Girl with diagnosis CP. M.Littls was born in 2001. as neonatal praetemporarium, asphyxia neonatalis, ischaemia cerebri neonati, haemorrhagia intracranialis and according to medical finding of psychologist in 2005. year disharmonic psychomotor development is slow downed on limit. In 2005, logopedic diagnosis evaluation was done to a girl, based on which were done program of treatments. After 3 months of treatments it is noticed getting better in manipulative handiness, attention, visuo-motoral coordination, in all segments of visual, additive and tactile perception, in understanding of speech, giving names for notions from pictures, large amount of words, syntaxes on level of phrases, rashness in speech is followed with global motoric unrest, Fo is in coordination with pathology of glottis and posture, spontaneously performing of commands. After 5 months, playing games are justified, she is playing with other children, has better orientation in space, making evaluation of experiencing of body in space, noticing of relations in space, making progress in kinesthetic perception and in area of graphomotorics, by herself is starting communication with different persons (pragmatic communication), vocabulary is wider, words are complete with typical distortion, but comprehensive for surrounding, she is analyzing strip story with speech therapist, direct with material or without previously seen material. Child went to regular pre-school kindergarten. Early logopedic stimulation had exceptional significance for this girl who had only physical treatment since she was 3.7 years old, with complete absence of logopedic treatment and advancing work since she was 2.5 years old, which did not influence her physical functions to be better.

P166**ROLE OF THE DYSPHAGIA COMMUNICATION DISORDERS REHABILITATION SHARING IN MULTI-DISCIPLINARY TEAMWORK REHABILITATION**

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The Phoniatic clinic is one of the rehabilitation clinics dealing with communication, swallowing and educational habilitation and rehabilitation in pediatric rehabilitation group. It is important to improve the cognitive function and nutritional status of such patients to improve the quality of his life in early childhood and later the children will need to improve his quality of life by educational and vocational developing skills. Accordingly the children will have

better chances to share in the development of their quality of life, and improve their cognitive skills to be active part of the community instead of being overload. In this study we will show a comparative study between 2 groups of children with brain insults: Group A: 50 patients (male and female aged between 4–6 years old) on regular communication, swallowing and educational rehabilitation program in physical medicine and rehabilitation hospital in Kuwait. Group B: 50 identical children in special needs schools have no rehabilitation program before they are admitted to the school. Methods for evaluation: test will be applied to the 2 groups. 1). Arabic language test; 2) Social IQ; 3) Developmental parameter. This study and its results will be discussed to find out whether the phoniatic clinic have a role to share in the rehabilitation program of those children as early as possible to improve their quality of life, or not.

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CLINICAL-DEMOGRAPHICAL CHARACTERISTICS AND AMBULATION OUTCOMES OF CHILDREN WITH TRAUMATIC BRAIN INJURY

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Introduction: Traumatic brain injury (TBI) is a leading cause of disability in the pediatric age group (1). children with TBI are often admitted to hospital-based comprehensive inpatient rehabilitation programs for intensive therapeutic services to regain their functional abilities to allow them to return to their home and community (2). **Aim:** The aim of this study was to determine the demographical characteristics, complications and ambulation status of the children with TBI who were rehabilitated in an inpatient pediatric rehabilitation service. **Patients and Methods:** A total of 25 children, (21 male, 4 female), with TBI, were included in the study. Age, sex, duration of disease (day), duration of rehabilitation stay (day), etiological factors and complications were recorded. Functional status of children was recorded as ambulatory and nonambulatory at admission and at discharge. **Results:** Most frequently reported etiological factor was traffic accident (76%) and the complications were spasticity (64%), and contracture (36%). Eight patients (32%) were ambulatory, 17 (68%) were nonambulatory at admission while 19 (76%) were ambulatory and only 6 (24%) were nonambulatory at discharge. Improvement of ambulatory status of children after rehabilitation program was statistically significant ($p=0.001$). The length of rehabilitation stay was significantly ($p=0.04$) longer in nonambulatory patients (47.52 ± 24.43) when compared to ambulatory patients (28.75 ± 13.39). **Conclusion:** Children with TBI demonstrated significant improvement in ambulatory status after rehabilitation program. The number of ambulatory patient increases after rehabilitation program and motor recovery is well.

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P168

IS THE CONSERVATIVE TREATMENT THE FIRST OPTION FOR IDIOPATHIC TOE-WALKERS? A CASE REPORT

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Introduction: Idiopathic toe-walking (ITW) is defined as persistent toe-walking in the absence of developmental, neurological or

neuromuscular conditions, after the age of two, first described as ‘congenital short tendo calcaneu’. However, subsequent studies have suggested that ITW may be just another manifestation of a more global neurodevelopmental condition. Treatment for ITW has also been controversial. Cast treatment appeared to offer little long term improvement and surgery showed better results, but it can debilitate triceps and weaken push-off. Physiotherapy could sum up to casting for better and safer results. **Aim:** To show the effectiveness of a conservative treatment. **Methods:** We report the case of a 10-year-old boy, ITW with an ankle dorsiflexion of 84°I and 86°D knee extended and 96°I and 94°D knee flexed, gastrosoleus retraction and generalized hypotonia. He presented postural and gait anomalies, with a decreased balance and complaints about occasional pain in heels and knees. The treatment consisted in casts (at least 12 hours/day) and a protocol of massage, passive triceps’ stretching and active exercises for enhance dorsiflexors’ activity, increase balance and improve posture and gait. These were taught to the child and his mother. **Results:** After two months the improvement was clear for posture, balance and gait (heel-stroke without bending trunk), with reduction of pain and an ankle dorsiflexion of 89°L and 90°R knee extended and 98°L and 100°R knee flexed. The adaptation and adherence to the treatment were perfect. The orthopedic surgeon ruled out Achilles lengthening, but recommended the continuation of the treatment and periodical revisions. **Conclusion:** The efficacy of different treatment modalities is unclear, but detection and early conservative treatment with casts and physiotherapy could be effective to avoid early surgical management, which should be reserved for resistant cases. A program of massage, muscular rebalancing and posture, balance and gait re-education may improve falls, pain and other associated difficulties. Parents’ collaboration is essential. More studies are needed to determine the natural history and optimal treatment for ITW.

P169

CLINICAL RESEARCH ON IMPROVING THE BRAIN MICROCIRCULATION OF CHILDREN WITH CEREBRAL PALSY BY ACUPUNCTURE

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Objective: To investigate the therapeutic action and value of acupuncture in Cerebral Palsy rehabilitation. **Methods:** 150 spasm Cerebral Palsy patients from 1.5 to 7 years old are randomly divided into three groups. Acupuncture group (group A): 50 patients are treated with head acupuncture and body acupuncture; Rehabilitation-training group (group B): 50 patients are treated with physical therapy of Bobath and Vojta methods. Acupuncture add rehabilitation-training group (group C): In this group 50 patients are investigated. **Results:** The total effective rate of group A and group C are obvious higher than that in group B. After treatment the DQ value of group A and group C are higher than that in group B ($p<0.01$). The improve rates of CT brain dysphasia and atrophy in group A and C are significantly higher than that in group B, The recover to normal rates of ECT brain blood stream in group A and C are obviously higher than that in group B. Results of TCD after therapy are better than those before therapy in group A [PI: 1.19 ± 0.19 and 1.10 ± 0.16 ; VP: (132.92 ± 17.14) cm/s and (139.63 ± 14.64) cm/s] and group C [PI: 1.18 ± 0.24 and 0.91 ± 0.19 ; VP: (131.84 ± 15.93) cm/s and (139.68 ± 15.66) cm/s]. **Conclusions:** Acupuncture can obviously increase cerebral circulation, improve cerebral cell metabolism, promote partial or complete compensation of cerebral function and the restoration and function of plasticity of cerebral tissue in children with cerebral palsy.

P170

STUDY OF CLINICAL MICROCIRCULATION EFFECT OF LASER RADIATION FOR CEREBRAL PALSY

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Objective: To study the effect of lower intensity semiconductor laser radiation for clinical microcirculation of children with cerebral palsy. **Methods:** 50 children with cerebral palsy were treated by laser radiation and erythrocyte aggregation and nailfold microcirculation were tested after treatment. **Results:** Improvement rate of erythrocyte aggregation of laser radiation group (60.47%) is remarkably higher than that of control. Nailfold microcirculation is obviously improved after treatment. **Conclusions:** Lower intensity laser radiation can improve the abnormal of erythrocyte aggregation and microcirculation disturbance.

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EXPLORATORY DEVELOPMENT OF COMBINED REHABILITATION TREATMENT FOR CHILDREN WITH CEREBRAL PALSY

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Objective: To investigate suitable rehabilitation modality of our country to spread. **Methods:** We studied the applying of integrated traditional and western medicine-home rehabilitation modality for children with cerebral palsy (tri-combined cerebral palsy rehabilitation modality) from Oct 1999 to Oct 2005. It was the first time that to study the combination of TCM rehabilitation with Western medicine rehabilitation and home rehabilitation modality in international and have an advantage of the technique of same kind. **Results:** The effective rate of 684 patients (80.4%) was significantly higher than that of Western medicine rehabilitation group (32%). And we took the leader of reporting the recovery rate of cerebral atrophy and dysplasia (31%) of cerebral palsy after treatment, significantly higher than that of treated by rehabilitation training only (2.56%). The study illuminated the dominant position of TCM and western medicine rehabilitation. After the study of molecular biology, etiology, haemodynamics, and microcirculation, brain electrophysiology, imaging, we also proved that the combined rehabilitation modality can promote the function rebuilding of nerve cell. We carried out home rehabilitation for children with cerebral palsy at home, edited and published series teaching material including book and VCD and replenished the vacant of internal. We published 20 paper's articles and one was included by ISTEP and 20 times were cited. The opinion of the evaluation committee is that the study achieved the level of domestic leading and international advanced. **Conclusion:** The rehabilitation modality can effectively degrade mutilation rate of cerebral palsy and relieve mind and economy burden of family and society.

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CLINICAL OBSERVATION ON EFFECT OF CLEARING THE GOVERNOR VESSEL AND REFRESHING THE MIND NEEDLING ON HEAD SPECI AND CT SCANNING OF KIDS WITH CEREBRAL PALSY

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Aim: To investigate action and value of acupuncture in Cerebral Palsy rehabilitation. **Methods:** 100 spasm Cerebral Palsy patients from 2 to 7 years old were randomly divided into two groups. Acupuncture group: 50 patients were treated with head acupuncture and body acupuncture; Rehabilitation-training group: 50 patients were treated with physical therapy of Bobath and Vojta methods. **Results:** The total effective rate acupuncture and rehabilitation-training group were obvious higher than that of rehabilitation-training group. After treatment the DQ value of rehabilitation-training + acupuncture group were higher than that of rehabilitation group ($p < 0.01$). In acupuncture and rehabilitation-training group were higher than that of rehabilitation group ($p < 0.01$). In acupuncture and rehabilitation-training group, improvement rate of brain dysphasia, brain atrophy in skull CT and recovery normal rate of skull SPECT were obvious higher than that of rehabilitation-training group ($t = 4.731$ $t = 5.971$ $p < 0.01$). **Conclusions:** Acupuncture can obviously increase cerebral blood flow (CBF) and improve cerebral cell metabolism, promote partial or complete compensation of cerebral function and the restoration and function of plasticity of cerebral tissue in children with cerebral palsy.

P173

EDUCATION REHABILITATION OF CHILDREN WITH MENTAL RETARDATION

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Objective: To seek effective methods of home education for the rehabilitation of children with mental retardation and improve the life quality of handicap children. **Methods:** 86 children aged range from 3 to 9 years with mental retardation were treated with home education rehabilitation. After acquired the general information and requirements of home education rehabilitation, training of home education rehabilitation were given to the parents in accordance with 'Portage early education course', 'early education project of Chinese children', 'family rehabilitation training/massage VCD', 'handbook of home rehabilitation for the children with cerebral palsy'. In order to understand the psychological developmental feature of children with mental retardation and work out the individualized home education rehabilitation program, each child was regularly assessed and guided. The education rehabilitation program was enforced by the parents guided by the rehabilitation doctors and the intelligence development state was tested regularly. **Results:** The results showed that after systemic home education rehabilitation, the intelligence and adaptive behavior of children with mental retardation could be improved. 21 children were excellence, 55 were effective, 6 were better than before and 4 were ineffective. 20 children were adopted to elementary education organization. **Conclusion:** Stable and practical individualized home education rehabilitation service for the children with mental retardation can promote the healthy development of cognition, speech, social adaptation.

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A NORMATIVE GAIT DATABASE FOR CHILDREN AGED FROM 6 TO 12

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Introduction: Gait analysis is often performed in ill or handicapped children in order to assess locomotor skills and the efficacy of therapy. Nevertheless, data on gait parameters in healthy children are scarce and come from small study populations. **Objectives:** To build a normative database of temporal and spatial gait parameters for healthy children aged from 6 to 12 years. **Method:** The chil-

dren's height and weight were recorded. A clinical examination was used to exclude subjects with pathological conditions that clearly altered walking ability. Children wearing orthopaedic soles were also excluded. The remaining children were asked to walk barefoot and 'as naturally as possible' along a 7-m GAIT Rite® portable walkway system. The recorded parameters were as follows: ambulation time on the walkway, velocity, cadence, stride length and duration, step length, width and duration, single support time and double support time. *Results:* 30 girls and 30 boys from each year group participated in the study. The height values ranged from 110 cm to 159 cm. Mean values and standard deviations for all parameters are given for both genders and in every year group and every height class. *Discussion and Conclusion:* We believe that this new database will be useful for therapists involved in the assessment and rehabilitation of children with motor impairment.

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CLINICAL AND INSTRUMENTAL EQUINUS FOOT CLASSIFICATION IN AMBULANT CP CHILDREN

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Introduction: Correct diagnosis of equinus foot in Cerebral Palsy (CP) children is of paramount relevance for consequent therapeutic choice. This study is aimed to integrate clinical and instrumental assessments in the classification of equinus foot in ambulant children with spastic forms of CP, according to Ferrari's diagnostic-therapeutic algorithm. The hypothesis is that clinical diagnosis can be evidenced by recurrent anomalies in Gait Analysis (GA) data, which can make objective the assessment usually depending on the clinician experience. *Methods:* Nine children (11.2±4.11 years), 5 diplegics and 4 hemiplegics, were evaluated. The first part of the study was the clinical assessment performed by a physiatrists expert in CP, using the Ashworth scale, the joint range of motion, muscle strength, muscle tone, muscle length, and Gross Motor Function Measure (GMFM). The second part of the study was the instrumental evaluation with Gait Analysis and dynamic EMG performed by a physiatrists expert in GA, blinded to the clinical diagnosis of equinus. *Results:* After the clinical assessment of these children, they were assigned to 8 different equinus categories. Since different forms of equinus can be present in the same patient, we were able to clinically classify 21 types of equinus in 15 feet (5 children diplegics, 4 hemiplegics, 1 controlateral foot in an hemiplegic child). Gait Analysis and EMG confirmed the equinus assignment in 20 out of 21 types; moreover Gait Analysis found 2 more types of equinus. Therefore the index of agreement between clinical and instrumental assessments, expressed by the Cohen's Kappa was 84.7%. *Conclusions:* In conclusion this pilot study supports the hypothesis that clinical diagnosis according to Ferrari's Classification of Equinus foot can be recognized even by means of gait data, making the clinical decision less arbitrary.

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ELECTROTHERAPY OF FUNCTIONAL OBSTIPATIONS IN CHILDREN

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Purpose: The purpose of this study is to stress out effects of electrotherapy in treatment of functional disorders of bowel control in children that are previously role out structural anomalies. *Methods:*

At University children's Hospital in Belgrade during 2006–2007 years period we evaluated 24 children age between 6 to 10 years with functional obstipations. First group of 12 children was treated by bowel management and electrotherapy. Second group of 12 children was treated only by bowel management. We applied electrotherapy: exponential current (EC) and transcutaneous electrical nervous stimulation (TENS). In EC, electrodes were placed on anterior abdominal wall, while in TENS application electrodes were placed on paravertebral site at the level of S2–S4. In all patients 4–5 therapy rounds were induced. Control examinations were done on every 3 months for one year. *Results:* During the treatment in 9 patients from first group we achieved faster and better bowel emptying compared to same results only in 4 patients in second group. After 6 months in first group better results were achieved in 1 more patient, while in second group we had no additional patients with signs of improvement. After one year in first group 11 (91.67%) patients were with satisfactory results of improvement, while in second group 7 (58.33%) patients achieved significantly better results compared to beginning of treatment. *Conclusions:* Treatment of patients with functional bowel disorders pointed out that implementation of electrotherapy procedures beside bowel management is significantly efficient than therapy with bowel management alone. Electrotherapy is painless, safe, easily for application and children are more comfortable in accepting one. This study suggests implementation of electrotherapy procedures as additional method in treatment of patients with functional bowel disorders due to its benefit.

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EVALUATION OF THE IMPACT IN THE FUNCTIONAL ABILITY OF RETT SYNDROME

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Introduction: Rett Syndrome (RS) is a progressive neurological disturbance of genetic cause due to mutations, usually sporadic, of the gene known as MECP2 (1). This syndrome affects, principally, female individuals, and in rare exceptions, boys. RS presents as main characteristics: stagnation in psychomotor development; loss of interest for people and objects; and largely manual stereotypes. *Aim:* The aim of this study is to evaluate and present the difficulties related with the functional abilities in patients with Rett Syndrome. *Patients and Methods:* For the execution of this work, PEDI (Pediatric Evaluation of Disability Inventory) (2), an instrument that measures the capacity of the child, was used. It consists of an evaluation through applied questionnaire to the parents or caregivers that quantifies the dysfunctions that the children present, considering the functional abilities of: self-care; mobility and social function. As much, 66 girls with Rett Syndrome were evaluated with an average age of 9.98 years, varying from 2 to 27 years of age. *Results:* Considering self-care, of the 73 evaluated activities, 34 (46.6%) were not accomplished by any child, in social function 33 (50.8%) of the 65 evaluated and in mobility of the total of 59 activities, 4 (6.8%) they were not accomplished by any child. Following are the averages of each functional ability followed by the maximum and minimum values: Self-care: 13.09 (minimum 1.37/maximum 36.99), mobility: 35.04 (minimum 3.39/maximum 83.05) and social function: 9.71 (minimum 0/maximum 27.69). *Conclusion:* It is important to emphasize that the greatest difficulty observed was in the area of social function, and as the area with the greatest functional ability was mobility.

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P178**TRANSFER AND LOCOMOTION ABILITIES OF PATIENTS WITH RETT AND ANGELMAN SYNDROME**

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Introduction: Any change so much structural as numeric of the genes can alter the genetic expression. Two syndromes that have genetic alteration are syndromes of Rett (RS) and of Angelman (AS). The diagnosis of these syndromes is very difficult to establish and it can be easily confused since in certain phases they present behavioral characteristics and similar motor deficits. Due to the similarities in the motor characteristics, both syndromes present difficulties in transfer and locomotion making it fundamental for the physiotherapist to verify the differences that occur among the syndromes. **Aim:** Compare the transfer and locomotion abilities of patients with Rett and Angelman Syndrome. **Patients and Methods:** Participating in this study were 67 subjects with RS and 22 with AS. All the patients were submitted to Pediatric Evaluation of Disability Inventory (PEDI) (1), which analyze the principal functional abilities and difficulties of a child. PEDI is divided into three areas related to self-care, mobility and social function. However, for this study the mobility area was considered with 59 related activities in the sub areas of transfer and locomotion. **Results:** In the sub area related to transfer, the children with AS accomplished, on average, 69.89 (± 25.36) of the activities and the patients with RS – 37.25 (± 24.85). In the sub area related to locomotion, the patients with AS presented an average of 68.83 (± 28.95) and the patients with Rett 33.52 (± 31.39). **Conclusion:** Analyzing the results, in spite of the difficulties and diagnostic confusions that occur among the two diseases, mainly due to the characteristic stereotyped movements and motor similarities, it was verified that the patients with AS present more motor abilities when compared with patients with RS. It is important to emphasize that statistical significance exist ($p=0.0023$) as much in transfer as in locomotion, in both, with RS presenting greatly inferior average scores than AS.

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P179**WILLIAMS SYNDROME AND SCOLIOSIS – A CASE REPORT**

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Introduction: The Williams Syndrome (WS) is an autosomal dominant disorder, resulting from a microdeletion in chromosome 7. It is a rare disorder, being the prevalence estimated between 1 in 7,500 to 20,000 live births. It is characterized by derangements in multiple body organs and systems, such as dysmorphic facies with combination of the following facial features: short upturned nose, flat nasal bridge, long philtrum, flat malar area, wide mouth, rood lips, dental malocclusion, spaced teeth and micrognathia. Supravalvular aortic stenosis, hypercalcemia, attention deficit, hyperactivity disorder and mental retardation are usually present. Other findings

include: joint hypermobility, scoliosis, kyphosis and lordosis. In addition to karyotype, fluorescent in situ hybridization (FISH) should be performed in patients in whom Williams Syndrome is suspected. Clinical features are evident from birth throughout adulthood. Cardiovascular diseases account for most of the early mortality associated with Williams Syndrome. A strong suspicion and early diagnosis are fundamental in these cases. **Case Report:** We report a case of W.S. in a 14-year-old boy with scoliosis. In the past personal history this child presented palatine cleft, inter-ventricular communication, supravalvular aortic stenosis (SVAS), delay in psychological and motor areas and scoliosis. The diagnosis of WS was established after genetic exams. He was observed in our department for scoliosis evaluation and management. The authors present this case for its rarity and complexity in terms of the treatment strategy.

P180**EFFECTS OF 3-YEARS POSTOPERATIVE REHABILITATION PROGRAM IN CHILDREN WITH SPASTIC PARAPLEGIC CEREBRAL PALSY**

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Introduction: Abnormalities of gait and diminished ambulation are common in children with spastic diplegic cerebral palsy. Muscle tendon surgery may improve these impairments by increasing joint motion and allowing for normal musculoskeletal alignment throughout gait. **Aim:** This study was designed to investigate the long-term effects of 3 years rehabilitation program on joint mobility, spasticity and gross motor function after muscle tendon surgery in children with diplegic cerebral palsy. **Patients and Methods:** This study included 20 children with spastic diplegic cerebral palsy (CP), age range 7–12 years; 14 received exercise training and physiotherapy 50 min, four times per week, for 3 years, which started about 1 month after the surgery. Six study participants withdrew for various reasons before the completion of the second year. Evaluation was conducted through Gross Motor Functional Measurement (GMFM), Modified Ashworth Scale, passive range of motion (ROM) of hip extension and abduction, knee extension and ankle dorsiflexion, assessed before rehabilitation (0), 1 year (1), 2 year (2) and 3 year (3) after the surgery. Data were analyzed by determining the mean of each variable for subjects at each assessment. **Results:** Three years after surgery, the functional status was improved in most of the 14 subjects. They showed improvement in GMFM scores (in domains four – standing and five – walking, running and jumping). The long term rehabilitation and muscle-tendon releases resulted in improvements in passive range of motion in the lower extremities three years postsurgery. On average for all subjects, hip extension, hip abduction, knee extension, popliteal angle and ankle dorsiflexion increased. **Conclusion:** Long-term rehabilitation exercise program that starts soon after the operation of patients with CP was beneficial and leads to significantly greater functional motor improvement at three years of treatment, in terms of ROM and GMFM.

P181**THE PATTERN OF PHONOLOGICAL PROCESSES IN CHILDREN'S SPEECH AGED 2 TO 4 YEARS**

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Description: In the initial years of speech growth, children use phonological processes in order to simplify the pronunciation of adult's words. According to Bental & Bankson Phonological processes

are mental performances which replace classes of sound which are more conveniently articulated for harder classes. Application of phonological processes reflects natural capacity and limitations of children's articulation system. The importance of phonological processes in speech and language pathology lies in the diagnosis, assessment, and treatment of articulation disorders. This study aims to derive phonological processes of one and two syllable words in a group of Farsi speaking children for determining phonological processes in Iranian children. *Methods*: This is a cross-sectional descriptive study containing sixty Farsi speaking 2 to 4 year old children selected from 10 nurseries in Isfahan city. The children did not have any problems regarding speech movement and hearing based on screening test, health child note and parents or tutors statements. The test used included 135 mono and disyllable words that were selected according Persian consonant inventory. Children named up to 135 pictures of words that were selected such that all consonant were repeatedly sampled in all word positions in monosyllabic and disyllabic words. *Results*: The derived phonological processes of one and two syllable words included: Weak Syllable Deletion, Final Consonant Deletion, Reduplication, Consonant Harmony, Cluster Reduction, Epenthesis, Metathesis, Stopping, Fronting, Gliding, Backing, Deaffrication, Affrication, Denasalization, Lateralization, Frication, and initial Consonant Deletion. More over, other phonological process occurred which are not defined in the resources such as /j, r, l /were replaced by /d/. *Conclusions*: Because the results are very expanding, they will be interpreted in the main article. Meanwhile some of the most important findings comprise: 1) Results proved that usage of phonological processes declined from 2 to 4 ages; 2) Some of the most pervasive phonological processes included: Cluster Reduction Deaffrication, Lateralization. 3) Many of the speech errors particular for elder children were only in disyllabic words especially words which have consonant cluster.

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RELATIONSHIPS OF VERBAL MOTOR CONTROL AND MOTOR SEVERITY IN CHILDREN WITH SPASTIC CEREBRAL PALSY

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Introduction: The speech production for communication is often impaired in cerebral palsy (CP). Problems in speech production may be a direct result of the verbal motor impairment due to a disturbed motor control in CP. *Aim*: This study is to investigate the relationships of verbal motor control and motor severity in children with spastic cerebral palsy. *Patients and Methods*: We collected 33 children with spastic CP having good speech intelligibility. The children were classified into two groups: group A (spastic diplegia (SD) or hemiplegia (SH), $n=17$) and group B (spastic quadriplegia, $n=16$). All children received Intelligence, Language, modified Verbal Motor Production Assessment for Children (VMPAC), including global motor control, focal oro-motor control, and sequencing subtests, speech intelligibility, CP types, and Gross Motor Functional Classification System (GMFCS) assessments. It was considered as statistical significance if $p<0.05$. *Results*: Group A had better VMPAC scores, intelligence, and language functions than group B ($p<0.05$), although there was no significant difference in the speech intelligibility scores between both groups. Correlation analysis indicated the all modified VMPAC scores had highly negative relationships with CP types ($\rho < -0.69, p < 0.01$) and GMFCS scores ($\rho < -0.52, p < 0.01$). All modified VMPAC scores were correlated positively with intelligence quotients ($\rho > 0.36, p < 0.01$). Most modified VMPAC scores had positive relationships with language functions of oral comprehensions, verbal expression, and global language functions

($\rho > 0.39, p < 0.01$). *Conclusion*: Motor severity had a relationship with verbal motor control in children with CP. The intelligence and language functions were also correlated with verbal motor control in children with CP. Children with spastic quadriplegic CP had more severe verbal motor impairment than diplegic or hemiplegic CP, even though both groups had good and matched speech intelligibility. Future research is focus on investigating the mechanism of verbal motor control for children with CP through kinematic and electromyographic analysis.

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AMNIOTIC BAND SYNDROME: TWO CLINICAL CASES

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Introduction: Amniotic band occurs sporadically in approximately 1:1200 to 1:1500 live births and resulting in amputations, constrictions and other deformities, mainly affecting the limbs. The exact etiology remains undetermined and its natural course unpredictable. Outcome depends on the severity associated malformations. *Aim*: The authors present 2 clinical cases of this rare syndrome, both presenting with severe limb malformations. *Patients and Methods*: The first case, HS, presents with agenesis of the distal phalanges and syndactylia of the medial and proximal phalanges of 2nd to 5th fingers of the left hand, popliteal pterygium and club foot on the left inferior limb. The second case, LSM, presents with agenesis of the distal phalanges and syndactylia of the proximal phalanges of 2nd to 5th fingers on the left hand, popliteal pterygium and foot disruption on the inferior right limb, agenesis of the cruciate ligaments and a severe club foot on the left inferior limb, ano-rectal malformation and supra-umbilicus hernia. Treatment options include rehabilitation, orthopaedic and surgical repair and will be discussed in detail. *Conclusion*: The authors aim to highlight the severe clinical and functional challenge in this rare disorder. Choices regarding treatment options are difficult and have to integrate cosmetic, functional and clinical aspects.

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RHOMBENCEPHALOSYNOPSIS DIAGNOSED IN CHILDHOOD: 2 NEW CASES OF GOMEZ-LOPEZ-HERNANDEZ SYNDROME?

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McKusick (1969) states: "...among the several hundred thousand patients in institutions for the mentally retarded in this country, many as yet undelineated syndromes exist...but because each is an isolated case the physician does not know what to make it...at single case may not impress: it may take two to arouse

suspicion that a discrete entity is involved.' Rhombencephalosynapsis (RES) is a cerebellar malformation of which 50 cases have been described worldwide. It is characterised by vermian agenesis or hypogenesis, fusion of the cerebellar hemispheres and the dentate nuclei. Supratentorial abnormalities can be associated. Hydrocephalus or ventriculomegaly, dysgenesis of the corpus callosum and absence of the septum pellucidum are the most common associated anomalies. Fused thalami, tectum and fornices, hypoplasia of the temporal lobes, olivary nuclei, anterior commissure and optic chiasma, and agenesis of the posterior lobe of the pituitary can occasionally be seen. Extracranial anomalies are very rare and may involve musculoskeletal, urinary tract, cardiovascular and respiratory systems. Non-specific dysmorphic features such as low set ears, hypertelorism and high arched palate are also reported by several authors. The clinical presentation and prognosis vary depending on the associated supratentorial anomalies. RES results from a disturbed development of the cerebellum between 28 and 41 days of gestation. There is still discussion whether the cerebellar malformation is due to undivided or to fused hemispheres. We report 2 new cases of RES diagnosed by magnetic resonance imaging (MRI) in living boys. Both boys showed cognitive and motor developmental delay, dysmorphic features, signs of cerebellar dysfunction and behavioural problems. We argue that in these cases RES may be part of a the Gomez-Lopez-Hernandez syndrome (GLH) syndrome, or cerebello-trigeminal-dermal dysplasia. This is an even rarer condition characterised by the triad of bilateral bands of temporal alopecia, trigeminal anesthesia and midline rhombencephalosynapsis. Phenotypic manifestations may be associated. Twelve GLH patients have been documented worldwide since 1979. If we find two more cases in Belgium, we can argue that there must be more undiagnosed patients. One of the interests of diagnosing rare syndromes is looking for the best prevention of late complications, searching for the most appropriate treatment, giving adequate information to the parents by comparing the presenting cases with older living individuals. We see for instance that children with GLH develop severe psychiatric problems in growing older. This advocates an early psychiatric follow-up and treatment. Physical treatment has been shown in the different cases to benefit the motor development of the children. In this review we compare clinical, radiological, behavioural characteristics of the 14 cases in order to look for more relationships.

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EARLY DIAGNOSTICS AND PHYSICAL THERAPY PROTOCOLS IN TREATMENT OF CHILDREN WITH OBSTETRICAL PLEXUS BRACHIALIS LESION

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Introduction: Obstetrical lesions of plexus brachialis are clinically manifested at birth with loss of motoric muscles functions and sensibility innervated by affected nerves. Diagnosis is made by clinical examination, neurophysiological evaluations, radiology techniques. Based on level and severity of lesions we implement rehabilitation program that include physical therapy and continuous follow-up with consultations by neurosurgeons and orthopedists. **Aim:** To maximally restore lost function of paralytic muscles, mainly muscle strength, further to prevent atrophy and contracture as well as to restore movement coordination and scheme of affected extremity. **Patients and Method:** During 2002–2008 at University children's Hospital in Belgrade, Serbia we evaluate 194 children with lesion of brachial plexus, 16 patients with lesion of upper type (Erb Duchenne) and 9 children with lesion of lower type (Klumpke Degerine), while other were with complete lesion. Clinical examination included: functional status estimation that combined with neurophysiological evaluations, electromyography (EMG) and somatosensory evoked potentials (SEP) point out level and severity of lesion.

Rehabilitation program is individual and includes: functional positioning of extremity with introduction of thermo, electro and kinesitherapy, while in later stage hydro, kinesio- and occupational therapy. In cases where surgery treatment was needed, physical therapy was introduced in postoperative period. **Results:** Our results showed that reinervational potentials in EMG and SEP during first 3 months point out neuropraxic lesions with good recovery prognosis. Denervational potentials after 3 months point out poor prognostic results with presence of neurotmesis when additional diagnostic evaluations are needed with surgical intervention in some cases. Physical therapy is maintained during growth continuously. **Conclusion:** Recovery of children with brachial plexus lesion is specific and is due to severity of lesion, physical therapy and rehabilitation program. Early diagnostics and therapy is important in prevention of permanent sequelae and best functional recovery.

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ASSESSMENT OF REGIONAL GABA_A RECEPTOR BINDING USING 18F-FLUOROFLUMAZENIL POSITRON EMISSION TOMOGRAPHY IN SPASTIC HEMIPLEGIC CEREBRAL PALSY

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Introduction: The pathophysiological mechanisms related to motor dysfunction in spastic cerebral palsy (CP) remain poorly understood. A number of imaging studies including diffusion tensor imaging (DTI) have demonstrated morphological abnormalities in hemiplegic CP patients. In addition to morphological and anatomical abnormalities, however, various neurotransmitters are thought to be involved in the pathogenesis of spastic CP. **Aim:** To investigate the GABAergic role in abnormal motor functions in spastic hemiplegic CP patients with regard to the imbalance between excitatory and inhibitory functions with positron emission tomography (PET) imaging using GABA_A binding radiotracer, [¹⁸F]-fluoroflumazenil (FFMZ). **Patients and Methods:** Eight patients (3 males and 5 females, mean age 11.3±4.7 years old) with spastic hemiplegic CP (4 left and 4 right) and 16 healthy persons (9 males and 7 females, mean age 21.0±1.2 years old) were enrolled. The inclusion criteria for hemiplegic CP were the patients who have white matter lesions without cortical injury confirmed by 3-T brain MRI. Subjects underwent PET imaging after injection of 0.14mCi/kg of [¹⁸F]-FFMZ. We obtained PET scans according to the dynamic protocol (60 frames×10s, 40 frames×15s, 20 frames×30s, 30 frames×60s) for a total acquisition time of 60 min. Statistical parametric mapping (SPM) analysis was used to compare the GABA receptor PET imaging between groups (uncorrected $p < 0.001$). (1) DTI data acquired by 3-T MRI were also analyzed. **Results:** SPM analysis of cerebral GABA receptor PET imaging showed increased GABA_A receptor binding in the affected motor cortex in spastic hemiplegic CP patients compared with normal controls. Fractional anisotropy value from DTI analysis was decreased at the corticospinal tract in affected side. **Conclusion:** As GABA_A receptor signaling modulates the function in the motor cortex, increased GABA_A receptor binding in the motor cortex might play an important role in poor motor control in patients with spastic hemiplegic CP.

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RELATIONSHIP BETWEEN READING ACCURACY AND VISUAL MEMORY OF WORDS IN NORMAL FARSI-SPEAKING CHILDREN

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Introduction: Success in the task of reading a paragraph or longer material in class or for homework depends on: reading speed, reading accuracy, the ability to sustain concentration while reading, comprehension of the material, and retention of what is read. A weakness in any of these factors in reading will lower the likelihood of successful reading. The inability to form a mental image of (visualize) words can be interpreted as having a poor visual memory. This inability is an enormous problem as, particularly without the knowledge of phonics and language structure, children have no notion of what to put on paper. *Aims:* The main goal was to explore relations between reading accuracy and visual memory of words in first grade students in total sample and also according to children's sex. *Methods:* This study was of a descriptive – analytic cross – sectional one. A sample of 180 students (90 males and 90 females) was selected from the first grade primary school – age children with a normal developmental history. Reading accuracy was assessed with the Standardized Reading Test for Farsi speaking children reading accuracy subtest and visual memory ability was assessed with the Durrell Reading Test visual memory subtest. After choosing the samples, they were asked to read the text aloud and their voices were recorded for the analysis of errors (substitutions, omissions, repetitions, corrections and reversals) made in reading text. After that visual memory test was performed. *Results and Conclusion:* The results showed correlation between reading accuracy and visual memory ($p < 0/000$) in total sample. Comparison between the means of males and females showed no significant difference ($p > 0/05$) on the test of reading accuracy and visual memory of words. Slow and/or inaccurate word reading performance can greatly inhibit reading comprehension performance because of a number of cognitive skills - auditory perception and memory (Information, Arithmetic and Digit Span), visual perception, memory, sequencing and hand-eye co-ordination (Picture completion and Arrangement, Coding, Mazes). Literacy skills require good visual recall for words, good phonological skills and kinaesthetic strengths. These skills make for fluency in spelling and handwriting. If there are weaknesses in these areas, literacy difficulties will follow. Small group of children have visual memory problem. They may actually reverse letters or words. They have difficulty matching the word image on the page with a previously image in their brain. So it seems that visual memory should be tested in any child who is entering primary schools to determine any potential problem in reading. We can provide practice for the student in retelling a group of objects/pictures shown for five (5) seconds and then hidden from sight (visual). In this manner, the student must come to learn that they have some responsibility in developing their own attending and memory skills. Our findings suggest that visual memory of words may play role in reading accuracy.

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ASSESSMENT OF SPINAL CORD MOBILITY IN CHILDREN WITH CHRONIC MOVEMENT DISEASES

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Introduction and Objective of Study: Effects of various, and sometimes negative, factors seen in childhood are of a potential effect on functioning of people in their mature and senior ages. Examination of the range of movement of spinal joints of children with chronic movement diseases will facilitate a proper assessment of the body in its growing stage. Contrary to appearances the documenting of the ranges of motion is not easy. Existing standards concern adults

(age intervals that are most often seen are: I 18–40, II 41–60, III 61–85 years). The experiment has been performed within the scope of statutory research (Ds-80) financed from the Warsaw Academy of Physical Education funds. *Material and Method:* Range of spinal mobility was examined in children. Examinations covered a group of 100 children. Qualified for assessment of the range of movement of spinal joints were those children with movement diseases. Said ranges of movement were determined using SFTR method. Examinations were conducted in two age groups: 6–9 and 10–15 years. Measurements of ranges of motions in spinal joints were carried out using the generally applied SFTR method. The following motions of the spine were examined: -bending and straightening of neck section, -side bends (left and right) in neck section, – turning motions (CW and CCW) in neck section, – bending in breast section, – bending and straightening in lumbar section, – side bends (left and right) in breast-lumbar section, turning motions (CW and CCW) in breast-lumbar section. *Results:* Standards concerning ranges of movement of spinal joints were determined for children with movement diseases. No statistically significant disparities were found between girls and boys, and thus the results can be studied jointly. Results of the two age groups subject to evaluation were compared. Values of the spine motion ranges in children were also compared with standards applicable to adults (3 age intervals: I 18–40, II 41–60, III 61–85 years). *Conclusions:* 1) Those locomotive organ components that face the most severe functional deficiencies, which appear with diseases, were observed. 2) Comparison of the above-discussed parameters in children, adults and elderly people signals important interrelations and directions of the growing physical degeneration of the public.

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ASSESSMENT OF SPINAL CORD MOBILITY IN CHILDREN

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Introduction: Properly chosen and dosed physical exercises in developmental age, and thus practicing of sports, cause hypertrophy and strengthening of the vertebrae themselves as well as similar effects in ligaments and muscles which stabilize them. This constitutes a positive effect of the motor activity on development of the child organism. The experiment has been performed within the scope of statutory research (Ds-80) financed from the Warsaw Academy of Physical Education funds. *Material and Method:* The study covered children of 6–9 and 10–15 years, and thus the people who are yet to see termination of their growth and development processes. Qualified for study of the spinal cord functional status in children of 6–9 years were 200 children (100 girls and 100 boys), and 200 children (100 girls and 100 boys) of 10–15 years. Examination was carried out in compliance with the methodology and standards applied in physiotherapy, based on the SFTR method, using flexible anthropometric tape. The examination concerned motions of the spinal cord in sagittal, frontal and transverse planes. *Results:* Values of the spine motion ranges in children were also compared with standards applicable to adults (3 age intervals: I 18–40, II 41–60, III 61–85 years).

Table I. Mean motion range of the spinal cord in examined groups children and elderly

		Age (years)				
Planes		6–9	10–15	18–40	41–60	61–85
C	S	9.5–0.3	8.0–3.5	8.5–0.3	7.5–0.2.5	5.5–0.2
	F	5–0.5	5.5–0.5.5	6.5–0.6.5	5–0.5	4–0.4
	R	8–0.8	8–0.8	8–0.8	7.5–0.7.5	6–0.6
TH	S	0–4	0–2.5	0–2.5	0–2	0–1.5
L and	S	6–0.4.5	7–0.5.5	8–0.6	6.5–0.5	4.5–0.4
TH-L	F	4.5–0.4.5	8–0.8	9–0.9	7.5–0.7.5	5–0.5
	R	4.5–0.4.5	5–0.5	4.5–0.4.5	3–0.3	2–0.2
C-TH-L	S	0–9.5	0–12	0–11.5	0–10	0–7.5

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PROGRAMS AND PROFESSIONAL 'STYLES OF PRACTICE' CHARACTERISTICS THAT INFLUENCE IN ADHERENCE TO CHILDREN'S HOME EXERCISE PROGRAMS

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Introduction: Inadequate adherence has been identified as a problem in home therapeutic programs for children. Little is known about how the management in physical therapy influences adherence to home exercises programs. **Aim:** This qualitative study explored parents' perceptions with the purpose of highlighting the role of intrinsic characteristics of home exercise programs and professionals' styles of practice during therapeutic encounters on the parents' adherence to exercises. **Patients and Methods:** Qualitative study using focus groups. Twenty-eight fathers and mothers of children treated by means of therapeutic sessions and home therapeutic programs in 4 early intervention centres in Spain participated into 7 focus groups. Audiotape, videotape and field notes taken during discussions were sources for data collection. Data were analyzed according to the grounded theory approach. **Results:** Three themes emerged illustrating that they are relevant issues on parents' adherence. The themes were the programs' requirements, the programs' effects and professional practice style. Requirements comprise type, quantity, duration of exercises and material resources. The benefits and adverse effects of the adherence's behaviour and effects of non-adherence behaviour are relevant for parents. To give information, use of teaching supports like feed-back during the learning, use the child as a model when parents learn the exercises, specific reminders to exercise (pamphlets, time reminders), and other perceptions like to be well-treated and perceive a good coordination between centre professionals are perceived as adequate styles of practice. **Conclusions:** This study identified several phenomena which may hinder the adherence process. Professionals who want parents to make positive decisions about adherence should plan their styles of practice and design adequate home exercise programs. **Funding Acknowledgements:** This work was supported by Ministry of Health (project number PI052418).

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THE PREVENTION OF FOOT DEFECTS IN CHILDREN

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Introduction: The foot defects occurring in children are common phenomenon. The changes in the arch of the foot are connected with dysfunction in posture and/or walking stereotype as well as with weakness of the muscle, skeletal and ligament foot systems. **Aim:** The first aim of the study was to estimate the arch of the foot in the facilitate and weight condition in the children in which the platypodia were not observed earlier and to demonstrate the conduct preventing the foot defect occurred. **Patients and Methods:** The study was performed on 206 children (102 boys, 104 girls) aged 9–17 years. (mean 10 years.). The subjects were random selected from schools in Poznan, Poland. All procedures were accepted by the Local Bioethical Committee and the written consent

from parents were needed. The estimation of the foot parameters was performed with the Podoskop (Posmed, Poland). The photography of weight-bearing and non-weight-bearing condition of the plantar part of the foot were analyzed according to the Weisflog linear estimation index of the foot. **Results:** The correlation between age, body mass and height to the arch of the foot were not served. The relationship occurring in arch of the foot in weight-bearing and non-weight-bearing condition was statistically significant within whole group of the study and within the sex ($p=0,001$, Wilcoxon test). In this same conditions the relationship between left and right feet were statistical significant too. **Conclusion:** The differences between the results of the arch of the foot in weight-bearing and non-weight-bearing condition shown the weak efficiency of the foot and necessity of putting corrective exercise into practice. The prevention and therapy should include the sensomotor training utilizing spiral work of the foot and simultaneously correcting the proprioception and muscle balance.

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A CRITICAL REVIEW OF EPIDEMIOLOGY AND PREDISPOSING FACTORS OF ACCIDENTS IN CHILDREN IN MASHHAD, IRAN

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Accidents are the most common preventable causes of death in children. Recognition of predisposing factors can help in institution of appropriate preventive measures. In this study, data of accidents and injuries in children (0–6 years of age) hospitalized in emergency department of three collegiate hospitals were obtained hospital charts and interviews with parents, and the results were analyzed with the SPSS software. Among 271 children hospitalized during the study, 62.4% were males and 37.6% were females. The most prevalent age of accident outbreaks was between 12–16 years of age followed by the age group of 4–8 years. The most prevalent categories of accidents included falls –38.4%, burns –21.8%, poisonings, motor accidents –14.8% homicides –3% and drowning and near-drowning –1.5%. 242 of investigated cases were complications, 27 led to disability and permanent sequel and 2 cases led to death. The most common time of day for accidents was the afternoon in the case of motor accidents mornings for burns, and noon for drowning. Accidents are more prevalent among teenage boys and pre-school children, especially in crowded low-income families. With regard to high incidence of accident fatality rate in our study we recommend institution of a comprehensive information system to effectively gather data, the results of which can be accessible to primary health facilities in home and production of safe industrial pharmaceuticals.

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TRAUMATIC INJURIES IN A PAEDIATRIC POPULATION AND PROMOTION OF CHILD SAFETY

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Introduction: In Portugal, injury is the leading cause of death in children and adolescents between 0 and 19 years old. When comparing the data of the 18 countries participating in the Child

Safety Action Plan, mortality rates in children and adolescents in Portugal are the third highest for boys and the fourth highest for girls. In 2001, these casualties represented almost 49 000 potential years of life lost. The analysis of the specific causes indicates that road traffic accidents are still the major cause of death, followed by choking or strangulation. There are also several causes of accidents that occur typically in domestic environment that are also responsible for a large number of fatalities. *Aim*: To determine the demographic and clinical characteristics of injuries in a paediatric population. *Patients and Methods*: The authors made a retrospective study of the causes of traumatic injuries of children in the Paediatric Development and Rehabilitation Service by reviewing the clinical files of the patients evaluated between 19 and 20. Demographic and clinical data such as diagnosis and cause of injury were collected and analysed. *Conclusion*: It is important to identify the main causes, the risk and the target groups of children injuries in order to develop national plans for injury prevention and promotion of child safety. These data are important for the promotion of media and school campaigns, and for the introduction of safety laws. The establishment of effective strategies is important to reduce children morbidity and mortality.

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TRAUMATIC BRAIN INJURY IN PEDIATRIC POPULATION – WHICH SOCIAL INCLUSION?

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Introduction: Traumatic brain injuries (TBI) are a very important cause of children morbidity and disability, with a negative impact on their life quality. Outcomes vary with the severity of injury, child age at injury, premorbid child characteristics, family factors and the families' socioeconomic status. *Aim*: To evaluate the social inclusion of children following a traumatic brain injury after hospital discharge. *Patients and Methods*: The authors made a retrospective study of the inpatients of a specific unit of the Pediatric Development and Rehabilitation Service, dedicated to the care of children that, at admission, were in coma or in a minimal responsive state. Medical records were reviewed corresponding to children admitted to this unit between 1996 and 2007 and their social inclusion was evaluated. *Conclusion*: Children following traumatic brain injuries face serious difficulties when they return to their familiar environment in terms of skills, behaviour, communication and education. They could also be a physical, emotional and financial burden to their families and society. Prevention measures and oriented rehabilitation programs are essential to assure a better outcome for children with TBI.

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CHOREA: AN UNCOMMON NEUROPSYCHIATRIC MANIFESTATION OF SLE IN CHILDHOOD

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Introduction: Systemic Lupus Erythematosus (SLE) is an immunologic disease predominantly affecting young women in

reproductive age. Only 15% of the cases are diagnosed during childhood. Despite the similar clinical presentation and immunological findings the paediatric group have higher rates of organ involvement. Neuropsychiatric manifestations are found in approximately 25–50%, among them 70% occur during the first year after the diagnosis. *Case Report*: The authors report a case of a 15-year-old girl fulfilling the criteria for SLE defined by the American College of Rheumatology and antiphospholipid Syndrome. She developed involuntary movements on right upper extremity followed by the involvement of the left arm as well. The MRI showed frontal lobe and periventricular in specific lesions. The patient was treated with ciclophosphamide obtaining clinical and imagiological improvement. *Conclusion*: Headaches, psychosis, cognitive dysfunction and cerebrovascular disease accounts for the most common presentations of neuropsychiatric manifestations of SLE. Chorea and other movement disorders are uncommon in course of Systemic Lupus Erythematosus. Despite the relatively good outcome, 25% have permanent neuropsychiatric damage. The authors discuss the neuropsychiatric manifestations, diagnostic evaluation, treatment and outcome in children with Systemic Lupus Erythematosus.

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OUR EXPERIENCE IN ACHIEVING PAIN REMISSION IN PATIENTS WITH ESSENTIAL TRIGEMINAL NEUROPATHY

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Introduction: Trigeminal neuropathy is a severe pain syndrome, which usually involves one or more branches of the Vth cranial nerve with an incidence of 3.4–5.9/100,000 people. Its treatment is a serious problem. *Aim*: The aim of this study is to assess the effectiveness of a complex non-surgical approach for reduction of pain in idiopathic trigeminal neuropathy. *Material and Methods*: The subject of the study is a group of 20 patients with signs and symptoms of essential trigeminal neuropathy. The diagnosis was proved by EMG test, blink-reflex, IgE level. The complex treatment includes drug mono-therapy (carbamazepin) and physical agent modalities: anode blockade with the diphasic modality (100 Hz) of the diadynamic currents for 10 min and ultrasound phonophoresis with Lidocain (0.2 W/sm², 5–10 min). The results were evaluated by the VAS and by the pain attacks regarding their number, intensity, duration, diurnal frequency. *Results*: At the 8th day 90% of the patients received optimal pain relief (no pain in daylight), 10% – very good results (solitary pain attacks throughout the day). At the 9th month 75% of the patients were with optimal results regarding pain, 20% with fair and 5% with satisfactory. *Conclusion*: The complex non-surgical approach including drug monotherapy and physical agent modalities could be a good alternative in the treatment of trigeminal neuropathy.

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PROGRESSIVE SCOLIOSIS WITH FAMILIAL HORIZONTAL GAZE PALSY - CASE REPORTCláudio S.¹, Loff C.², Soares Branco P.¹¹Curry Cabral Hospital, Physical Medicine and Rehabilitation Dept., Lisbon; ²Dona Estefânia Hospital, Physical Medicine and Rehabilitation Dept., Lisbon, Portugal

Introduction: Horizontal gaze palsy and progressive scoliosis (HGPPS) is a rare autosomal recessive disorder, due to ROBO 3 gene mutation on chromosome 11. It is characterized by absence of conjugate lateral eye movement, progressive scoliosis developing in early childhood and adolescence, midline pontine cleft, butterfly configuration of the medulla oblongata, brain stem hypoplasia and absence of facial colliculi. **Aim:** To report a case of HGPPS. **Patients and Methods:** The authors report the case of a 4 years old Portuguese boy seen at the PRM department due to a Progressive Scoliosis and an absence of conjugate lateral eye. For diagnosis purposes x-rays of the vertebral column and a cranial and spinal MRI were performed. **Results:** The physical and neurological examination revealed a dorsal scoliosis, a horizontal gaze palsy and pendular nystagmus. There was a left thoracic scoliosis in the x-ray and in the medullar MRI. The cranial MRI revealed hypoplastic pons, with a midsagittal cleft, absence of the prominence of facial colliculi and hypoplasia of the medulla oblongata with butterfly configuration. The patient is wearing a Boston orthosis and undergoing occupational therapy. **Conclusion:** In this case there were diagnostic criteria for HGPPS. The early recognition of this entity is important to try to prevent rapid progression of scoliosis and to minimize the possible limitations and restrictions caused by visual impairment.

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TRAUMATIC LOWER LIMB AMPUTATION IN A 3 YEARS OLD CHILD: CASE REPORTSousa P.¹, Coelho J.P.², Afonso C.³, Vasconcelos A.³, Reis V.³, Batalha I.³¹Physical Medicine and Rehabilitation Dept., Hospital São João, Porto; ²Physical Medicine and Rehabilitation Dept., Hospital de Santa Maria, Lisboa; ³Pediatric Rehabilitation Dept.; ³Centro de Medicina de Reabilitação de Alcoitão, Portugal

Introduction: Major causes of amputations among children are electric burns, road traffic accidents and machine injuries. Such injuries can have profound and lasting effects on the functional status and quality of life of affected children. Many factors, including the expected skeletal growth, functional demand on the locomotor system and prosthesis, and psychological issues, make caring for these young patients particularly challenging. **Clinical Case:** A 3 year-old girl, victim of a road traffic accident resulting in several important injuries including multiple pelvic fractures with lumbosacral plexus lesion, left lower limb crushing injury and extensive thoraco-abdominal burns. One month after the accident she was submitted to a left hip disarticulation due to lower limb ischemic necrosis. During the first months she was also submitted to several skin graft surgeries. She is now in an integrated rehabilitation program in our Pediatric Rehabilitation Department and presents the following problems: anatomical structural abnormalities of the pelvic ring caused by the pelvic fractures, excessive soft tissue and irregular shape of the pelvic weight bearing surface, areas of retractile and adherent scars

in the thoraco-abdominal region resulting in postural changes and neurogenic bladder and distal right lower limb muscular weakness as a consequence of the lumbosacral plexus lesion. **Conclusion:** The prognosis of these kind of situations has improved as a result of early improved emergency and critical care management, new surgical techniques, early rehabilitation, prosthesis fitting, and new prosthesis design. This clinical case is particularly challenging because of the multiple problems presented by the child requiring an interdisciplinary approach with the intervention of different medical specialties and other rehabilitation professionals. Regarding the complexity of the situation an individualized and well managed rehabilitation program will play a fundamental role in the future of this child.

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CONSTRAINT-INDUCED THERAPY: A METHOD FOR THE HAND FUNCTION IMPROVEMENT IN CHILDREN WITH HEMIPLEGIC CEREBRAL PALSY

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Introduction: Constraint - induced therapy (CIT) is a method used in a habilitation program to improve the function of the affected hand in children with cerebral palsy (CP). **Aim:** The aim of the study was to evaluate the effect of constraint - induced therapy on affected hand function in children with CP. **Patients and Methods:** Thirteen children with CP were included in the study after evaluation of the hand function with Assisting Hand Assessment (AHA). Inclusion criteria were: one-sided or marked asymmetric hand function impairment, age of 18 months to 14 years, ability of a child to understand simple instructions and motivation of child and parents to continue with the program at home. Children had an occupational therapy program for 45 minutes twice a day, 10 days in a row at the hospital setting. Non involved arm was immobilized by an individually made plastic orthosis for the time of therapy. Children were engaged in activities, which stimulated the use of the affected arm. Parents were instructed how to continue the work with their child until the period of 4 months was completed. Children were followed-up with AHA at 2, 4 (at the end of CIT) and 6 months after the first assessment. Analysis of AHA was done by 4 team members, who all finished the AHA educational course. The consensus scores were used for statistical analysis. **Results:** Eight children concluded the whole program. Clinical examination and AHA testing after 4 months of program showed significant improvement in affected hand function. A case of 8 years old boy will be presented in details. He gained 11 points at AHA assessment (statistically significant change). We observed better movement of upper arm and forearm, stabilization with a grip, readjustment of grip, finger movement, coordination of arms and hands, orientation of objects and flow in bimanual task performance. **Conclusion:** Results of a study are confirming our hypothesis that children who regularly use CIT in guided activities achieve better spontaneous function of the affected hand.

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STANDARD UROTHERAPY AND PELVIC FLOOR EXERCISES FOR CHILDREN WITH DYSFUNCTIONAL VOIDING

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Purpose: Some studies have reported on symptom and urinary tract infections (UTIs) improvement in children after using urotherapy programs without EMG biofeedback but the objective data to support these results are missing. The aim of this study was to inves-

tigate the role of standard urotherapy with pelvic floor exercises in children with dysfunctional voiding. *Methods:* Prospective clinical study included 75 children (3–13 years old) who were divided into two groups: urotherapy group (43 patients) was submitted to 6.5 (range 4–14) sessions of urotherapy over a 12-month period while control group did not have urotherapy but was followed for one year. Urotherapy consisted of timed voiding, hydration, optimal posture during voiding and pelvic floor exercises. Constipation and UTIs were treated in both groups (laxatives, antibiotic prophylaxis). Selected children from both groups received pharmacotherapy (anticholinergics or Desmopressin). Uroflowmetry with EMG of the pelvic floor and ultrasound residual urine volumes were obtained before and at the end of the 12 month treatment period. All children have been tested before and 12 months later using empirically designed International Reflux Study modified questionnaire (1, 2). *Results:* After one year of therapy urinary incontinence and nocturnal enuresis were significantly decreased only in urotherapy group while constipation and UTIs were significantly reduced in both groups. Dysfunctional voiding and incontinence symptoms score was significantly improved in both groups. Uroflowmetry parameters such as AFR, PFR, FT, RU and curve shape were markedly improved only in urotherapy group. *Conclusion:* Simple therapeutic program regularly controlled is sufficient in the majority of children with dysfunctional voiding for achieving good results. By curing urinary incontinence, nocturnal enuresis, constipation and UTIs urotherapy with pelvic floor exercises should be the mainstay of treatment for dysfunctional voiding.

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LEAP- LIFESTYLE EDUCATIONAL ACTION PLAN

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This programme involves the recruitment of 12–16 year old obese Maltese children (Body mass index (BMI) >98% centile). During the Summer holidays these children will then undertake a 10 week medically supervised educational programme, that will involve a series of weekly lectures by nutritionists, psychologists and rehabilitation specialists in conjunction with physical activity classes. These physical activity classes have been adapted to take into account the physical limitations of the children yet, at the same time, stress their physical abilities whilst maintaining a high element of fun. Their Body Mass Index will be monitored throughout the whole programme. The Aim of the programme is to instil a lifestyle change to the participants where the importance of proper nutrition and regular exercise is encouraged. Familial involvement is an important aspect and the children's parents are encouraged to attend the lectures and partake in regular exercise with their children outside of the LEAP programme.

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DIAGNOSIS OF CLAVICULAR NON-UNION IN A BASEBALL PLAYER

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Introduction: 29-year-old Japanese baseball player with right shoulder pain. *Aim:* Athlete care, non-surgical treatment, outcomes of recurrent shoulder pain. *Patients and Methods:* Right-handed baseball player from Japan, previous fall onto right side, given shoulder sling in emergency ward, discharged home. Instructed to gradually increase range-of-motion (ROM) as tolerated. Presented to office for second opinion 8 weeks later with aching shoulder pain and clicking when pitching, especially late cocking phase. No neck or radiating arm pain. Denied paraesthesia/weakness. No atrophy/deformity. No bony tenderness, no deltoid/trapezius tenderness. Limited active range-of-motion (AROM) forward flexion (FF) 0–160°, abduction 0–100°, external rotation (ER) 0–30°. Positive painful-arc 8–120°. Positive Neer, negative Hawkins/Speed's. Easily reproducible click with rotation, positive O'Brien's. Rotator cuff strength intact. Neurological testing normal. Differential includes Rotator Cuff Injury, Labral Tear, Instability/Dislocation, Internal Impingement. *Results:* X-rays demonstrated Allman IIB distal clavicular fracture, inferior displacement distal fragment. No callus development. MRI showed large Hill Sachs deformity without Bankart lesion. Rotator cuff intact without tear/degeneration. No labral injury (all images presented). Treatment: Avoid ROM >90° FF/abduction, no combined abduction/ER; no throwing, lifting >5lb, or resistive exercises; increase calcium/vitamin-D intake. X-rays 12-weeks showed no progression/displacement, minimal healing. Pt declined surgery. Applied bone growth stimulator system, nutritionist referral. At 20-weeks successfully avoided surgery, developed callus, began AROM >90°. 22-weeks gentle resistive exercise; 24-weeks throwing activity; return to sport 28-weeks after full pain-free ROM, normal strength, mature callus, proper throwing technique. *Conclusion:* Clavicular non-union should not be missed in evaluation of any shoulder pain patient with remote trauma history. Stress of throwing may place clavicle in compromised position impairing healing. A bone stimulator should be considered by all physiatrists as a potential adjunct. Additional internal impingement diagnosis required education/training on proper technique. The Hill-Sachs indicated dislocation warranting further teaching and specialized rehabilitation. Comprehensive care, including proper nutrition, sport-specific education/training, and medical device use when appropriate, may prevent surgery. The multiple diagnoses of the overhead throwing athlete demand thorough knowledge of sport-specific rehabilitation to ensure good outcome.

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KARATE INJURY PATTERNS - CAN WE 'KICK' THE INJURY BUG?

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Introduction: Injuries are common during martial arts, ranging from concussions, fractures, dehydration. However, prevention plans are often nonexistent during competitions. Furthermore, controversy exists whether beginner or advanced students and males or females are more prone to injuries. *Aim:* Analyze injury patterns, investigate rank, competition type, strike type on injury rate, provide prevention strategy plan. *Patients & Methods:* Annual national karate tournament, involving fighting (kumite), forms (kata), board-breaking (tameshiwari). 150 competitors, white through black-belt. Age, rank, gender, competition-type, injury-time/mechanism analyzed. For prevention plan, kumite required mouthpieces, protective head/hand/foot gear, groin cup; joint taping disallowed; competitors were provided adequate water, frequently hydrated; kata/initial kumite occurred on hardwood, finals kumite on mats; no formal warm-up (competitors warmed-up until felt ready); tameshiwari used 10"×12"×1" white-pine, shuto-strike (knife-hand) recommended. *Results:* Injury incidence: 19/150

(12.7%), all adults (>21years), 5 female, 14 male; 7 green/12 black belts (other belts – no injuries). 8 injured during kumite (most <3min): lacerations, contusions, epistaxis, nasal contusion, interphalangeal dislocation, mallet finger, interphalangeal sprain. No dehydration/concussion/fracture/muscle strain/internal injury/spine injury. Only potentially serious injury (potential nasal fracture) occurred after inadvertent illegal manoeuvre (ridge-hand). No injuries during kata. 11 injuries during tameshiwari (all lacerations, contusions), all on index/middle metacarpals (one 5th metacarpal) during seiken-tsuki (punching). No injuries with shuto (knife-hand). No difference between smaller versus larger board-breaks. Photos of all techniques/strikes included. *Conclusion:* A good team physician not only treats injury, but recognizes competitor injury patterns/habits, and should develop prevention strategies. This study showed: males injured more, countering common misconception that females may be more injury-prone. Black-belts injured more frequently; advanced training doesn't decrease injury risk. Kumite injuries occurred early, possibly from pre-competition excitement/anxiety, or inadequate warm-up period (unlikely as no muscle strains occurred). Foot injuries most common. No injuries during final-rounds, suggesting competitor endurance adequate; fatigue did not pre-dispose to injury. Taping does not prevent injury. No re-injuries of previous condition occurred, suggesting competitors utilized proper warm-up/technique. Tameshiwari knife-hand strike decreased injury risk. Most injuries were index/middle metacarpals, reinforcing proper technique used (decreased 'boxer's' fracture risk). As a result of study, foot protective gear was re-examined and equipment safety monitored in future tournaments; beginning tameshiwari competitors were taught safe striking techniques; pre-fight calming techniques instituted, formal warm-up/stretching was recommended for future competition. Physicians must be proactive to devise strategies/techniques to prevent future injuries.

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ELECTRICAL STIMULATION EFFECT ON MUSCLES ENDURANCE

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Background and Objective: The history of electrical stimulation as a method to affect muscle fibers has its roots in the Greek medical literature. Application of electrical stimulation can change muscle fibers from type II to type I. As a result, the muscle fibers transform into a more fatigue resistance type. This feature probably presents a new method in sport to enhance endurance records in the athletes. The main goal of this research is to evaluate the effect of stimulation usage on athletes' endurance performance. *Materials and Methods:* This study is a clinical trial, interventional study, that was performed on two cyclist groups, each one including 10 male athletes. The range of their age was between 17 and 20 years old. First group received electrical stimulation in conjunction to their routine exercises and the second group; just routine exercises. Record measurement was performed in three stages: before application of stimulations or exercises, after stopping stimulations and 8 weeks after that, naming them 0, 1 and 2 phases respectively. Variable factors in this study included distance, speed, energy consumption index and finally fatigue scale. Data analysis was performed by the help independent t-test and SPSS program. *Results:* Both groups had decrease in speed and distance records at stages (1), (2) in comparison with stage (0). However, these findings were less prominent in group 1. Similarly fatigue level was less prominent in group 1. These differences were significant between two groups, statistically. Energy consumption showed an increase between stage (0–1) and stage (1–2). This increase was observed more dramatically for group 2. However, statistically, this difference was not significant. *Conclusion:* Results of this research showed that use of electrical stimulation prevents decrease in en-

durance until 8 weeks after stopping stimulation. Also it showed decrease in energy consumption and fatigue feeling. However this method has no side effects. Therefore, it may be used as a practical adjacent technology in athletes' pre-events preparation.

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ISOKINETIC ANKLE STRENGTH IN ATHLETICS

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Introduction: Lateral ankle sprain is a frequent injury in sports. Despite of a codified initial treatment, after-effects are frequent and often incapacitate. Evertor weakness may be one of hypothesis of ankle after-effects. Indeed, ankle stability needs co-activation of the antagonists and there is a possible relationship between muscular imbalance, pain, instability, and injuries. *Aim:* To evaluate the evertor and invertor strength of the ankle in different athletic disciplines, taking into account dominant/non dominant foot and previous ankle sprain antecedents. *Patients and Methods:* 40 Athletes, 34 men and 6 women, aged between 15 to 36 years old, runners, jumpers and sprinters, 28 with a previous history of lateral ankle sprain, have been evaluated with a CON-TREX® dynamometer: invertor and evertor strength in concentric at 30°.s⁻¹ and 120°.s⁻¹, and evertor strength in eccentric at 30°.s⁻¹. *Results:* The evertor strength was higher than invertor on the dominant foot. In jumpers evertor strength was lower on the non-dominant foot than on the dominant, and there was no difference between non-dominant and dominant foot in runners and sprinters. However, the evertor strength was lower in non-dominant foot ankles previously injured and when functional signs of discomfort were present. *Conclusion:* In sports, evertor strength increases mainly in the dominant foot. Future studies aimed at explaining the ankle muscular adaptations in sports. The decrease of evertor strength caused by ankle sprain and/or related to functional signs of discomfort is a debate.

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INFLUENCE OF RUGBY ON SHOULDER INTERNAL AND EXTERNAL ROTATORS STRENGTH

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Introduction: In shoulder, rotator cuff balance is essential to maintain stability and ensure permanent centring of the humeral head. There is a possible relationship between muscular imbalance and injuries. In rugby, shoulder injuries are frequent like shoulder instability. Muscular imbalance and/or muscular deficit of the shoulder internal (IR) and external (ER) rotators would intervene in mechanisms of shoulder injury. *Aim:* To compare IR and ER isokinetic shoulder strength between rugby men and non-athletic subjects. *Patients and Methods:* Subjects rugby men (4–7 days/week) were compared with subjects with no antecedent of shoulder injury and no overhead sports, on isokinetic evaluation, in a cross-sectional controlled study. Thirty-nine subjects participated in this study: 19 rugby men (24±4 years, 181±6 cm, 91±11 kg) and 18 non-athlete non-injured controls (NNC) (21±2 years, 180±8 cm, 72±5 kg). Isokinetic shoulder IR and ER strength was evaluated with a CON-TREX® dynamometer, in the seated 45° abducted test position in the scapular plane (Davies position). Angular velocities chosen were 60°.s⁻¹ and 240°.s⁻¹ in concentric mode, and 60°.s⁻¹ in eccentric mode for both shoulders. *Results:* In rugby men, the comparison between dominant and non-dominant

side showed higher IR values for the dominant side, and higher ER values for the non-dominant side. In absolute strength, the comparison between rugby men and NNC showed higher values for the rugby men ($p < 0.05$ at all angular speeds). In strength indexed by weight, the comparison between rugby men and NNC showed higher ER/IR ratios of dominant side for the rugby men, and higher ER/IR ratios of non-dominant side for the NNC. *Conclusions:* The shoulder strength was higher on the rugby men. In this group, IR strength was higher on the dominant shoulder and ER strength was higher on the non-dominant shoulder. These results raise questions about the influence of sports discipline on the ER/IR ratio and their consequences on the risk of injury.

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DYSFUNCTIO POSTURALIS IN SCHOOL CHILDREN - CASE REPORT FROM RURAL 'CUKARICA', BELGRADE, SERBIA

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Introduction: There is increasing number of school children having dysfunctio posturalis, scoliosis, pedes plana but on the other side there is decreasing number of school children having regular physical activity. *Aim:* The objective of this case report is to present the situation in primary schools of the rural part of 'Cukarica' municipality in Belgrade, Serbia. *Method:* 1,200 school children from 5 primary schools, ages 8, 10, 12 and 14 years were examined by specialist of physical medicine. The data were collected about the practicing of sport and the amount of time spent with PC. *Results:* 840 (70%) of examined children had dysfunctio posturalis. Out of this number, only 7 of them (less than 0.1%) practice some sport. The rest - 833 didn't practice any physical activity, the total free time spent with PC. 165 of them are obese (close to 20%). 360 (30%) had normal posture, well developed musculature, no scoliosis. Out of that group 290 have regular physical activity (3-5 times per week, 1-2 hours - swimming, athletics, dancing, basketball). *Conclusion:* Regular physical activity, less time in front of PC, well balanced nutrition provides regular growth and development. The children of the rural parts of Belgrade's municipalities have a problem where to practice sport, none of the schools have a sport facility. Physical medicine specialist in the primary health care center is vital part of the team in prevention of dysfunctio posturalis in school children. His/her role is to emphasize the importance of sport possibilities development in the rural parts of the city as well.

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BIOMECHANICAL ANALYSIS OF THE FEMUR BY EXTENSOMETRIC MEASURE

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Introduction: Fractures of the trochanterian region are very common in orthopaedic surgery. The increase of life expectancy in developed countries induces an ineluctable increase of the impact of fractures of the upper end of femurs. The mechanical strains while walking are very important. In the United States, the annual number of fractures of the upper extremity of femurs is estimated at 240,000 and in Europe 1,700 fractures are reported every day [1]. Moreover, the fracture of the upper end of the femur is a significant factor of overmortality [2]. *Aim:* The objective of the present study was to develop an experimental test which permitted to charge the human femur in physiological requests in order to model the bases of the mechanical behavior of the femur in spite of the significant anatomical differences between the femurs, and to evaluate the

orders of sizes and the orientation of the main strains on the surface of the human femurs under given static loading. *Methods:* The experimental tests have been carried out on five pairs of fresh femurs (N=10) requested in their natural physiological conditions corresponding to the position a human being standing on one feet. The analysis by extensometry by rosette strain gauges, positioned in annular position on three levels: trochanterian, subtrochanteric and diaphysial, with 4 gauges on each level, enabled us to determine the evolution of the distribution of the principal strains on the surface of the human femur. *Results:* For each localization, the mean value and standart deviation of the principal strains have been calculated. The results showed that at all levels (i.e. trochanterian, subtrochanteric, diaphysis) the orientation of the principal strains is made in a privileged direction for all femurs. The femur behaves like a beam charged in flexion compression. The greatest diaphysic strains are observed in the top of the femur. A preponderance of the components in traction exists at the external level whereas the components in compression are found on the internal level. This study permits a better understanding of the distribution of the strains on the surface of a femur which is submitted to a statical stress according to its mechanical axis.

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THE RELATIONSHIP BETWEEN SELF-ESTEEM AND PHYSICAL FITNESS AMONG STUDENTS OF TABRIZ UNIVERSITY

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Introduction and Aim: It is assumed that initial involvement in physical activity increases physical ability which raises physical self-evaluation and leads to higher levels of overall self-esteem. Thereby, to examine mentioned theory current study has been done. *Patients and Methods:* 468 Students in B.S. degree regardless of their disciplines were studied in this descriptive research. We selected samples with systematically random method. Fitness tests of Tabriz university including: sit up, 49 m running, 100 m running, 1600 m running for males and 800 m for females, pull up, trunk flexibility and high jump, were used for measurement of fitness level. For self-esteem measurement we used Coopersmith self-esteem inventory. *Results:* After collection of data regarding personal characters, physical fitness and level of self-esteem, we analyzed data with T-Student and Pierson regration. At last we obtained following results: there was a significant relationship between self-esteem and physical fitness of the subjects ($p \leq 0.01$). No signification difference was obtained between male and female students in terms of self-esteem ($p \leq 0.05$). There was a significant difference between athlete and non-athlete self-esteem. ($p \leq 0.01$). *Conclusion:* According to findings of this research, regular physical and sport activities can enhance self-evaluation and self-esteem of young people.

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MAXIMAL ISOMETRIC STRENGTH MEASUREMENTS OF CERVICAL SPINE FLEXORS AND EXTENSORS USING HANDHELD DYNAMOMETER

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Introduction: We sought to determine whether or not a handheld dynamometer is a good tool for assessing the maximal isometric strength of cervical spine flexors and extensors. *Material and Methods:* In this prospective test-retest study in thirty healthy subjects, we implemented two different protocols using a Microfet 2 handheld dynamometer: a self-test and an evaluator-performed test. *Results:* With self-testing, we found a typical muscle profile, with mean values of 170.4 Newtons (N) in flexion and 237.8 N in

extension and a standard error of measurement (SEM) of 22.3 N and 25.3 N, respectively. The intraclass correlation coefficients (ICCs) and confidence intervals (CIs) are good for both flexion (ICC: 0.865; CI: 0.735 to 0.933) and extension (ICC: 0.846; CI: 0.702 to 0.924). With an evaluator, we obtained mean values of 95.5 N in flexion and 85.5 N in extension, with an SEM of 14.5 N and 10.8 N, respectively. Here, with an inverse flexor/extensor strength ratio, the reliability / reproducibility results were poorer. Despite a good ICC for flexion (0.800) and an adequate ICC for extension (0.634), the observed CIs were too wide (0.613 to 0.902 in flexion, 0.348 to 0.812 in extension), especially in extension. **Conclusion:** Self-testing with a handheld dynamometer enables easy, reliable and reproducible measurement of maximal isometric strength for cervical spine flexors and extensors. This protocol could be used in a population of healthy rugby players to establish a frame of reference for muscle strength, as part of longitudinal medical follow-up and for recovery from cervical spine sports injuries.

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CERVICAL ROOT LESION AND PERIPHERAL NERVE INJURY IN IRANIAN WRESTLERS

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Wrestling is one of the most involved sport in sports injuries. Because of increasing number of wrestlers in IRAN as a native sport, and lack of a scientific study on prevalence of cervical root lesion and associated peripheral nerve lesions, we decided to study prevalence, type and involved root of cervical radiculopathy and also associated predisposing factors in 40 wrestlers of 36–63 year age and at least 10 years of wrestling carries. This study was the cases under taken in Tehran – Iran were examined clinically and then by electrodiagnostic study and finally referred for cervical spine MRI. Following results were obtained by electrodiagnostic studies in 40 persons and MRI in 21 persons. About 45% of patients studied by electrodiagnosis had cervical radiculopathy. 100% of patients studied by MRI were reported by a radiologist to have cervical spine involvement as follows: Degenerative changes=61% Disc protrusion=28% Cervical canal stenosis=19%, Disk extrusion=9% The most common involvement in electrodiagnostic study was bilaterally C6 root lesion. The most common involved level in MRI was C5–C6 disc. There was no statistically significant correlation between root lesion and previous nerve injury, age of the athlete and years of wrestling carries. Based on this concept that electrodiagnosis is the most specific test, MRI was calculated to have 41.6% specificity in evaluation of cervical root lesion. 27% of cases had associated peripheral nerve lesion of upper limb, among these bilateral carpal tunnel syndrome (15%), tardy ulnar palsy (12.5%) were most prominent. There was high statistical correlation between ulnar nerve lesion and previous elbow injury. 54% of patients had concomitant peripheral nerve injury and cervical root lesion (Double crush syndrome).

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EVALUATION OF MENARCHE AGE AND THE RELEVANT FACTORS IN IRANIAN FEMALE ATHLETES

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Introduction: Correct prediction of menarche age in girls brings about the ability to offer them the necessary information in the

appropriate time and to prepare them for the changes they will experience in this period. In Iran, there are no available data in this regard yet. The results of this study may be used in proper education and training with consideration of menarche age. **Methods:** This cross-sectional descriptive study has been performed on 629 girls of 24 provinces of Iran. The data gathering form included the following items: precise age at menarche; past history of disease (s); and the information regarding the place of living which was filled out with the help of the case herself and also one other family member. The stage of maturity regarding telarche and pubarche, percent of body fat and the relevant data were entered based on history taking and physical examination. For predicting menarche age in the cases, linear regression model was used. Helsinki was promised in all stages of the study. **Results:** In the 454 cases that were passed menarche age, mean of age at menarche was 158.2±0.7 months. The means of menarche age in their other family members were as follow: for grand mothers 12.9±0.25 years; for mothers 13.6±0.14 years; for the greatest sister 13.7±0.13 years; the second sister 13.7±0.15 years; the third sister 13.6±0.23 years; the fourth sister 14.2±0.21 years; the greatest maternal aunt 13.4±0.21 years; the second one 13.4±0.25 years; the greatest paternal aunt 13.5±0.25 years; and the next one 13.4±0.26 years. Earlier menarche was reported in: 1-lower height ($p<0.001$), 2-lower age at beginning exercise ($p=0.019$), 3-lesser number of sisters ($p=0.007$), 4-lesser number of brothers ($p=0.003$), 5-higher percent body fat ($p=0.037$), 6-higher body mass index ($p=0.002$). 7-residing mountain side regions ($p=0.001$). The regression model showed that the menarche age was predictable based on these variables: current height of the case ($p<0.001$); height of the place of living from the sea ($p<0.001$); number of brothers ($p=0.006$); number of sisters ($p=0.008$) ($p=0.001$, R square=0.99). **Discussion:** Comparing the mean menarche age in grandmothers as the oldest generation to that of mothers and aunts as the middle, and the cases and their sisters as the youngest generation in this study showed an increase in age at menarche in the younger generations.

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REHABILITATION AND EXERCISE THERAPY IN SPECIAL DISEASES

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Chronic conditions are a major problem in developed countries today. Management of chronic diseases like diabetes and renal diseases and also congenital hematological problems like thalassemia and hemophilia comprise an important area of challenge in medicine. Making a healthy, joyful and independent life is the main goal of rehabilitation of these patients. Knowledge about pathophysiology and about chronic complications of these diseases is the first step in planning their management, rehabilitation and exercise therapy. The important considerations will be reviewed. Frequent problems in these diseases may cause inactivity and dependent life style. One of their biggest problems is chronic pain which needs special attention towards psychological issues (depression and anxiety), so behavioral treatment and solving sleep disturbances may come important. Other problems may be categorized as musculoskeletal pain (myofascial pain syndrome, fibromyalgia and chronic fatigue syndrome). Diabetes mellitus, chronic renal failure and neuropathy are ranked in the top list for rehabilitation. Especially diabetic patients need special attention for their acute and chronic painful problems. Many psychological problems of chronic diseases may be controlled by scientifically programmed regular exercise. Regular physical activity is an important component of a healthy lifestyle in these patients. Physical activity and cardiorespiratory fitness will decrease mortality of these diseases. More recently, the Center for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM) suggested that the focus be broadened to address the needs of more sedentary individuals, especially those who can not or will not engage in structured exercise programs.

Based on the above mentioned considerations, scientific exercise programs will be written for each patient individually to address his/her condition and needs. Aerobic conditioning, Resistive exercise, Cardiopulmonary function rehabilitation, and Flexibility exercises comprise the main components of an exercise program. Exercise prescription should address the following components: 1 – mode, 2 – intensity, 3 – duration, 4 – frequency, 5 – progress. The program will be offered based on the patient's age, his/her physical condition and his/her compliance. As for special diseases like diabetes mellitus or chronic renal failure, accompanying conditions for example cardiovascular diseases, neuropathy and hypertension should be considered important in planning exercise. In hematological conditions like thalassemia and hemophilia tissue oxygen delivery is affected by both of concentration and kinetics of hemoglobin. So, exercise programming should be suggested cautiously. Choice of sports for patients with congenital bleeding disorders should be based on enjoyment with some consideration for avoiding serious injury. In conclusion, therapeutic exercise is a vital component of patient intervention and is a core element in the care of patients with dysfunction. Applying appropriate exercise prescriptions based on physiologic response to exercise and the principle of specificity of training will ensure appropriate training response and minimize signs and symptoms of chronic patients.

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REVERSIBILITY OF ACHILLES TENDINOSIS VIA ECCENTRIC TENDON TRAINING: CLINICAL AND ULTRASONOGRAPHIC FOLLOW-UP IN AN ACTIVE TOPATHLETE

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Introduction: Achilles tendinopathy has generally been considered as a difficult to treat degenerative process caused by tendon overuse. Recently, aside from good clinical results of eccentric training, structural tendon healing as well has been described in patients with chronic Achilles tendinosis. This was documented in less active patients with an average of 50. **Aim:** This case report demonstrates for the first time the structural reversibility of a symptomatic Achilles tendinosis in an active top athlete via eccentric tendon training. **Patients and Methods:** The patient, described in this case, is a 25-year-old, professional, female Belgian athlete, active in the 100 and 200 m sprint. In 2003 this patient suffered training and competition limitations caused by the development of achillodynia at the left side. Ultrasonographic evaluation showed an Achilles tendinosis zone with a maximal thickness of 7.8 mm a few centimeters proximally of the calcaneal insertion. The therapy consisted of daily eccentric tendon training, whilst her training and competition demands were maintained and even progressively enlarged in function of the athlete's goals. **Results:** The clinical improvement via intensive eccentric tendon training was accomplished in a relatively short period. Moreover also serial ultrasonographic evaluation – each time done by the same experienced musculoskeletal radiologist – demonstrated a gradual structural healing of the Achilles tendinosis with normalisation of the tendon structure in 2007. These results were paralleled by great accomplishments on European, world and Olympic championships. **Conclusion:** This case report shows that in an active athlete structural normalisation of Achilles tendinosis is possible via daily eccentric tendon training. This structural healing occurs notwithstanding the high training and competition demands of a professional athlete. This enforces the idea that tendinosis can not be considered as a degenerative and irreversible process.

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BIOCHEMICAL MARKERS AND TRACE ELEMENTS IN CARDIORESPIRATORY PHYSICAL ACTIVITY

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Introduction: The general physical activity, programmed with a clear intention constitutes a reference process in Physical Medicine and Rehabilitation. **Aim:** Correlate modifications of biochemical markers and trace elements produced by programmed cardiorespiratory physical activity in healthy individuals trained with 3 different tests, one of them, with 2 modalities: Aerobical Resistance (AR), strength resistance test (SR) and maximum overload test (MOUltraMarathon, MORugbyMatch) **Patients and Methods:** Groups: 1) (AR) 22♂ long distance race (40') with a cardiac frequency \pm 5 beats per minute related to Anaerobical threshold; 2) (SR) 16♂ two repetitions being 40 % of maximum strength, one circuit of Press banca, quadriciceps exercise, thorax dorsal pulley, hamstrings press exercise, triceps high pulley, Curl with bar, nape press and rowing with low pulley; 3) (MOUM) 5♂ and 4♀ ultramarathon (100 km); 4) (MORM) 26♂ Rugby pro-league. Before and after the tests: Zn²⁺ and Cu²⁺ levels in blood and urine. Fe²⁺ in blood (Perkin Elmer photoespectrometry) CPK, LDH, Transaminases, proteins in urine, leukocytes total count and neutrophil count. **Results:** Reduction of blood [Zn²⁺] and increase of blood [Cu²⁺], urinary depletion of Zn and the appearance of proteins in urine. The relation between [Zn²⁺] [Cu²⁺] is an evidence and sign related with endurance and overloaded physical activity. **Conclusion:** We can affirm the modifications of the main values measured ([Zn²⁺] [Cu²⁺] CPK, LDH, Transaminases, proteins in urine, leukocytes total count and neutrophil count) in the 4 tests, statistically significant in most of the items in SR and MORM groups. Correlation produced between biochemical markers, trace elements and physical exercise depends on the following facts: intensity, kind of exercise and load of cardiorespiratory physical aerobic activity.

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A NEW CONCEPT OF DYNAMIC NEUROMUSCULAR REPROGRAMMING USING HUBER® DEVICE

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Introduction: The neuromuscular reprogramming remains the more important phase in the rehabilitation treatment of the knee joint instabilities. The techniques to improve the proprioception did not evolve since the invention of the pulley-therapy and of the Freeman platform. Today, it seems that motor coordination training using a motorized oscillating platform (Huber® device) could represent a real innovation in this domain. The goal of our work is to optimize the neuromuscular reprogramming and to favourise the return to the socio - professional and sports activities. **Material and Methods:** The Huber® device, produced and distributed by LPG Systems France, generates a permanent adaptive regulation of the joint protection while soliciting preferentially the proprioceptive system. This new procedure also allows the patients to carry out a double task exercise protocol and to solicit mainly the tonic muscles. During the post-surgical or post-traumatic rehabilitation of the knee instability the neuromuscular reprogramming is practiced on the

Huber device as soon as the patient could put again his foot on the ground. Initially, the plateau oscillates slowly and with a low amplitude and the exercises are not difficult. Then, there is a progressive increase of the parameters in order to attain a maximum level towards the end of the rehabilitation programme. *Discussion:* The Freeman platforms, extensively used for the knee joint traumas, produce motor programs that are not adapted because based mainly on the visual and vestibular system. On the other side, the rehabilitation programme using stable platforms seems to solicit mainly the somesthetics afferents inputs. This type of rehabilitation programme is more effective but more limited and more separated from physiology. In fact, all the traditional techniques have the inconvenience to realize an isometric workout at the knee level. *Conclusion:* Today, we think that the rehabilitation devices with motorized platforms used for the motor coordination correspond best to the management of the neuromuscular reprogramming of the inferior limb. This concept satisfies us totally and we think that these new device (Huber®) represent, finally, an evolution in the neuromuscular reprogramming.

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STRESS FRACTURE OF THE 8TH RIB IN A PROFESSIONAL DANCER – CASE REPORT

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Introduction: Stress fractures of the ribs are not uncommon in rowers, but there are very few cases reported in other activities. The first rib is most commonly affected, with fewer publications addressing stress fractures in another rib. *Aim:* To present a clinical case of a stress fracture of the 8th rib in a professional dancer (oriental dances), distinctive because it involves an activity not previously reported and a fracture site on the anterolateral side of the rib. *Patients and Methods:* A female professional dancer presented with intense right sided chest pain, for 8 weeks, with onset coincidental with increase in training intensity before participation in European tour. The patient had already recurred to an emergency room without clinical improvement or diagnostic conclusion. *Results:* At our consultation, intense pain at palpation of the 8th and 9th ribs was noted and a stress fracture was suspected. A bone scan and a CT-scan confirmed the diagnosis. The patient endured in a rehabilitation program and the pain disappeared. *Conclusion:* Stress fractures may occur when muscle weakness or fatigue causes a redistribution of forces that result in microtrauma to the underlying bone. Also, muscle contraction can generate strong forces along the surface of the bone, with the stress fracture occurring where the bending stresses are maximal. In our case, the activation and repetitive contractions of the external oblique abdominal and serratus anterior muscles resulted in significant stresses being placed upon its insertions along the 8th rib. The diagonal movement that characterized our patient's motion pattern justified the fracture localization on the anterolateral aspect of the rib.

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ACCELERATED REHABILITATION AFTER SURGERY FOR ANTERIOR CRUCIATE LIGAMENT LESIONS IN ACTIVE PATIENTS

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Introduction & Purpose: The goal of this research is to evaluate the effectiveness of the accelerated rehabilitation in cases of complete lesions of the anterior cruciate ligament of the knee, which have been operated. *Material & Method:* The research involved 50 young patients with this type of lesion operated within the first year after the trauma, arthroscopically, using bone-tendon-bone technique. The patients were blind divided in 2 equivalent groups as for mean age, sex ratio and mean delayed time to operation. First group underwent the normal rehabilitation program and the second group underwent the new, accelerated rehabilitation protocol. The evaluated parameters included the circumference of the knee and thigh, the active and passive knee range of motion, the strength in the flexor and extensor muscles of the knee and the knee stability. The tests were performed before and after the rehabilitation treatment. *Results:* For the group 2 it was obtained a significant improvement in all the parameters examined, with an exception in the stability of the knee, which was not statistically significant. *Conclusions:* The accelerated rehabilitation treatment after operated lesions of the anterior cruciate ligament of the knee has a significant importance in the dynamic stability of the joint (ROM, strength), but the passive stability is not improved in the same way. For active persons the treatment of choice after ACL lesions should be surgery followed by accelerated rehabilitation.

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REHABILITATION OF THE ACHILLES' TENDON INJURIES

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Aim: The aim of this work is an analysis of medical rehabilitation results after Achilles' tendon injuries at patients treated in the Ribarska Spa during the period from 2005 to 2007. Forty-six persons with ruptured or sectioned Achilles' tendon were rehabilitated during that period. Most often the injuries were caused by a sudden and strong jerk of the leg – 31 patients (67.4%); left Achilles' tendon was injured more often – 28 cases (60.9%). There is a large number of male patients – 35 (76.1%), with an average of 38 years of age. These are persons of various professions; there were no active sportsmen among them and most of the injuries happened during their daily physical activities and rarely during recreation. Twenty two patients (47.8%) were treated in the orthopedically conservative way and 24 (52.2%) have operation, six of them after a longer period of conservative treatment. Cast immobilization was applied to all of the patients. Stationary treatment in our institution lasted averagely for 27 days. In order to objectivise the results of the medical rehabilitation, we measured the movement. Rate of the ankle and evaluated muscle strength of the injured leg's musculature in accordance with MMT, before and after application of the balneal physical treatment. Thirty two persons (69.6%) were fit for work after the cure and to 14 patients (30.4%) it was suggested to continue the rehabilitation in ambulatory conditions. *Conclusion:* It is most important to prevent injuries. If it comes to an injury of the Achilles' tendon, an organized and strictly individual operative cure is important, because it is the best and quickest healing method of the Achilles' tendon rupture. After removing the immobilization, it is necessary to proceed with continual and individual medical rehabilitation,

carefully at first, intensively later on, as well as to wear orthopedically adequate foot wear for a certain period of time. Since there is a possibility of bad cicatrisation and consequent hypotrophy of the injured leg's musculature, the physical therapy treatment should last long enough.

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PATELLAR DISLOCATION – A DIAGNOSIS AND REHABILITATION PROTOCOL

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Acute patellar dislocation accounts for 2% to 3% of all knee injuries and is the second most common cause of traumatic hemarthrosis. Its annual incidence ranges from 7 per 100,000 to 43 per 100,000, depending on age and patient population. Depending on the study, 30% to 72% of dislocations can be expected to be sports related and 28% to 39% of these injuries will have associated osteochondral fractures. This injury may occur when patients with normal anatomy are exposed to direct high energy forces, but most studies find that it occurs more commonly when patients with abnormal anatomy are exposed to indirect forces. It can cause patellar instability, pain, recurrent dislocations, decreased level of sporting activity and patellofemoral arthritis. The authors present a patellar dislocation protocol of diagnosis and rehabilitation according to a review of the literature.

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THE INTERDISCIPLINARY TEAM FOUNDATION OF THE PERFORMANCE TRAINING

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Introduction: In the international context of the performance and high performance sport we can't speak about the increase of the level of performance without taking into consideration the interdisciplinary team which represents the foundation of the sportsman's training. The athletics department of CSM Pitesti, as a youth department, doesn't have many members from the team we have just spoken about. That is why the lack of the sportsmen's performance can be justified with the increased need of real specialists like: physical trainer, kinesitherapist, psychologist, etc. *Aim:* The aim of the research was to improve the physical performance by using both the kinesi and the physical training means. *Content and Methods:* This research is in fact a study of a medical consent of a trainee (triple jump) and mostly a study on her medical recommendation made by INMS Bucharest. From her medical consent we evidenced the following aspects that we wanted to improve: – Thorax elasticity; – The left lumbar curvature; – The asymmetry of the inferior members; – The lumbar mobility. As specialists in sports and sports medicine and taking into consideration the financial possibility and the equipment that our athletes from CSM Pitesti use during the training hours, we based our experiment on conceiving some schedules of exercises which have the aim of increasing the thorax elasticity, the mobility of the lumbar spine and which can create an equilibrium between the anterior and posterior muscles of the body. We also recommended a daily use, both during the training hours and during the rest of the day, of a support which can upraise with 1 cm the shorter leg. *Results and Conclusions:* After a period of six months' exercises we ascertained: – An increase of thorax elasticity from 7 cm to 12 cm; – An increase of lumbar mobility from 5 cm to 25 cm; – The elimination of lateral oscillation due to the asymmetry of the inferior members by using a 1 cm support; – The disappearance of lumbar curvature by using the support. All these, together with the physical training, contributed to the increasing of the

sport performance of the trainee with 40 cm during the contest in which she took part.

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THE EFFECT OF PAIN-FREE TREADMILL TRAINING ON FIBRINOGEN, HEMATOCRIT, LDL AND HDL CHOLESTEROLS IN PATIENTS WITH CLAUDICATION

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Introduction: Chronic ischemia of lower limbs may result from not only atherosclerotic stenoses but also from rheological abnormalities such as increased blood viscosity. Arterial blood flow may also be impaired because of decreased endothelium-dependent vasodilation. Patients with claudication may have increased blood viscosity caused by elevation of hematocrit and plasma fibrinogen. The elevated level of LDL cholesterol, leading to impaired function of endothelium, has also been observed in this group of patients. *Aim:* To assess the effect of pain-free treadmill training on changes of plasma fibrinogen concentration, hematocrit, LDL, HDL cholesterol levels and walking ability in patients with claudication. *Patients and Methods:* Sixty patients with peripheral arterial occlusive disease and intermittent claudication (Fontaine stage II) were randomly assigned into the treadmill program or a control group. The patients in exercising group were exercising 1 hour on the treadmill (repetitive intervals to 85% of the pain-free walking time), 3 times a week for 3 months. Patients in the control group were asked to maintain their usual level of activity. *Results:* The LDL cholesterol level in the exercising group significantly ($p < 0.05$) decreased by 21.7% (from 4.15 to 3.25 mmol/L) and HDL cholesterol level significantly ($p < 0.05$) increased by 14.6% (from 0.96 to 1.10 mmol/L) in the training group but changes of both LDL and HDL were insignificant in the control group over the 3 months. Pain-free walking time was prolonged by 109% and maximal walking time increased by 54% in the exercising group ($p < 0.01$), whereas no significant improvement in the above walking variables were observed in the control group. *Conclusion:* It is concluded that improvement in walking time over 3 months of pain-free treadmill training is associated with progressive normalization of LDL and HDL cholesterol levels in patients with claudication.

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P223

STRATEGIES OF POST-EXERCISE RECOVERY – THE VALID CRITERION FOR ASSESSING FATIGUE AND RECOVERY

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Introduction: The majority of available literature suggest that active recovery is most effective in removing muscle fatigue. Different experimental protocols and criteria used for the recovery process evaluation in some studies may be the reason that observed results are often non-homogenous or conflicting. *Aim:* To assess the influence of different relaxation modes: stretching (ST), active recovery (AR) and passive recovery (PR) on muscle relaxation after dynamic exercise of the quadriceps femoris. The other purpose was to compare the protocols used in this and the other published recovery studies in order to suggest the most appropriate rationale for use of certain type of fatiguing exercise, and valid criterion for

assessing recovery effectiveness. *Subjects and Methods:* 10 male volunteers (24–38 years) following warm-up (5 min of cycling at 30 W) performed 3 sets of dynamic leg extension and flexion at 50% of previously determined Maximal Voluntary Contraction (MVC), with a 30 sec rest between sets. After completing the above leg exercise AR (light pedaling on the cycle ergometer (10W) at 60 rpm for 5 min), PR (passive rest for 5 min) or ST (5 min of postisometric relaxation) was applied. Then subjects performed isometric knee extension at 50% of MVC to the point of fatigue when surface electromyogram (EMG) was measured. *Results:* The post-AR mean MVC was significantly ($p < 0.05$) higher than post-PR and post-ST. No difference in MVC between AR and baseline was observed. There was no significant increase in the activation of motor unit in both post-PR and post-ST, but significant ($p < 0.05$) increase was noted post-AR. *Conclusion:* Our findings confirms previous suggestions that the light active exercises appears to be most appropriate mode of recovery after dynamic leg muscle fatigue. The fatiguing exercise and protocol used in this study seem to be appropriate, and MVC and EMG valid criteria for recovery assessment in similar future research.

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HIP RESURFACING ARTHROPLASTY FOR THE YOUNG AND ACTIVE PATIENTS

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Introduction: Resurfacing arthroplasty is an attractive option for young and active patients, not only to relieve pain and improve function but also to meet the high physical demands. It is the less aggressive method which respects more the articular anatomy, biomechanics and proprioception. *Material and Methods:* We present 44 patients undergoing resurfacing hip arthroplasty (two of them bilateral, all of them operated by the same surgeon, the minimum follow-up was 3 months (3–24 m), the selection criteria were: pain, inability to activities of daily living, good bone quality based upon radiological criteria, the age less than 65 in males and 60 in females. Prior to the intervention patients are informed of the advantages and disadvantages as well as the rehabilitation programme to follow. For evaluating the functional outcomes we used the Harris' scale and the Lyshom scale to the sporting activity. We describe the complications and evolution as well as the rehabilitation programme 24 h following surgery. *Results:* Average hospital stay 3.88 days, the functional evaluation was good or very good, return to laboral activity at 5 months and less than 4 months for sport activities. Three neck fractures and one tendinitis psoas were the complications. *Conclusions:* Hip resurfacing is a good option for young patients. Respect more the anatomy, biomechanical and proprioception. If the patient needed a replacement, could seen as a first intervention and only having to replace the femoral stem.

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USING MODELING METHODS TO STUDY INJURY MECHANISM OF THE LOWER LIMBS DURING VOLLEYBALL SPIKE MOVEMENT FOR FEMALE PLAYERS

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Introduction: Most of the lower limb musculoskeletal injuries in volleyball are happening during jumping or landing movements

in spiking (1). The most frequently injured joints are the knee and ankle, and most of the studies focused on several biomechanical aspects as joint kinematics or peak vertical reaction forces (2, 3). Hewett (4) reported that knee injury rates are three to four times greater for female athletes. *Aim:* To provide a better understanding about the mechanisms contributing to the female volleyball athletes joint injuries during spike movement. *Patients and Methods:* Six female college high performance volleyball players executed 5 times, spike jumping and landings on a contact pressure platform (footscan plate 0.5 m, RSSCAN). Lower limb joint kinematics was recorded and analyzed using SIMI Motion software. The peak pressure distribution on feet was also recorded for both jumping and landing movement using footscan gait scientific and balance software (RSSCAN). A computational model for the lower limbs were developed using Anybody software, and the specific kinematic, pressure distribution and body weight were input for every athletes. Muscle forces and joint moments and reactions were computed for ankle and knee joints. *Results:* Comparing the computed data between players resulted in an increased stress at knee joint and a higher peak of ground reaction forces for a reduced thigh muscles activity. *Conclusion:* To reduce knee injuries at knee joint level, female athletes may need special exercises to increase and balance thigh muscle strength.

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A BIOMECHANICAL VIRTUAL MODEL OF THE SHOULDER USED TO STUDY INJURIES DURING VOLLEYBALL SPIKE MOVEMENT

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Introduction: The relation between extreme angles of the shoulder joint and muscle injuries are not fully understood for the spike movement in volleyball. Previous research has suggested that reactive muscle recruitment strategies are varying to preserve joint integrity (1–3). A research that quantifies the importance of muscle recruitment level for glenohumeral stability at different angle during the spike movement is necessary. *Aim:* To provide a better understanding about the mechanisms contributing to the volleyball athletes shoulder injuries during spike movement. *Patients and Methods:* Six female college high performance volleyball players executed ten times, spike movement and the upper limb joint kinematics was recorded and analyzed using SIMI Motion software (SIMI Reality Motion Systems). A computational model for the entire body was developed for every athlete, using Anybody software (Anybody Technology A/S), and the specific kinematics as velocity and angles were input for upper limbs. Muscle forces and joint moments and reactions were computed for shoulder joint. *Results:* The anterior deltoid and supraspinatus muscles are activated together during volleyball spike to elevate and place the humerus; the infraspinatus and teres minor muscles are activated during movement of the arm in an overhead position. *Conclusion:* The aim of this study was to develop a virtual model of the musculoskeletal system that can be used to perform inverse kinematics for volleyball spike under training conditions and to

investigate the shoulder muscle activity. The recorded movements were simulated with high accuracy on Anybody model. We can conclude the developed numerical model could be used to improve the personal performance by finding an optimal technique and help to avoid, by virtual simulation, the extreme movements that can produce injuries.

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FUNCTIONAL REHABILITATION IN REPETITIVE ANKLE SPRAIN

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Introduction: The ankle is the most frequent place for musculoskeletal trauma. Sprains represent 75% of ankle trauma. **Aim:** The aim in functional rehabilitation in patients with repetitive ankle sprains is to obtain a stable ankle and prevent a new injury. **Patients and Methods:** Over a period of 2 years, there were treated 56 patients with ankle sprain in the Posttrauma Rehabilitation Unit – 2nd Orthopedics - Traumatology Department from Timisoara, patients with ages between 14–36, 23 of them with repetitive sprain. The functional reeducation was performed in the acute phase according to the RICE principle (rest, ice, contention, elevation), followed by a proper rehabilitation program, in conformity with the objectives wanted. The assessment of the rehabilitation program efficacy was made using the Ferretti assessment grid with the following interpretation: 100–90: excellent result; 80–90: good result; 70–75: poor result; <70: extremely poor result. **Results:** Patients who began the rehabilitation program immediately after injury obtained an excellent/good results, but those with ankle sprain history, who not followed a functional rehabilitation treatment, or the treatment was not properly conducted, had poor results, owing to the lateral instability syndrome, cause of the repetitive sprains. **Conclusions:** The early mobilization is efficient in ligament healing, neuro-proprioceptive reeducation, obtaining an stable ankle, preventing new injuries. Early mobilization, reducing the immobilization period, represent the key for success in repetitive sprain prevention.

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ULTRASOUND (US) WITH KETOPROFEN VS. IONTHOFORESIS WITH KETOPROFEN IN THE TREATMENT OF EPICONDYLITIS

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Introduction: Pain disorders in elbow region is often a reason of the movement constraint. The enthesopathy is one of the most common reasons of this disorder. **Aim:** We focused on two similar enthesopathies – the affection of the epicondylus lateralis and medialis humeri. The physical examination and the interview with the verbal scale of pain were used to assess the effectiveness of the therapy. **Material and Methods:** Twenty patients diagnosed with epicondylopathy were treated with ultrasound with ketoprofen and twenty were treated with ionthoforesis with ketoprofen. **Results:** The data of the clinical examination (objective assessment) and the interview (subjective assessment) were collected separately. We show these effects separately regarding the subjective and objective symptoms. For the verification of the therapeutical ef-

fectiveness of therapy in the treatment of epicondylopathy we used the exact Fisher's test. Ultrasound (US) with ketoprofen and ionthoforesis with ketoprofen show therapeutical effectiveness in therapy of enthesopathy of lateral and medial epicondylus. **Conclusion:** Ultrasound (US) with ketoprofen and ionthoforesis with ketoprofen show therapeutical effectiveness in therapy of enthesopathy of lateral and medial epicondylus. The effectiveness of ultrasound (US) with ketoprofen was higher. This could be statistically proved. The experiment has been performed within the scope of statutory research (Ds-81) financed from the Warsaw Academy of Physical Education funds.

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PHYSICAL ACTIVITY – AN IMPORTANT BENEFIT FOR PATIENTS SUFFERING FROM DIABETES MELLITUS

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Introduction: Diabetes mellitus is the most common endocrine disease; it is major problem in medicine, not only for diabetics but also as general health problem. Physical activity was accepted as a therapeutic approach in diabetics. **Aim:** The objective was to assess the role of physical activity in DM patients and in their values of glycemia. **Methods:** In study were included 96 consecutive patients diagnosed with DM, according to diagnostic criteria by new definition form of WHO and ASD. According to these criteria, 46 patients were type 1 DM, 50 patients were type 2 DM. Physical activity is applied 10 days consequently, after psychological preparation and treatment of patient according the standard protocol to physical activity. The assessment of glycemia was done before and after physical activity. **Results:** Glycemia level was decreased by physical activity, DM type 1 patients for 25.0 mg/dl in male and 30.4 mg/dl female, respectively. DM type 2 patients the glycemia was decreased by physical activity 25.4 mg/dl in male and 18.0 mg/dl in female, respectively. Female patient's type 1 after physical activity there was a decrease in glycemia levels compared to patient's type 2. There wasn't significant difference between male and female in decrease of glycemia by physical activity. **Conclusion:** In DM patients, physical activity decreases level of glycemia. There is no important difference between gender and type, in these patients. Physical activity in these patients doesn't need the important circumstances and has a low cost effectiveness. We recommend that physical activity should be part of the treatment of DM patients.

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EVOLUTION OF ENDURANCE DURING A MULTIDISCIPLINARY TREATMENT OF CHRONIC LOW BACK PAIN AND ITS INFLUENCE ON WORK CAPACITY

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Introduction: Low back pain is a common disorder touching up to 80% of the population, with redundancies of up to 70%. A small proportion would go on to develop chronic low back pain (LBP) with reduced work capacity and they would count for the majority of the costs. Up to day, a multi-disciplinary treatment

program is one of the best approaches. In the program one of the mile-stones is restoration of function. The aim of this study was to follow patients, according to the endurance change after the program and its influence on workability during one year after inclusion in a such program. *Method:* Patients were following a multidisciplinary treatment for 3 weeks including physiotherapy, occupation measures combined with an educational program with behavioural and psychological interventions on an outpatient program. We studied the endurance with the help of the Bruce test, accomplished at the beginning and at the end of the program. On the other hand the patients filled out pain questionnaires and PACT score according their own impression on workability. *Results:* There were a clear relation between the increase in the cardiovascular endurance and the increased workability. Almost every patient presented an increase in the VO_2 max, even though the workability did not follow. This increase were associated with a decrease in pain apprehension. *Conclusion:* A multidisciplinary treatment program, teaching the patients how to care with their pain and to accept it even if it persists is successful in lowering the global pain. If the program allows the patients to strengthen the endurance, the workability will increase in parallel. In this way the patients were able to reduce the consumption of medicaments and to increase the work capacity.

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LOW BACK PAIN IN MUSICIANS – DIAGNOSIS AND PREVENTIONAL POSSIBILITIES

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Introduction: Musicians belong to a group of Professionals, who suffer extreme stress at the muscle-skeleton-system according to their Instruments. Usually playing an instrument already starts at an age of 6 to 8 years and it achieves its height at the early professional years between 25 and 35. So far, the influencing factors of the extreme stress on the spinal column of musicians are not sufficiently analysed yet. *Functional Diagnosis:* The functional diagnosis of the spine, which can be done today by musicians specific to their Instruments, is an essential part of the planning of preventive measures in the sense of a secondary and tertiary prevention. Measures and methods of instrument specific functional diagnosis are being presented. (three dimensions). *Prevention:* Meanwhile it has been realised, that a general health prevention of musicians has to be accompanied by a stress prevention according to the load of the instrument. Therefore, measures of the individual promotion of the health have to be adjust to the stress of work as well as the health-and training conditions. Consequently, those measures can help to reduce or rather to avoid the consequences of the illnesses contributed to the stress at the muscle-skeleton-system according to the instrument. In addition, they also can improve a possibly reduced fitness (efficiency) by older musicians.

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THE TRANSFERSOME® TECHNOLOGY – NEW TREATMENT OPTIONS FOR LOCAL PAIN IN MUSCLES AND JOINTS

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Introduction: Diractin® is a new, Transfersome® carrier based ketoprofen formulation for local application. Transfersome® carriers are able to cross the skin barrier driven by the transcu-

taneous moisture gradient avoiding clearance of the drug by the cutaneous microcirculation, and allowing targeted delivery into deeper subcutaneous tissues like muscle and joints. Diractin® showed substantially higher drug concentration in target tissues like muscle as compared to conventional topical ketoprofen and oral ketoprofen in pigs (1) with low systemic exposure. *Aim and Patients:* The analgesic effect of locally applied Diractin® was investigated for pain associated with osteoarthritis (OA) of the knee and exercise-induced acute muscle pain as compared to a conventional topical ketoprofen gel, placebo and oral analgesics. *Methods:* Acute forearm muscle pain was induced by eccentric muscle contractions prior to single application of test items. Pain was assessed using a visual analogue scale. Pain of thigh and calf was induced by walking down stairs with a total altitude of 200 m, before subjects received repeated treatment with Diractin® for one week. In several placebo-controlled clinical studies patients with knee OA were treated with different doses of Diractin® for 6 to 24 weeks. The WOMAC subscales for pain, function and patients global assessment of therapy were used as efficacy measures. *Results:* Diractin® led to higher pain reduction in acute muscle pain vs. placebo and conventional gels. A metaanalysis revealed superiority vs. oral ketoprofen. In OA studies, Diractin® reduced pain significantly better as compared to placebo and with similar efficacy to oral treatment. The therapeutic effect was maintained at least for 24 weeks. Diractin® was generally well tolerated. Except for dermal irritation no relevant drug-related adverse events were observed. *Conclusions:* Diractin® showed better efficacy than oral ketoprofen in the treatment of exercise-induced muscle pain whereas conventional topical gels did not differentiate from placebo. For the treatment of pain in OA Diractin® showed an efficacy superior to placebo and comparable to celecoxib (2).

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EFFICACY OF PHONOPHORESIS OF A CREAM CONTAINING GLUCOSAMINE SULFATE AND CHONDROITIN SULFATE COMPARED TO TOPICAL USE OF THE CREAM FOR OSTEOARTHRITIS OF THE KNEE

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Objective: To assess the ability of a topical preparation of glucosamine sulfate and chondroitin sulfate to reduce pain related to osteoarthritis (OA) of the knee. *Methods:* Sixty-one patients were randomized to receive a topical glucosamine and chondroitin preparation (group A) or phonophoresis of this cream (group B) over a 6 week period. Efficacy was assessed using a visual analog scale (VAS) for pain as well as the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), and questionnaire in evaluation of pain at rest, one leg stance, 50 step walk & 3 steps up & down pain. *Results:* VAS scores indicated a greater mean reduction in pain on one leg stance for the phonophoresis glucosamine/chondroitin preparation group (mean change -2.6 cm, SD 1.6 cm) compared to the glucosamine/chondroitin group (mean change -1.6 cm, SD 1.7 cm) after 6 weeks. After 6 weeks the difference between A and B groups in their mean reduction of pain at 50 step walk from baseline was 1.4 (95% CI 0.1 to 2.4, $p=0.02$) and for 3 step up and down was 1.8 (95% CI for difference between groups, 0.7 to 1.9 cm; $p=0.003$). *Conclusion:* Topical application and phonophoresis of glucosamine and chondroitin sulfate are effective in relieving the pain from OA of the knee and improvement is evident within 6 weeks. The pain relieve is more prominent in phonophoresis of this cream. Phonophoresis of glucosamine and chondroitin sulfate cream is effective treatment method in physiotherapy of patient with OA of the knee.

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EVALUATION QUALITY OF LIFE IN A PATIENT WITH LOW BACK PAIN AFTER TWO WEEKS DICLOFENAC-POTASSIUM (RAPTEN DUO®) THERAPY

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Introduction: Low back pain (LBP) is one of common problem of modern working man, which caused many medical and social-economical problems. Nowadays LBP is still open 'field' for new treatment and searching for ideal therapy. **Aim:** The aim of the study was to establish how influenced two weeks Diclofenac-Duo (Raptan Duo®) treatment on bettering state of health in patient with LBP. **Material and Methods:** We examined 100 patients (60 female and 40 male), age 40–70 with diagnosis of low back pain. Beside physical examination and evaluation of radiological criteria all patient fulfil short, 8 questions, questioner about quality of life. **Results:** All patients had positive results during physical examination and significant changes on radiological evaluation. At the beginning of treatment patient evaluated their pain in 66.67% as severe but after two weeks treatment we shown reduction of pain and have 20 % of moderate pain and 50% of severe pain, no statistically significant difference between gender. After treatment 16.67% of patient self evaluated their state of health much better and 30.13% better which is statistically significant ($p=0.042$). We also found reduction of limitation daily activities which was more statistically significant ($p=0.038$) after two weeks treatment in younger patients. Reduction of professional activities because of LBP was decrease after treatment and it was more statistically significant in younger patient ($p=0.033$). Likewise, at the end of treatment we found bettering self evaluation of patient emotional status, which was described as bettering interpersonal contact with family and friends which patient describe as result of treatment. Also we found statistically reduction of depression which patients described as result of reduction LBP. **Conclusion:** Result of our evaluation pointed to that using Raptan Duo in treatment of LBP could provide bettering state of health patient with LBP, but also indicate importance individualization dose of treatment.

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MANAGEMENT OF PAIN WITH OPIOIDS IN REHAB CONSULTATIONS

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Introduction: The pain is defined as sensory or emotional experience associated with a real or potential tissue damage. We have quantitative and qualitative scales to measure different physical and pharmacological treatments to help in pain control. **Aim:** To determine the improvement of patients with different pathologies causing pain, and their grade of satisfaction after treatment with opioids. **Materials and Methods:** 27 patients: 24 men and 3 women. Average age: 62 years. **Pathologies:** global osteoarthritis (3), cervical osteoarthritis (2), lumbar osteoarthritis (14), knee osteoarthritis (3), hip osteoarthritis (3), shoulder pathology (5). Previous treatment: 11 with first level analgesic treatment at maximum dose, 4 patients in treatment of second level and 12 in the combined treatment of first and second level. Patients were reviewed after a month and 2 months, assessing pain visual analogic scale (VAS) Time evolution: 21 patients an average 5.5 years and 6 less than half a year. Losses: 4 did not receive treatment, 1 patient non-localized and 2 with poor opioid tolerance (anxiety, dizziness). **Results:** VAS half pre-treatment: 8.3 VAS

post-treatment with fentanyl 12.5 ug: 10 patients did not improve, 13 concern improvement of 2 points on average, 4 patients did not take their medication. 2 patients did not tolerate opioid (dizziness, diarrhea and anxiety). VAS post-treatment with fentanyl 25 ug: 5 patients had the same value, 7 improved (2.5 points on average), 2 not tolerate (vomits and anxiety). Rehab Treatment: kinesitherapy (10 patients: 5 improved in pain scale the first month and the following 6, the second month), electrotherapy (9 patients: 6 improved in pain scale the first month, and 4 the second) and 4 did not take treatment.

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BONE AND JOINT CHANGES IN PATIENTS RECEIVING LONG TERM HEMODIALYSIS TREATMENT AND BLOCK INJECTION THERAPY

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End-stage renal disease (terminal uraemia) is characterized by discontinuation of the kidney's excretory, endocrine and regulatory functions, resulting in disturbance of serum concentration of substances regulated by the kidney's normal function. End-stage renal disease treated by long term hemodialysis therapy (HD) presents the process wherein the efforts and aimed to make up for the kidney's function in the most adequate and acceptable manner. In condition when plasma concentration of calcium and phosphates are elevated, the salt complex is created and deposit in the intestinal soft tissue as well as in joint margin and with dialysing-related amyloidosis (B-2 micro globulins) and progressive osteoporosis can make a frequent cause of very severe chronic pain which requires long-term medicament therapy. Long lasting medications in HD patients may increase the risk of toxic side effects and gastric problems. Those problems in HD patients limits the ability to stand and walk and connected with less activities and poor physical functioning makes a progressive muscle atrophy. The aim of this study was to evaluate the safety and efficacy of local corticosteroid injections in the treatment of chronic pain syndrome with hindered mobility function in patient receiving long-term hemodialysis with changes on lumbar spine. We covered 117 patients of both sexes (27–84 years old) treated by chronic hemodialysis program at Institute for Renal Diseases, UCC Zvezdara-Belgrade, during the period from January 2002 to January 2006. All of them had problems with pain which require the therapy. After clinical checking, blood analysis and radiography detection we performed the block corticosteroid injections in painful region with protocol of three injections with break of 7 to 14 days. Due radiography analysing we noticed changes of joint and spine position, abnormality of bone structure with its defects, chondrocalcinosis of i.v. discus and meniscus, calcification of tendons and spondylosis and arthritis with huge osteophytosis. There were no side effects and bleeding during administration of block injection. In 40% of patients we performed two injections and in 60% of patients we performed three injections. In all patients we got therapy benefit with decreasing or stopping of oral medications. In few cases we performed soft lumbar and knee support before starting activation. Blocking of pain and faster recovery are notified in younger group of patients but mostly in the group of patients at the beginning of HD process. Block injections are safe and efficacious method for treating the chronic pain syndrome in HD patients. Injection protocol program are successfully applied with satisfactory beneficial effects of decreasing the pain, slower muscle atrophy with improving the ability for normal functioning and the better quality of living.

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GAIT ANALYSIS DURING AN ORIGINAL WALKING TEST: APPLICATION IN FIBROMYALGIA SYNDROME

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Introduction and Aim: Gait analysis represents a relevant method to detect walking disorders and to appreciate the effectiveness of treatments. The purpose of this study was to develop an original walking test likely to show abnormal gait. This test could be relevant particularly in patients with pathologies associated to symptoms of physical or mental fatigue and psychomotor slowdown. **Patients and Methods:** Gait analysis data of 265 healthy volunteers (144 women and 121 men aged 5–83 years, included in nine age groups) were established. Control subjects and patients walked at their comfortable speed down and back along a 40 m straight corridor. Subjects repeated the way three times corresponding to a total distance of 240 m. The gait analysis system used in this study (Locometrix™) included an acceleration sensor, a recording device and a computer program for processing the acceleration signals. The sensor was incorporated into a semi-elastic belt and placed over the L3-L4 intervertebral space. A 20-sec period of stabilized walking was selected for each of the 6 ways to calculate stride frequency, stride length, stride regularity, step symmetry and medio-lateral, cranio-caudal and antero-posterior activities. The walking speed was measured with electrical photocells. **Results:** Good reproducibility of gait analysis (intra-tester, inter-corridor and inter-analysis) was observed: coefficient of variation remained below 10% for walking speed, stride frequency, stride length (Fig. 1), stride regularity and below 15% for step symmetry. Normative data and patterns during the 6 ways were established for all variables, age groups and sex. Speed of control subjects began to decrease during the sixth decade in men and the seventh decade in women. Variable of gait measured in FM patients illustrated a major reduction ($p < 0.05$) of speed, stride length (Fig. 1), stride regularity and activities (medio-lateral, cranio-caudal and antero-posterior) in comparison with normative data. **Conclusion:** Patterns of parameters measured during an original walking test offer relevant perspectives to gait analysis and to track the evolution of gait after treatments in several pathologies. We objectified a major psychomotor slowdown in FM patients. This test could be relevant to track the evolution of symptoms in these patients.

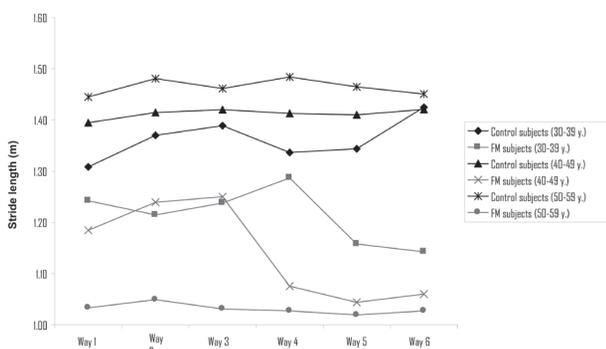


Fig. 1. Pattern of stride length during the 6 ways in control and FM subjects.

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THE LABILE VERTICAL PHORIA TEST, A LANDMARK IN CHRONIC PAIN SYNDROMES

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Introduction: There is no necessity to have Parkinson's disease or stroke to suffer from postural disorders. Numerous patients without a precise anatomical diagnosis, particularly in the case of chronic pain syndromes (CPS), belonged in this population. Previous study reported that vertical heterophoria (VH) in CPS can disappear immediately after a specific proprioceptive physiotherapy (SPP) of temporomandibular joint, oropharynx and/or pelvis, and observed pain reduction (not evaluated). **Aim:** To show that: (i) the labile nature of these VH (relative deviation of the visual axes reduced via binocular vision mechanisms) is indeed associated with the SPP and not spontaneous or random; (ii) the indicated therapeutic interventions are particularly effective for pain. **Patients and Methods:** Forty patients (mean age: 43 years), suffering from CPS, were selected because they also had VH for far sight, determined with Maddox's rod test. They were randomly separated into 2 groups (SPP Group and Control Group), proved equally distributed for sex and age. Pain was evaluated using a subjective visual analogical scale (VAS). The SPP group was managed according to the indications of the labile VH test: over 14 days, each patient had 3 SPP sessions associated with non-specific physical therapy (massage, mild stretching). The Control Group received only the non-specific physical therapy during 3 sessions over the 14 days. On day 14, all the patients were re-evaluated for VH and pain. During the next 11 days, the Control Group received the SPP. On day 25, they were re-evaluated for VH and pain. χ^2 test was used. **Results:** On day 14, five patients had persistent VH in the SPP Group, vs. 20 in the Control Group, and pain VAS was significantly lower ($p < 0.001$). On day 25 vs. on day 14 in the control Group, 4 patients had persistent VH and pain levels had significantly decreased ($p < 0.001$). **Conclusion:** The SPP, surprisingly effective on the patient's phoria, provides particularly informative indications of the therapeutic intervention that reduces the intensity of pain. This should help clarify, for basic researchers, clinicians' reported observations of patients suffering from postural function disorders.

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SPONDYLOSIS: THE ASSESSMENT OF THE DEPRESSION LEVEL WITH BECK'S INQUIRY-SHEET AS A SCREENING METHOD

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Introduction: The association between the chronic pain and depression was shown in several trials. For many chronic diseases a positive correlation with depression has been. There exist some established methods of assessment of the depression level. One of them is the Beck's inquiry-sheet. However there are no widely recognized standards of depression rate in health adults in Polish population. **Aim:** The aim of the study was to determine the value of Beck's scale for patients with spondylosis and to compare this with the corresponding level for healthy individuals. **Patients and Method:** Our preliminary study involved 225 individuals: 150 – the control group and 75 – probands with spondylosis as the only disease. The control group consisted of healthy individuals according to the WHO criteria. For the verum group taking antiphlogistica and analgetica was accepted, so did the hospitalization because of low

back pain. Our examination consisted of the standardized inquiry and the assessment of depression with the Beck's. *Results:* Between this two groups we observed a slight difference in the Beck's score. The median in the group with spondylosis was 4 and in the control group 3. These results were on the edge of statistical significance ($p=0.052$). *Conclusions:* Our study emphasizes the important role of an clinical psychologist in the rehabilitation team. The study should be continued on the greater number of individuals.

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MUSCULOSKELETAL COMPLAINTS AND INDIVIDUAL CHARACTERISTICS, PHYSICAL, PSYCHOSOCIAL RISK FACTORS AMONG NURSING PERSONNEL IN SHIRAZ UNIVERSITY MEDICAL SCIENCE HOSPITAL -IRAN

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Introduction: Work related musculoskeletal disorders have been described as one of the main health problems among healthcare workers. *Objective:* To investigate the relationships between physical, psychosocial, and individual characteristics and musculoskeletal complaints among nursing personnel in Shiraz University Medical Science Hospital, Iran. *Methods:* In this study a questionnaire survey was carried out among 467 nursing personnel in 3 teaching hospitals in Shiraz, Iran. The questionnaire involved information on the respondent's job and employment history, weekly working hours, individual characteristics, physical and psychosocial risk factors at work, the occurrence of musculoskeletal complaints in the past 12 months. *Results:* The subjects consisted predominantly of women (80%), with ages less than 35 years (81%). A high proportion of nurses (83.5%) reported more than two musculoskeletal complaint, in the past 12 months, with low back pain being the most common condition (77.5%). This was followed by MSD of the knee (65.6%), upper back (55.8%), shoulder (55.6%), neck (52.8%), wrist (47.0%). Excessive work load (with adjusted odds ratio of 6.87 (95%CI: 1.17–2.96) and employment status (with adjusted odds ratio of 8.2, $p<0.03$) was identified as a significant risk factor for muscle skeletal complain during our study's. Lifting, moving or transferring patients and manual handling were identified as significant risk factor for LBP and knee pain, upper back. BMI in majority of persons (65.7%) was normal (between 18.5–24.9). *Conclusion:* This investigation suggests that MSD is more frequent among nursing personnel in Shiraz university Medical science hospital in Iran, when compared to around the world.

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P241

HOW GOOD ARE WE IN REVIEWING PATIENTS' REHABILITATION GOALS?

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Background: Goal planning and regular monitoring of goals is a fundamental component of the multidisciplinary rehabilitation process.

Standards: British Society of Rehabilitation Medicine standards for specialist in-patient and community rehabilitation services standards state that 'all programmes and goals where possible must be reviewed at frequent intervals ideally not less than fortnightly and the programmes adjusted accordingly'. *Methods:* Retrospective audit of all goal planning meetings for in-patients who underwent goal planning and were discharged from the rehabilitation unit from July 2006 to December 2006. *Results:* There were a total of 91 multidisciplinary goal planning meetings for 38 patients. A review meeting date was mentioned in 82% of meetings and the planned review took place in 84%. In 16% the review meeting was delayed because of various reasons. A total of 546 goals were documented. 65.9% were outcome goals, 29.8% process goals, and 4.3% structure goals. Of outcome goals 56.2% were impairment goals, 36.6% activity goals, and 7.2% social participation goals. A total of 78.1% of outcome goals were achieved- 1.4% much more than expected, 15% more than expected and 61.7% expected outcome. For 20% the outcome was less than expected and for 1.9% much less than expected. *Recommendations:* All initial goal planning meetings and subsequent review meetings should mention the date and time of any further review meeting. The review meeting should take place as planned. If this is not possible the reasons should be documented.

P242

PREDICTING THE APPROPRIATENESS OF REFERRALS FOR ELECTRODIAGNOSTIC STUDIES

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Introduction: Electrodiagnostic studies are commonly performed as a part of overall evaluation of the patients with a suspected neuromuscular diseases and also give information about localization and severity of the lesion. However, uncritical use of these tests might detract from their value. The aim of this study was to describe the demographic characteristics of the patients referred to our electrodiagnostic laboratory and determine how often the referral diagnosis could be confirmed or not. *Material and Methods:* All patients admitted to our electrodiagnostic laboratory between March and November 2005 were examined. Age and gender of the patients, speciality of the referring physician, referral diagnosis were obtained from the referral forms and the electrodiagnostic conclusions were evaluated prospectively. *Results:* 480 consecutive patients, 83.5% of whom were women, were included in this study. Their mean age was 49.0 ± 14.5 years. The most common referral sources were from physiatrists (40.6%) and rheumatologists (30.9%). They were followed by orthopaedic surgeons (10.8%) and neurologists (4.8%). Carpal tunnel syndrome (70.6%) was the most common referral diagnosis and it was confirmed electrophysiologically in 44.5% of the patients. The other diagnostic groups were polyneuropathies, radiculopathies, plexus lesions and muscle disorders. Among all studies 51% were normal. *Conclusion:* The percentage of abnormal electrodiagnostic studies in our center was lower than the other European country's average. Although judging appropriateness of referrals to electrodiagnostic examination is subjective, this result probably points to a lower quality of referrals to our laboratory compared with these centers. Therefore, more selective referral of examinees would lighten the burden on the laboratory and shorten waiting time for patients who really need this valuable examination.

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DETECTION OF PATIENTS WITH RISKS OF OSTEOPOROSIS WITH BONE MARKERS

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Osteoporosis is a major health problem and currently defined as a systemic skeletal disorder. The patients with risk factors and

secondary osteoporosis can be early detected by bone markers. Prevention is consisting of: 1) early detection of risk groups, 2) healthy nutrition, 3) physical activity, 4) elimination of bad habits. The aim of this study is to represent our management for early detection of patients with risk factors of osteoporosis. *Material and method:* We have made 116 examinations in a period of one year, by protocol and anamnesis of American woman care association and bone markers (osteocalcin, pyrilin-x-d). The bone turn over by bone markers on loss of bone were indication of secondary osteoporosis. There were examination 94 female and 22 male, with age of 17–86 years. *Results:* Distribution of patients by age and sex were: 15–20 years, 1 male; 31–40 years, 3 female; 41–50 years 6 female, 1 male; 51–60 years, 34 female, 2 male; 61–70 years 13 female 10 male, upper 80 years 1 female, 1 male. Patients in age: 15–20, 31–40 and 41–50 years were 8 all with risk of secondary osteoporosis. By age 51–60 years, 36 female from them 12 with risk of secondary osteoporosis, by age 61–70 years, 37 female with postmenopausal condition, by 8 of them complication fracture, and by 7 of them it was result of risk by secondary osteoporosis, who was not treated. By age 71–80 senile osteoporosis. We suggested the patients with secondary osteoporosis to take calcium and vitamins, and by postmenopausal to make DEXA and treat with antiresorptive therapy. *Discussion:* Postmenopausal osteoporosis is treating, but patients with secondary (after surgery, cancer, arthritis, trombosis) did not know that they are candidate for fracture and other complications. The bone markers show bone turn over at the moment of analyze and from their results, can be indication for DEXA. *Conclusion:* We had detected patients by protocol and bone markers and from that depends treatment with preventive and curative dose with antiresorptive drugs.

P244

AN EASY FUNCTIONAL CAPACITY EVALUATION IN CHRONIC LOW BACK PAIN

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Lifting is said to be on of the major risk factors for the onset of low back pain, several different measures has been developed to study this. Several programs are available in order to measure these components, or to determine the ability of an individual to perform a certain job or to discover if the job creates dangerous positions for the worker. In these different fields reliable and valid instruments exist but they are costly and time spending. We present a simplified functional capacity measuring that we use daily in practise. *Method:* 280 patients have been evaluated on this base. The majority was referred to multidisciplinary rehabilitation treatment. The patients had recurrent back problems for months or years. Inclusion criteria were between 18 and 64 years, currently of work, no work compensation. Exclusion criteria were chronic low back pain with a specific cause. They followed a one-hour evaluation test as a functional capacity evaluation at the end of the multidisciplinary treatment period, it was compared to the PILE-test done at the beginning and at the end. *Results:* We included 280 subjects: 160 men and 120 women. Mean age 43.6 by the women and 44 years by the men. We studied the caring foot-hip, hip-shoulder, 5 m carrying, pushing and tiring and the global weight carried during the test. We found this global value to be 696 kg by men and 422 kg by women suffering from chronic lumbar pain. The increase in this value had a clear incidence on a greater work ability, as had a decrease. *Conclusions:* We were able to develop a lifting capacity program that is easy to reproduce and not expensive, giving us the possibility to have an idea on how to reorient the patients according to their work place and their capacities. We could also have an information of work performance and power consumption. It should be more tested and compared to standard capacity in the healthy population.

P245

ISOKINETIC MUSCLE TESTING FOR WEAK PATIENTS SUFFERING FROM NEUROMUSCULAR DISORDERS: A RELIABILITY STUDY

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Precise, sensitive muscle strength testing methods are needed to investigate muscle function in patients with neuromuscular disorders (NMD). Here, we describe an isokinetic knee flexor and extensor testing procedure using the Biodex 3®'s continuous passive motion (CPM) mode. The torque values recorded during passive isokinetic motion were subtracted from the torque values obtained for the same movement with maximal, concentric effort. The aim of the present study was to *i)* evaluate the method's reliability in NMD patients presenting mild to severe muscle weakness and *ii)* study the relationship between manual muscle testing (MMT) and isokinetic dynamometry. The fifteen participating patients were tested twice; the respective intraclass correlation coefficients (ICCs) for the two sessions ranged from 0.91 to 0.99 for the peak torque, work and power and from 0.50 to 0.90 for the angle at peak torque. The Spearman rho correlation coefficients comparing isokinetic values and MMT values ranged from 0.67 to 0.74 ($p < 0.01$). This reliable, dynamic method appears to be of great value in NMD evaluation when sensitive strength measurement at the knee is required.

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ISOKINETIC STUDY IN HEALTHY WRIST - NORMAL VALUES - PRELIMINARY STUDY

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Introduction: There are few studies published about isokinetic techniques at wrist functional valuation and a limited references about normal values for maximum strength and work by repetition at this joint. As healthy wrist we take an historical data from patients with references of distal radius fracture, who was taking part in a isokinetic study in both wrist to determinate normal values of maximum strength and work repetition. Also, we analyse the normal values for flexion-extension coefficient of wrist. *Material and Methods:* A descriptive study of 40 healthy wrist was done without importance of side-dominant hand. An isokinetic study has been done with isokinetic dynamometer Dexter Hand Evaluation. The data was acquired at a speed of 45°/s with a range of motion of 60°. Five repetitions was required and maximum strength moment and repetition work of flexo-extension of wrist was acquired. *Results:* High variability at data was found, as we can see at the table. The mean value of extension/flexion coefficient was 0.53. Also the age and sex was analysed as variability parameters. *Conclusions:* There are no data enough for extrapolate our conclusion for all population. Further studies have to be done with more cases. But we found a high variability at the strength of flexor-extensors muscles of the wrist. The flexor muscles are stronger than extensor's ones. The strength values are higher in men than women in both cases, and in hand worker people. The isokinetic studies are useful at functional valuation of wrist.

	Max strength momentum (kg/cm)	Work by repetition (kg×cm)
Dorsal flexion of carpo	56.9 (ranged 21.9–102.3)	43.4 (ranged 15.8–80.9)
Palmar flexion	105.4 (ranged 36.5–191.9)	70.5 (ranged 23.9–120.2)

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LUMBOSACRAL PLEXUS LESION DUE TO GLUTEAL COMPARTMENT SYNDROME

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Introduction: Gluteal compartment syndrome is a rare (an unusual) clinical entity. Documented causes include trauma, drug abuse with altered mental status and prolonged immobilization, excessive exercise or iatrogenic complications. **Aim:** This is a case report of a man who presented with left gluteal compartment syndrome, lumbosacral plexus lesion, rhabdomyolysis and acute renal failure. **Patients and Methods:** A 47-year-old male patient with known history of drug abuse came to the emergency department with altered mental status, dyspnea, absence of deep tendon reflexes of his left lower limb, pain and massive oedema of the left gluteal region. Laboratory investigation revealed the presence of rhabdomyolysis and acute renal failure. The patient was treated with hemodialysis along with alkaline hydration. Electrophysiological examination revealed lesion of right lumbosacral peripheral nerves, with normal findings from the peripheral nerves of both the upper and the right lower limb. MRI investigation confirmed the clinical diagnosis of left gluteal compartment syndrome: '...oedema of the left superficial lumbosacral muscles all along their course at the lumbar region, massive oedema of the left gluteal muscles...'. **Results:** 8 days after his admission, the patient's renal function returned to normal as well as his level of consciousness. At his exit from the hospital one month later he was able to stand unassisted and walk using a cane with help. **Conclusion:** The most common cause of gluteal compartment syndrome is substance abuse accompanied with prolonged immobilization due to loss of consciousness. Thus, the differential diagnosis of painful swelling in the lower extremities presenting as deep vein thrombosis or post-traumatic sciatic nerve palsy should include gluteal compartment syndrome.

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FUNCTIONAL PARAMETERS AND ULTRASONOGRAPHIC ASPECTS IN PATIENTS WITH PAINFUL KNEE OSTEOARTHRITIS

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Introduction: Knee osteoarthritis (KOA) is an important cause of musculoskeletal pain and disability (1). Synovitis and joint effusion are secondary phenomena in OA as a consequence of condrolysis (2). Goals of managing KOA include controlling pain, maintaining and improving the range of movement and stability of affected joints, and limiting functional impairment (2). **Aim:** In our prospective study, we assessed the efficacy of rehabilitation program based on the exercise program over the presence of synovitis or joint effusion in patients with painful primary KOA. We evaluated the correlation between these sonographic aspects and functional parameters, before and after rehabilitation program. Synovitis and effusion were recorded in the suprapatellar recess using US equipment. **Patients and Methods:** We studied seventy-four patients (48 women, 26 men), aged between

43–68 years. All patients were clinical, functional (VAS scale, WOMAC index) and imagistic (X-rays and sonography) evaluated. The complex rehabilitation program (educational, dietetic, pharmacological, physical - kinetic) was performed 5 days/week, 2 weeks. All subjects received a more selective COX-2 inhibitor (etoricoxib) and were evaluated at baseline (T1) and at 2 (T2) and 8 (T3) weeks. **Results:** The studied parameters had improved, especially in T2 moment ($p < 0.05$). Multivariate analysis showed that sonographic aspects correlated statistically with VAS score and WOMAC index. The pain improvement is correlated with sonographic aspects. After 8 weeks, improved functional status was maintained. **Conclusion:** Our results reflected two aspects: the first - the favorable complex effect (clinical, functional and sonographic) of rehabilitation performed in the patients with painful KOA; the second - the ability of ultrasound exam to detect subclinical synovitis may be very important for improving the early diagnosis of KOA.

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P249

RISK FACTORS FOR DEPRESSION IN MUSCULO-SKELETAL DISORDERS

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Introduction: Depression is often present in somatic disorders. Somatic diseases could directly or indirectly cause depression. Musculo-skeletal disorders last long, are characterized by pain and fear of functional disability. In those patients depression is not noticeable at the beginning. One has to look for hidden signs of depression. **Aim:** The aim of this work was to examine appearance and risk factors for depression in musculo-skeletal disorders. **Examinees and Methods:** Examination was conducted on 93 patients with different musculo-skeletal disorders, who were hospitalized at the Clinic for physical medicine and rehabilitation in Tuzla. Study included patients with rheumatoid arthritis (RA), osteoarthritis (OA), lumbal syndrome (Sy LS) and with implanted hip endoprosthesis because of OA. Depression was diagnosed with the Self-evaluation scale for depression according to Zung (modified in 1991). Performance of everyday activities, pain, and living condition were also examined. **Results:** Depression was present in majority of the examined patients. The longest duration of the disease had RA patients. The worst financial situation had patients with RA (46%), and the best patients with endoprosthesis (22%). Fear of the future had 92% of RA patients, and 33% of patients with endoprosthesis. Fear of the disease's progression had 100% of RA patients, 72% of OA patients, 70% of LS patients, 33% of patients with endoprosthesis. Everyday pain was present in 71% RA patients, and only in 22% of endoprosthesis patients. The worst functional disability had patients with RA and patients with endoprosthesis. The best functional status had patients with Sy LS. The highest percentage of depression was present in RA patients (88%), then in 80% of OA patients, 74% of Sy LS patients and the least with patients with endoprosthesis. The most severe depression had RA patients. **Conclusion:** Depression is found in majority of patients with musculo-skeletal disorders who were on rehabilitation. The longest duration of the disease, the worst functional disability, pain, the worst financial situation, the biggest fear of disease's progression have RA patients. Those are possible reasons for depression. Psychiatrist has to expect and recognize depression, begins the treatment, because untreated depression makes the treatment slower and more difficult.

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NERVE CONDUCTION VELOCITY OF MEDIAL ANTEBRACHIAL CUTANEOUS NERVE IN PATIENTS WITH PERIPHERAL NEUROPATHY

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Objectives: The medial cutaneous nerve of the forearm or medial antebrachial cutaneous nerve (MACN) is a pure sensory nerve. This nerve arises from the medial cord of the brachial plexus. The nerve gives off a small branch to supply the skin on the anteromedial surface of the distal half of the arm and the terminal branches supply the medial, anteromedial and posteromedial surface of the forearm as far as the wrist. The aim of this study is the evaluation of MACN in patients with mixed sensory and motor polyneuropathy involving the nerves of the upper and lower extremities. **Methods:** This study was performed on 30 patients with clinical symptoms of peripheral neuropathy (such as pain, numbness and parasthesia, muscle weakness, decreased vibration and position sense and decreased deep tendon reflexes) approved by electrodiagnostic examination (lower extremities, the tibial, the peroneal and sural nerves conduction velocity below 40m/s and upper extremities, the median and ulnar sensory and motor conduction below 45 m/s). Three parameters of the including distal latency, nerve conduction velocity and the amplitude of responses were detected and the findings of these patients were compared with the same findings of 30 normal persons matched for age and sex with our patients. Latencies and conduction velocities of the MACN were measured antidromically with stimulation at 5cm above the medial epicondyle of the humerus and recorded by the surface electrode at 14cm distally. **Results:** For each parameter, mean \pm 1SD was calculated. In the study group distal latency was 3.26 ± 0.4 ms, NCV was 49.3 ± 6.2 m/s and amplitude of response was 6.3 ± 2.5 mv. In the control group, these parameters were 2.8 ± 0.24 ms, 56.9 ± 5.43 m/s and 11.03 ± 3.57 mv, respectively. **Conclusion:** The MACN is involved in patients with peripheral neuropathy and the study of this nerve in the electrodiagnostic evaluation of patients can be helpful.

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NECK PAIN IN ADOLESCENT HEADACHE SUFFERERS – A COHORT STUDY OF SCHOOL CHILDREN

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Introduction: Although neck pain (NP) and headache (HA) are often concomitant in adolescents, only few data exist on the association of NP with HA in this age group. **Aim:** The aim of the study was to examine the association of concomitant NP with the adolescent HA and on the outcome of HA. The associations of self-reported NP, physical findings of the neck and disc degeneration of the cervical spine with adolescent HA were studied. Results published in four articles in Cephalalgia and in academic dissertation will be reviewed. **Study Population:** This study is part of a population-based follow-up study of 12-year-old children ($n=1135/1409$) with and without HA. A sample of adolescents ($n=304$) was followed to the age of 16 years, and at the age of 17 years, 69 of them participated in a magnetic resonance imaging study (MRI) of the cervical spine. **Results:** During the follow-up from 13 to 16 years of age, changes in both HA type and frequency were common. Poor outcome of HA was associated with NP interfering with daily activities at the age of 13 years. The changes in HA type were not

predictable by NP. At the age of 16 years, the local and referred palpation pain of neck muscles, self-reported NP and NP intensity were associated with HA, and especially with disturbing HA not relieved with analgesics. The association of NP with HA was not determined by HA type. Mild degenerative changes of the cervical spine were common but did not contribute to headache. **Conclusion:** HA in adolescence is often episodic, and preventing and treating NP could be important in the prevention of future chronic adult HA.

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P252

DOES AGE INFLUENCE SCAPULAR KINEMATICS? A CASE-CONTROL STUDY USING CLINICAL ASSESSMENT PROTOCOL

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Objectives: To determine if the clinical assessment protocol for identifying scapular positioning and dynamic control is feasible for discriminating scapular kinematics between different age groups. **Methods:** Forty-six adults, their age ranging between 18 and 86 years, and 59 children, 6–17 years of age, participated in this study. Kinematic data were collected using a clinical assessment protocol including an observation protocol, the measurement of the distance between the acromion and the table, inclinometry and the medial rotation test for dynamic scapular stability. **Interventions:** Not applicable. **Results:** The observation protocol for scapular winging and tilting did not show significant differences between adults and children or between any of the five subgroups. After controlling for body mass index, the distance between the acromion and the table with both shoulders relaxed was significantly smaller in children than in adults ($p<0.04$). In addition, children showed greater upward rotation ($90,8^\circ$; SD $15,3^\circ$) than adults ($83,0^\circ$; SD $15,3^\circ$) ($p=0.011$). No significant differences were seen between children and adults using the medial rotation test. **Conclusions:** The measurement of the distance between the acromion and the table, and the measurement of upward rotation by means of two inclinometers show significant differences in three-dimensional scapular positioning between children and adults.

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IMPORTUNES OF NERVE CONDUCTION STUDIES IN PATIENTS ON PERITONEAL DIALYSIS

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It is known that patients with uremia might have a different stage of polyneuropathy. The aim of this study is to detect polyneuropathy in patients on continuous ambulatory peritoneal dialysis (CAPD). We examine 62 CAPD patients, divided in two groups. In Group 1 were 20 patients with diabetes mellitus (DM), and in Group 2 were 42 patients without DM. We registered biochemical parameters (glycemia, urea, creatinine) and nerve conduction velocities (NCV) of peroneal, tibial and sural nerve, as well as late responses. DM patients were significantly younger, with lower level of creatinine and higher glucose concentration ($p<0.01$), but there were no differences in age, CAPD duration, level of urea and subjective signs of neuropathy. When we analyzed NCV, we found that mean range of all analyzed parameters, including the latency of F wave and TL in patients with DM were pathological. In Group 2 we registered prolonged latency of F wave, and slowing NCV of sural nerve. Comparing the NCV in two groups we found significant difference in all analyzed parameters ($p<0.01$). In Group 1 we found significant correlation between NCV of peroneal, tibial and sural nerve as well as prolonged F wave latency

with duration of dialysis, glycemia, urea and creatinine. In Group 2 we found significant correlation between prolonged latency of F wave and slowing of NCV of sural nerve ($p < 0.01$) with level of urea and creatinine. In this study, we registered pathological neurophysiologic changes in patients on CAPD. The worse polyneuropathy changes were found in patients with DM.

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THE EFFECT OF CLINICALLY EXAMINED CERVICAL PAIN ON THE PERFORMANCE IN POSTURAL CONTROL TESTS AMONG WOMEN WITH RHEUMATOID ARTHRITIS

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Introduction: Impaired postural control has been reported among patients with chronic neck pain, tension neck, cervical root compression, and whiplash associated disorders. The involvement of the cervical spine in patients with rheumatoid arthritis (RA) is common (1). Ekdahl and Andersson reported in 1989 (2) that among RA patients those with cervical pain had a greater tendency to fail in performing one-leg stance test than patients without cervical pain. After those preliminary findings the association between cervical pain and postural control among patients with RA has not been examined. **Aim:** To explore the effect of cervical pain on test assessing different domains of postural control among RA patients. **Patients and Methods:** Ninety-one RA patients and 110 controls. Postural control tests: timed one-leg stance test, timed up and go test, and several tests on force-plate. Questionnaires: health assessment questionnaire; pain, self-rated general health, self-rated postural balance (visual analogue scales); psychological distress. Clinical examination: presence of cervical pain, and swollen or tender joints in the lower extremities; erythrocyte sedimentation rate; duration of the disease; the presence of rheumatoid factor. Cervical radiographs. Muscle strength measurements: grip, isometric knee extension/flexion. Aerobic capacity: submaximal bicycle ergometer test. **Results:** No statistically significant differences were found in postural control measurements, demographic or clinical characteristics, in the presence of radiographic changes in the cervical spine, or in the physical performance of the subjects with or without cervical pain. **Conclusion:** There seems to be no association between clinically examined cervical pain on one hand and disease-specific characteristics, physical fitness, or postural control on the other, among RA patients. It may be of interest for further studies to examine the association between self-reported neck pain and clinically examined cervical pain, and to find out if there is an association between the presence of self-reported neck pain and impaired performance in postural control tests among RA patients.

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IMPAIRED PERFORMANCE IN POSTURAL CONTROL TESTS IS ASSOCIATED WITH WORSE SCORES OF THE HEALTH ASSESSMENT QUESTIONNAIRE DISABILITY INDEX AMONG WOMEN WITH RHEUMATOID ARTHRITIS

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Introduction: Rheumatoid arthritis (RA) often results in reduced work capacity and permanent work disability, thus causing expensive consequences for society. Maintenance or restoration of functional capacity is understandably a major goal of therapy. The health assessment questionnaire (HAQ) and its modified versions have been widely used to evaluate the disability in daily activities (1). One would think it logical that there was a significant relationship between HAQ and the performance in postural control tests among RA patients. The results have, however, been contradictory. Postural control is 'a very complex entity that must be measured across different domains and it cannot be reflected by any one single measure' (2). **Aim:** To explore the relationship between functional status and the performance in tests assessing different domains of postural control among RA patients. **Patients and Methods:** 91 RA patients and 110 controls. The patients were grouped according to the total score of HAQ: HAQ1=0 ($n=21$); HAQ2=0.1 to <1 ($n=44$); HAQ3=1–3 ($n=26$). Postural control tests: timed one-leg stance test (OLST), timed up and go test (TUG), and several tests on force-plate. **Results:** Poorer performance in the OLST and TUG tests was associated with worse HAQ scores. Of the force-plate measurements only double-leg stance, eyes open, showed association with HAQ scores. Including the results of the controls to the analyses gave some clarifying information but did not alter the main results. **Conclusion:** It is suggested, that attention should be focused to improve postural control if the result in the OLST test is below 30 s, or in the TUG test above 8 s among RA patients younger than 60 years. The force-plate measurements are not good for screening postural control impairments associated with functional disability but they may still have their use in, e.g. monitoring the effect of intervention or rehabilitation.

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RESULTS OF THE ZEBRIS-WALKING ANALYSIS BY PATIENTS WITH COXALGIA (DYSPLASIA OF THE HIP; DEGENERATIVE ARTHRITIS OF THE HIP JOINT)

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Introduction: At the clinical practice the valuation of the function of the hip joint is predominantly based on subjective characteristics as pain and mobility. In contrast, the SD-ultrasound-walking analysis ZEBRIS offers an objective method to assess the joint mobility (flexibility), the biomechanics of the joint as well as walking pattern. **Material and Method:** 12 patients with coxalgia and positive Trendelenburg's sign took part on a 3-D-real time-walking analysis (sonographic examination) on a treadmill before as well as six months after a hip prosthesis Implantation (a hip replacement; implantation of a hip). **Results:** In comparison with the cinematic measurements before and six months after the hip prosthesis implantation the patients achieved a distinct improvement of the walking pattern. **Discussion:** The SD-ultrasound-walking analysis represents a reliable monitoring of the most important cinematic walking parameters. The reconstruction of the physiological joint geometry is an essential condition to obtain a normal state of the walking pattern and a good joint function, next to the practised rehabilitation within the scope of a following treatment by all twelve patients.

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HEAD-EYE-MOVEMENT IN DIFFERENT AGE GROUPS AND PATIENTS WITH SHOULDER-NECK-SYNDROME**Seidel E.J., Hartmann J., Groß S., Schaaf T.***Centre of Physical and Rehabilitative Medicine, Clinical Centre Sophien- and Hufeland Klinikum Weimar, Germany*

Background: To gather impulses of an eccentrically located object by visual sense organs, a change of view is needed whereby the object will be fixed in the Fovea centralis (Zangenmeister, 1982; Funk, 1977). This ambient motion is referred as gaze shift. A gaze shift is the difference between two following lines of vision, which are defined by the off-axis angle in relation to a constant ambience (Fuller, 1992). This angle is the result from the head-position in ambience and the position of the eyes in orbit. Assistance of a horizontal Head-Movement is not needed for targets within $\pm 40^\circ$ in eccentric position. If there is assistance of the head during gaze shifts of $\pm 40^\circ$, which could be realized by Eye-Movement only, the subject shows a disposition towards the stereotype Head-Mover. In this context Fuller (1992) created the term 'gain', which is estimate by dividing the angle of Head-Movement by the angle of targets. If this 'gain' goes below the quality of 0.5 the test person's stereotype is Eye-Mover. In the other case the subjects stereotype is Head-Mover, when the quality overshoots 0.5. Beyer & Seidel (2006) found that there is a positive correlation between the stereotype Eye-Mover and the Shoulder-Neck-Syndrome. **Methods:** The analysis comprises 17 children with an average age of 6.59 ± 0.51 years, 25 children ($\text{Ø}12.16 \pm 0.55$ years), 23 juveniles ($\text{Ø}17.17 \pm 0.58$ years) and 72 patients with Shoulder-Neck-Syndrome ($\text{Ø}43.07 \pm 3.06$ years). The Head-Movements of the test persons were measured by the assistance of the measuring system zebris® CMS 70P. In the first instance we investigated the maximum extent of the movements of the cervical spine. Afterwards the test person was requested to fix objectives in horizontal ($\pm 70^\circ$ of position neutrally) and vertical ($\pm 30^\circ$ of position neutrally) plane. The outgoing proportion between measured Head-Movement and requested Eye-Movement (70° horizontal/ 30° vertical) is the Head-Eye-Quotient (the 'gain'-value). Additionally the dominant eye has been identified. **Results:** Our results show, that there is a direct relation between Head-Eye-Movement in the vertical plane there are 100% Head-Movers in the group of children (7 y.o.), 56% in children (12 y.o.), 13% in juveniles (17 y.o.) and 9.8 % in the group of patients. In the horizontal plane there are 100% Head-Mover in the group of children (7 y.o.), 52% in children (12 y.o.), 13% in juveniles (17 y.o.) and 18 % in the group of patients. There was no significant correlation between the Head-Eye-Quotient and the gender respectively dominant eye. **Discussion:** In the course of age there is a change of the stereotype from Head-Mover to Eye-Mover. In this context the findings of Simonet (2003) become a therapeutic importance, because he found in presbyopic patients the possibility to modify the neuromuscular stereotype. Therefore, it would be possible to train the stereotype Head-Mover by limiting the gaze with pinhole glasses or varifocals provoking Head-Movement. Against the actual tendencies in workstation ergonomics, the design of workstations should be changed to stimulate Head-Movement. In this way muscular tensions in shoulder and neck could be prevented for example in jobs with sitting position.

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COMPARISON OF MEASUREMENT DEVICES ZEBRIS® CMS 70 P AND VARILUX ESSLOR VISIONPRINT SYSTEM™ FOR IDENTIFICATION OF NEURO-MUSCULAR PATTERNS 'HEAD-OR-EYE-MOVER'**Seidel E.J., Hartmann J., Schaaf T., Groß S.***Centre of Physical and Rehabilitative Medicine, Clinical Centre, Weimar, Germany*

Background: The concern Varilux-Essilor designed an attachment named VisionPrint Sytem™ (VPS) that measures the »gain« re-

spectively the head-eye-quotient (HEM). To verify if the VPS is appropriate for scientific studies the reliability and validity were explored via the measurement device zebris® CMS 70 P. **Methods:** For our study 23 juveniles ($\text{Ø}17.17$ y), an weight of $\text{Ø}68.96$ kg and an height of $\text{Ø}176.43$ cm were investigated. First the »gain« was estimated by the VPS with a randomized, device internal generation of 25 optic-attractions. Afterwards the 25 optic-attractions were generated verbally and randomized and the head-movement was measured by the CMS, whereas the VPS was disconnected and only used for presenting the gaze targets. One week later at the same time of day (biorhythm) the testing routine of the VPS was attended once more, to evaluate a test-retest-reliability. **Results:** The validity of the CMS corresponds to the known values from preliminary inspections and must be classified as very good. Hence the CMS could serve as assessment to estimate the construct validity of the VPS. The validity of the VPS was classified as very good. The regression analysis produced a R^2 of 0.75. The test-retest-reliability of the VPS must also be classified as very good. The regression analysis produced a R^2 of 0.87. The middle deviation between the measured head-movement amplitudes amounts $+5.25^\circ$. The VPS detects, on average, a »gain« amount which is about 0.13 points higher. The analysis of the gaze shift simulation at modified home positions results in a middle deviation of 1.89° , this corresponds to a »gain« amount of 0.05. **Discussion:** Concerning the topic, the measurement device CMS is appropriate for scientific applications and can be recommended for the exploration of the pattern head-mover or eye-mover. The VPS achieves very good validity – and reliability values. The disadvantage of this measurement device is due to the absence of a possibility to record a modified home position in regard to the horizontal and frontal plane.

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CRANIOMANDIBULAR DYSBALANCE IN MUSICIANS - BENEFIT OR HANDICAP?**Seidel S.L.², Fischer A.¹, Häußler K.², Günther P.¹, Seidel E.J.^{2,1}***¹Sophien- und Hufeland-Klinikum Weimar; ²Hochschule für Musik 'Franz Liszt', Weimar, Germany*

Introduction: Craniomandibular dysbalance (CMD) encloses painful but even painless dysfunctions of mandible joint and surrounding areas. In this study, we would like to examine if CMD without subjective disturbances have to be treated. Or is CMD at musicians even a precondition for high-performance instrumental play? **Methods:** We examine 22 musicians (students, Professionals and teacher for music) aged 21 to 52 years. All musicians have got CMD, eleven of them with disturbances (patients), eleven without subjective disturbances (proband). Interview, manual-medicine examination and 3-D-movement-analysis of cervical spine and Craniomandibular System was done to all musicians. **Results:** Proband and patients were different in the characteristic of CMD. There were much less probands with objective Symptoms of CMD like audible click at the mandible joint or paraesthesia. Proband showed also a wider range of motion of the cervical spine than patients. **Conclusions:** It is necessary to distinguish between dysfunction and dysbalance. The elimination of Craniomandibular dysbalance (without subjective disturbances) could reduce the high-performance of instrumental play. On the other hand, severe dysfunctions of Craniomandibular System disable the musician in playing his/her instrument and ought to treat.

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THE ASSOCIATION OF CARPAL TUNNEL SYNDROME WITH CERVICAL RADICULOPATHY (DOUBLE CRUSH SYNDROME)**Forogh B.***Physical Medicine and Rehabilitation, Iran University of Medical Sciences, Iran*

Carpal tunnel syndrome is one of the most common Peripheral nerve diseases. Upper extremities pain due to carpal tunnel syndrome is one of the major situations encountered in electrodiagnosis centers, which can be accompanied by cervical radiculopathy. Prevalence of carpal tunnel syndrome with cervical radiculopathy (with regard to patients' age) 7–70% has been reported in different studies. The prevalence is higher among male and middle age groups. The goal of this study is to emphasize on prevalence of double crush syndrome and its appropriate treatment. It is very important to consider this syndrome in patients with carpal tunnel syndrome who don't respond to treatment studies. In this study 113 patients who had carpal tunnel syndrome and their diagnosis were made with electrodiagnosis were checked for concomitant radiculopathy. Most of patients were between 20 to 50 years old. The mean of disorder time was 21.3. In 16.8 of patients with carpal tunnel syndrome, cervical radiculopathy detected. *Result:* In this study after assessment of factors (NCV in carpal tunnel, sensory median nerve delay time in 14 cm, movemental median nerve in 8 cm, delay time between ulnar and median nerves) in 320 patients who came to Shafa hospital electrodiagnosis center, 113 case showed electrodiagnostic findings in favor of carpal tunnel syndrome. The average (mean) of patients' age was between 44 years and 45 years, minimum 20 years and Maximum 75 years. (less than 20 or 20 one case, between 20 to 50 years 83 cases, more than 50 years 29 cases.) This study shows that in case of carpal tunnel syndrome, it is necessary to consider possibility of concomitant radiculopathy and it is important to take necessary measures for both conditions.

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CHANGES OF SURFACE-EMG IN PATIENT AFTER POLIOMYELITIS

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Introduction: Following a poliomyelitis anterior acuta patients suffer from paralysis of the limbs and trunk. Continuous training of damaged muscles are necessary, but disorders by overuse are possible. *Aim:* Previous an effective training, especially for the muscles for standing position and gait stabilisation, the impairment of these muscles must be recognised. *Patients and Methods:* 26 patients with a postpolio syndrome (age 63 years, 17 female, 9 male) were compared with 26 healthy persons (age 60 years, 20 female, 6 male) without neurological or orthopedic diseases. In all patients and control persons surface-EMG-activity of 8 muscles during standing position and gait was determined: m. multifidus, gluteus medius, obliquus externus et internus, biceps et rectus femoris, vastus medialis et lateralis. The median of 5 sec standing and during 6 steps of both groups were compared by means of the Mann-Whitney-U-test ($p < 0.05$). *Results:* In standing position the activity of the m. obliquus internus of control persons ($m = 18.27 \mu V$) is significantly higher than that of the patients ($m = 9.97 \mu V$), whereas all 4 tested muscles of the upper lower limb in patients have significantly more activity than in healthy persons. The same results could be occurred during the steps. *Conclusion:* In standing position the patients with postpolio syndrome show lower muscle activity in the trunk, especially in the m. obliquus internus, as the control persons, what means that they have no enough muscular capacity. During gait important higher activities could be documented in the patients muscles, because of the repaired increased motor units after poliomyelitis.

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P262

THE INFLUENCE OF SMOKING ON FUNCTIONAL OUTCOME IN STROKE PATIENTS

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Introduction: Stroke is a very complex and serious disease with many complications and low-level recovery. *Aim:* To assess the relationship between smoking and functional recovery of patients after stroke. *Methodology:* This retrospective study analyzed a hundred stroke patients who had their rehabilitation treatment, which comprised magnetotherapy, kinesitherapy and occupational therapy. Before the outset of rehabilitation treatment, each patient was tested by the Scale for prognosis of spontaneous recovery. The estimation parameters on effects of rehabilitation were Brunstrom Classification for a grade of neurological status, Functional Independence Measure-FIM, Mini-Mental State examination-MMSE, Dementia Mood Assessment Scale-DMAS. These parameters were checked before rehabilitation, after 30 and 60 days and after 6 months. *Results:* The average age of all patients was 64.85 years. They were classified into two groups, the 1st group had 33 non-smoking patients and the 2nd group had 67 smoking patients. The scale for prognosis of spontaneous recovery was 21.242 in the 1st and 21.522 in the 2nd group. The average value of MMSE scale in the 1st group was 20.394, 22.424, 23.909, 24.373 and in the 2nd group 20.266, 22.308, 23.860 and 24.273. *Conclusion:* Comparative analyses of stroke patients show statistically better recovery in the 1st group and highly significant difference in results of MMSE, and the scale on prognosis of spontaneous recovery of the 1st group shows progressive gain.

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LABORATORY GAIT ASSESSMENT BEFORE AND AFTER VISCOSUPPLEMENTATION WITH HYALURONIC ACID

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Introduction: Since 1998, the Gait Analysis Laboratory of CMRA provides objective data of gait parameters. Three-dimensional kinematics, ground reaction forces and joint kinetics are systematically evaluated. Viscosupplementation is a valid therapeutic approach to symptomatic knee osteoarthritis. In the rehabilitation of stroke sequelae, the patient may present co-morbidities that affect functional prognosis. Knee osteoarthritis is a common example. *Aim:* To perform laboratory gait assessment before and after 4 intra-articular applications of hyaluronic acid in the left knee of a patient. *Patients and Methods:* 72 year-old male patient, presenting sequelae of ischaemic stroke. Left hemiparesis. Left knee osteoarthritis (Kellgren IV). *Results:* (Computerized data available, including graphic data). We describe symptoms, standing posture, gait cadence, knee kinematics, and vertical component of ground reaction forces (GRFz), regarding the affected limb. Before: Pain: 8/10 (VAS – visual analogue scale), Standing posture (sagittal plane): Hip flexum 21°; Knee flexum 35° Gait cadence: 79.1 steps/min, Knee kinematics (sagittal plane): stance 24°–58° of flexion; swing 27°–53° of flexion, GRFz: 0.7 sec to reach first peak, to a maximum=76% of body weight; absence of second peak.; After: Pain: 5/10 (VAS), Standing posture (sagittal plane): Hip flexum: 14°; Knee flexum: 28°, Gait cadence: 57 steps/min, Knee kinematics (sagittal plane): stance 16°–37° of flexion; swing 27°–37° of

flexion, GRFz: 0.3 sec to reach first peak, to a maximum=74% of body weight; second peak present to a maximum=80% of body weight. *Conclusion:* The Gait Laboratory provided data that allowed the objective monitoring of a therapeutic intervention by quantifying variables and explaining the clinical findings.

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IDENTIFICATION OF THE DYSTONIC CERVICAL MUSCLES IN THE PRIMARY CERVICAL DYSTONIA (PCD) PATIENTS

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Introduction: The most widely used method for identification of dystonic muscles in PCD is the physical examination (PEX) and electromyography (EMG) mapping. But, there are many limitations in this method. *Aim:* To document usefulness of the 18F-FDG-PET/CT in identifying the dystonic muscles and to document which dystonic muscles are responsible for abnormal posture in PCD patients. *Patients and Methods:* Eight PCD patients were evaluated with EMG-mapping and 18F-FDG-PET/CT. Dystonic muscle in EMG-mapping was defined as a muscle demonstrating turn/sec >100. And dystonic muscle was defined as a muscle demonstrating increased 18F-FDG uptake in the whole muscle area utilizing PET and fused PET/CT images by visual analysis. *Results:* Deep and superficial cervical muscles demonstrated increased 18F-FDG uptake. Obliquus capitis inferior (OCI) and splenius capitis (SPC) at the rotation side are major rotational muscles (6 of 8 and 7 of 8 torticollis patients) and SPC/OCI/longus capitis (LC) at the lateral flexion side are major lateral flexors (6 of 8/5 of 8/5 of 8 laterocollis patients) in 18F-FDG-PET/CT. SPC at the rotation side and SCM at the contralateral side are major rotational muscles (8 of 8 and 6 of 8 torticollis patients) and SPC and levator scapula (LS) at the lateral flexion side are major lateral flexors (8 of 8 and 4 of 8 laterocollis patients) in EMG-mapping. Total dystonic muscles mismatching to dystonic posture are 8 muscles in PET/CT and 15 muscles in EMG-mapping. Maximal rotation angle correlates significantly with SUVs of OCI at the rotation side ($r=0.825$, $p<0.05$). *Conclusions:* 18F-FDG-PET/CT scan provides valuable information for identification of dystonic muscles in all layers of the neck in PCD patients, especially deep cervical muscles which be can not detected in EMG-mapping. 18F-FDG-PET/CT is more specific than EMG-mapping method, and EMG-mapping method is much sensitive but false positive rate is high. OCI at the rotation side is the most important dystonic muscle which is predominantly associated with torticollis.

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CLINICAL AND FUNCTIONAL DIAGNOSTIC OF THE PAINFUL HIP

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Introduction: The painful hip is one of the most common causes for medical examination (family doctor, orthopedics, rheumatology, PRM) and often needs multidisciplinary medical approach. It is very important to determine the real pathologic cause of a painful hip and to have the proper therapeutical strategy and methods for

each of these, so to minimize the immediate and later clinical and dysfunctional consequences. *Aim:* This poster wants to be a short presentation of differential diagnostic of the painful hip and a remember of the principal scales and methods used in Rehabilitation Medicine for clinical, paraclinical and functional evaluation for a patient with hip pain as useful tools in diagnostic and treatment management. *Material and Method:* This poster presents the most common causes of a painful hip, organized by the two peaks of incidence (childhood and old people) and classified upon the principle causes of pathology – osteoarthritis, inherited, post-traumatic, etc. Beyond the characteristic clinical and paraclinical aspects of these diseases, it's very important to determine the functional impact of the painful hip upon the personal life (activities of daily living, family activities) and socio-professional changes for the patient; there are enumerated the most used functional evaluation scales (FIM, WOMAC), dysfunctional levels – ICIDH, 1980 (impairment, disability, handicap, incapacity) and the newest point of view through bio-psycho-social classification by ICF, 2001. *Conclusions:* 1) The evaluation of a patient with a painful hip must be done in a complex manner – clinical, etiological and functional – for a realistic and individual management of the rehabilitation therapy, trying to improve the functional level and for a better quality of life; 2) Rehabilitation is the multi- and inter-disciplinary patient-oriented management of functioning and health.

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CLINICAL EVALUATION OF THE DRIVING ABILITY IN ACQUIRED NEUROLOGICAL DISABILITY: QUESTIONNAIRE STUDY OF PATIENT'S ABILITY TO RETURN TO DRIVE AFTER BRAIN AND SPINAL CORD INJURY

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Clinical evaluation of the driving ability in acquired neurological disability: Questionnaire study of patient's ability to return to drive after brain and spinal cord injury. *Aim:* Ability to drive after neurological injury is an important goal for people within the working age group. We conducted a survey of people who were admitted at a tertiary neurological rehabilitation centre in UK to gauge their experience with regards to return to driving. Inclusion criteria- all those under 65 years of age who had some experience of driving before neurological injury. Exclusion criteria- complex disability with severe cognitive and physical impairment. *Results:* Demographic details showed that male 25, female 15, mean age was 47. Time elapsed since neurological injury, ranged from 7 months to 2 years. Diagnosis: Stroke 19, Traumatic Brain Injury 4, Spinal cord injury 6, GB syndrome 5, MS 1 and other 5. These characteristics were seen Dyspraxia 3, Neglect 1, Cognitive impairment 10, Hemianopia 7, Lack of motivation was seen in 5. Information given on driving assessment: Yes 9, No 31. 21 of the total group returned to drive, out of which those driving for work 13 and driving for leisure 8. Specialist assessment was needed in 13. *Conclusion:* There are many factors which affect the process of relearning the driving skills. Visual disturbance, dyspraxia and hemispatial neglect can be overcome by multidisciplinary rehabilitation and specialist driving assessment centres. However cognitive impairment, particularly lack to motivation to return to drive can remain as an important factor which prevents a person from driving after neurological injury.

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GAIT MONITORING BY STEPS-ON-THE-SPOT ASSESSMENT IN HEMIPLEGIC STROKE

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Introduction and Aim: Quantified assessment of gait is more and more used for driving our neurological patients' therapy. However, this method is often time-consuming, difficult and expensive. Therefore, after a first assessment, many teams do not repeat this examination. The present study suggests the steps-on-the-spot study as an alternative method. Therefore, we will compare here gait and natural steps on the spot. **Method:** Natural steps on the spot were measured out on a force platform (SATEL) during 25.6 seconds with a sampling frequency of 40 Hz, whilst the spatial-temporal gait parameters were collected with the help of a locometer (SATEL) for a 9-m-walking. During their rehabilitation, 10 hemiplegic patients were recorded by both methods, once a month during at least 3 months. Each patient was assessed at the same time clinically by FIM and PASS. **Results:** The results show a good correlation between the gait parameters and the steps-on-the-spot parameters during rehabilitation. The most relevant are the speed of the force center shift (correlated to the gait speed), the oscillations frequency (correlated to the gait cadence), the amplitude of the center force shift (correlated to the length and asymmetry of the steps) and finally, the duration of the on-the-left and on-the-right stance (correlated to the durations of the stance phase and of the swing phase). In addition, those kinetic measurements were observed more sensitive than the clinical assessments. **Conclusion:** In conclusion, this study demonstrates that the natural steps on the spot measured out on a force platform is an alternative, sensitive, fast and easy method for quantifying the variation of the gait parameters. Moreover, its accessibility is non limited and its cost very low. We consider therefore this method as a first choice for the follow-up of the walking progress in our neurological patients during their rehabilitation.

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BRAINSTEM AUDITORY EVOKED POTENTIAL (BAEP) IN BRUCellosIS

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Introduction: Brucellosis is a zoonosis still endemic in many parts of the world including coastal countries of Mediterranean Sea, Middle East regions and Central and South America. **Aim:** We surveyed whether patients with systemic brucellosis, BAEP differs from healthy persons or not. **Patients and Methods:** Fifteen patients with acute systemic brucellosis without neurological involvement and 15 apparently healthy persons underwent a brainstem auditory evoked potentials (BAEP) study. **Results:** Comparison of pooled data between the systemic brucellosis and healthy groups showed no significant differences in all BAEP parameters. **Conclusion:** In conclusion, BAEP parameters in brucellosis group did not differ from healthy persons. Thus in interpretation of BAEP in patients that referred for another reason and have systemic brucellosis, it is not necessary to consider about the effect of brucellosis on BAEP.

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STUDY OF PLANTAR PRESSURE DISTRIBUTION WITH INSTRUMENTED INSOLES IN PATIENTS WITH TOTAL KNEE REPLACEMENT

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Introduction: Total knee replacement (TKR) is a widely used surgery in the management of knee osteoarthritis. Gait analysis is a tool that has been used to measure functional outcome following TKR. **Aim:** The aim of this study is to contribute with new data in gait analysis in patients with TKR by evaluating plantar pressure distributions. **Material and Methods:** The study included 32 patients with uni or bilateral TKR, at least one year before the analysis. The analysis was performed with an instrumented insoles system with data transmission by telemetry. The parameters: stance time, cadence, peak and mean maximum plantar pressure and the maximum percentages of initial contact and push-off were analyzed in anatomical plantar areas. **Results:** The average of the stance time in right knees (RK) was 0.81s (SD±0.18) and 0.84s±0.15 in left knees (LK). The cadence in RK was 98.66±11.46 steps/min, LK 97.18±11.51 s/m. The mean peak of maximum pressure corresponded to the forefoot, 1225.62 KPa±721.84 for the RK, and 1391.40 KPa±684.81 for LK, and the mean maximum pressure corresponded to the rear foot with 276 KPa±123.18 for RK, and 284 KPa±81.61 for LK. The maximum percentages of initial contact corresponded to the mid and forefoot, with an 18.36% in RK, and 16.57% in LK. The push-off corresponded to the medial and lateral area with a 96% in RK, and 97% in LK. **Conclusions:** No significant statistical differences were obtained for stance time or cadence between knees. In both knees the maximum pressure corresponded to the forefoot and the mean maximum pressure to the rear foot. The initial contact corresponded in greater percentages to the forefoot and the push-off to the medial and lateral area in both knees.

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PERFORMANCE OF RISK ASSESSMENT INDICES FOR THE PREDICTION OF POSTMENOPAUSAL OSTEOPOROSIS

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Introduction: Bone mineral density (BMD) assessment by dual-energy X-ray absorptiometry (DXA) is the gold standard for identifying asymptomatic individuals with osteoporosis (1). Therefore clinicians need tools to identify patients most likely to benefit from testing (2). **Aim:** The purpose of this study was to determine the performance of osteoporosis risk assessment indices in identifying women with osteoporosis. **Patients and Methods:** Ninety-eight postmenopausal women aged 45 years and older were included in the study. BMD was used for diagnosing osteoporosis (T-score ≤ -2.5) at the femoral neck and lumbar spine (L2-L4). The subjects were evaluated in terms of the risk for osteoporosis by using Osteoporosis Prescreening Risk Assessment (OPERA), weight criterion Age, years after Menopause, age at MENARCHE, Body mass index (AMMEB), National Osteoporosis Foundation (NOF) and Osteoporosis Self-Assessment Tools (OST). Sensitivity, specificity and the diagnostic value of the risk assessment indices were calculated. **Results:** The proportion of women with osteoporosis at the femoral neck was 14.3% (14/98) and, 33.7% (33/98) at the lumbar spine. The sensitivity, specificity and the diagnostic value of the risk assessment indices to identify osteoporosis at the femoral neck were found respectively 35%-71%-66% for OPERA, 80%-68%-69% for AMMEB, 60%-62%-62% for NOF and 80%-68%-69% for OST. At the lumbar spine these values were 12%-93%-66% for OPERA, 60%-73%-69% for AMMEB, 42%-72%-62% for NOF, 54%-76%-69% for OST. **Conclusion:** These results show that OST and AMMEB have high sensitivity for identifying femoral neck osteoporosis. Therefore all four indices have low sensitivity

for identifying lumbar spine osteoporosis. In conclusion OST and AMMEB could be preferred as a screening test in clinical practice for identifying the femoral neck osteoporosis.

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IMPORTANCE OF DIAGNOSTIC PROCEDURES IN DIAGNOSTICS OF THORACIC OUTLET SYNDROME (SY TOS)

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Introduction: Thoracic outlet syndrome (Sy TOS) can cause much serious complication as the result of the specific changes anatomic-vascular structures of the upper aperture of thorax. The main characteristics are compression in the muscles and reduced circulation in the cervical region and arms. **Background and Purpose:** The aim of the study was to establish how effective were standard diagnostics methods Doppler sonography, oscillography and RTG of cervical region. **Materials and Methods:** We have examined 60 patients (30 male, 30 female), aged 25–65. All the patients passed through complete neurological and physiatrist examination. **Results:** All patients had indicative radiological imaging of the cervical region which mean hyperplasia processus transversus VC 7 bilateralis. Oscillography results were also positive in all patients. All patients had DCA and TCD. Analyzing results of DCA we found there was no significant statistic difference ($\chi^2=0.529$; $p=0.467$) between positive and negative results. Also, there was no significant statistic difference ($\chi^2=1.143$; $p=0.285$) between results of TCD. Results pointed no correlation between sex and single Doppler sonography results (for DCA Pearsonov $\chi^2=0.168$; $p=0.682$ and for TCD Pearsonov $\chi^2=0.933$; $p=0.337$), as in case that one result was positive as in case that both results were or positive or negative. **Conclusion:** Radiological imaging and oscillography shown as good indicator for diagnostic Sy TOS. Classical method of Doppler sonography could not be reliable index to diagnose Sy TOS, so we proposed using Doppler sonographies methods in provocative position to diagnose Sy TOS.

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DOES COMPREHENSIVE INPATIENT REHABILITATION AFFECT THE DISEASE ACTIVITY AND PHYSICAL FUNCTION IN PATIENTS WITH RHEUMATOID ARTHRITIS IN A LONG-TERM PERIOD?

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Introduction: Rehabilitation interventions and strategies are a core component of the management of people with rheumatic diseases. **Aim:** The purpose of this clinical trial was to evaluate the long-term impact of a 1-month comprehensive protocol of rheumatologic rehabilitation program for patients with RA on physical function and disease activity scores. **Patients and Methods:** The patients of this trial were selected from 188 patients diagnosed with RA according to the classification criteria of ACR. Patients with functional class I-III RA were divided to rehabilitation group (RG) and control group (CG). Mean follow-up of these groups were 15.9±9.9 months. All of the patients (mean age: 50.2±12.7 years, mean duration of RA: 6.6±5.7 years) have used combined DMARDs in

addition to low-dose steroid and NSAID regimens. The RG was also treated with education and self-management, exercise, occupational and physical therapy, psychological counseling, orthotics and assistive devices for 1-month inpatient rehabilitation process. The CG were treated with 'Patient education and exercise booklet' of NRAS(1) in addition to DMARDs treatment. Both groups were encouraged to take part in aerobic activities 2–3 times a week. SPSS 11.5 descriptive, *t*-tests, NPar Wilcoxon signed ranks tests were used for statistical analysis. **Results:** There were not any statistically significant differences between RG and CG in disease and treatment parameters. While changing in DAS28 scores were not statistically significant (RG: 1.8±0.6 vs CG: 1.9±1.2, $p=0.06$), changing in HAQ were statistically significant (RG: 0.8±0.5 vs CG: 0.2±0.6, $p=0.01$) in comparisons of intergroup. Scores of HAQ were different in RG (from 1.8±0.5 to 1±0.8, $p=0.02$) at follow-up. **Conclusion:** Comprehensive inpatient rehabilitation programs for patients with RA are safe, effective and reasonable interventions with improvement physical function of HAQ. Based on our results, comprehensive inpatient rehabilitation programs are superior to exercise booklets commonly used in RA patients for physical function.

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DOES COMPREHENSIVE INPATIENT REHABILITATION AFFECT THE DISEASE ACTIVITY AND PHYSICAL FUNCTION IN PATIENTS WITH ANKYLOSING SPONDYLITIS IN A LONG-TERM PERIOD?

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Introduction: Rehabilitation interventions and strategies are a core component of the management of people with rheumatic diseases. **Aim:** The purpose of this clinical trial was to evaluate the long-term impact of a 1-month comprehensive protocol of rheumatologic rehabilitation program for patients with AS on physical function and disease activity scores. **Patients and Methods:** The patients of this trial were selected from 74 patients diagnosed with AS according to the modified criteria of NY. Ambulatory patients with AS were divided to rehabilitation group (RG) and control group (CG). Mean follow-up of these groups were 9.7±7.6 months. All of the patients (mean age: 37.3±13.3 years, mean duration of AS: 6.6±7.1 years) have used SSZ and NSAIDs. The RG was also treated with education, exercise, occupational and physical therapy, postural training (1), cardiopulmonary rehabilitation, orthotics, local injections, and disability solutions for 1-month inpatient rehabilitation process. The CG were treated with patient education and exercise by 'Guidebook for patients with AS' of National AS Society (2). Both groups were encouraged to take part in aerobic activities 2–3 times a week. SPSS 11.5 descriptive, *t*-tests, NPar Wilcoxon signed ranks tests were used for statistical analysis. **Results:** There were not any statistically significant differences between groups in disease and drug characteristics. The intergroup comparison of changes on Bath AS Disease Activity Index (BASDAI) showed significant differences in the decrease BASDAI between study groups (RG: 1.1±2.2 vs CG: 1.9±1.7, $p=0.04$). **Conclusion:** Comprehensive inpatient rehabilitation programs for patients with AS are effective intervention on BASDAI. Inpatient rehabilitation programs are similar to exercise booklets commonly used in patients with AS for physical function (BASFI). Inpatient procedures may lead to immobility tendency. Future studies are needed to answer this question.

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NECK MUSCLES CROSS SECTIONAL AREA IN ADOLESCENTS WITH AND WITHOUT HEADACHE – MRI STUDY

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Introduction: Cervical musculature may play an important role in the genesis of tension-type headache. However, there are no reports on a possible association between the morphometrical features of the neck flexion and extension muscles and adolescence headache. **Aim:** To examine differences in neck flexion and extension muscles cross-sectional area (CSA) in adolescents with and without headache. **Methods:** A population-based sample of 17-year-old adolescents with migraine ($n=19$), tension-type headache ($n=24$) and healthy controls without headache ($n=22$) was examined. CSA of the neck muscles was measured from axial T1-weighted magnetic resonance images (MRI). **Results:** Boys with tension-type headache showed significantly smaller CSA of right sternocleidomastoid muscle than boys with migraine and girls with tension-type headache showed significantly smaller CSA of combined right sternocleidomastoid and scalenus muscles than girls with migraine. In addition, boys with migraine had significantly larger CSA of both right sternocleidomastoid and combined right sternocleidomastoid and scalenus muscles, and left semispinalis capitis muscle and combined left semispinalis and splenius muscles than boys without headache. In boys and girls no other significant differences were observed in the CSA of neck flexion or extension muscles. **Conclusions:** This preliminary work demonstrates that both girls and boys with tension-type headache and migraine have differences in the size of neck flexion muscles, especially unilaterally. In boys, unilaterally increased size of neck flexion and extension muscles is associated with migraine. These findings, if confirmed in further studies, may have important diagnostic and therapeutic implications for rehabilitation of adolescents with headache.

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ADAPTATION OF TURKISH VERSION OF THE FOOT AND ANKLE OUTCOME SCORE (FAOS)

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Background: The aim of this study is to assess the validity and reliability of Turkish version of the Foot and Ankle Outcome Score (FAOS). **Materials and Methods:** FAOS consists of 42 items assessing five subscales including pain, other symptoms, function in daily living activities (ADL), function in sport and recreation and foot and ankle related quality of life (QoL). A total of 68 patients with foot and ankle problems were included in the study. FAOS was administered to subjects twice a week for testing reliability. The validity was based on performing additional tests including pain severity and functional capacity. Pain severity was assessed by using visual analogue scale (VAS). Pain severity included the pain measurement at night, while ascending/descending stairs, walking on rough surface and patient's global assessment of pain. Functional capacity was measured by VAS and included, patient's global assessment of their functional capacity, difficulty in ascending/descending stairs, and quick walking. Also the time measurement of 100 m walking was observed for calculated from all patients. **Results:** The reliability of the Turkish version of FAOS was very good (ICC range 0.94–0.97), with high internal consistency (Cronbach's alpha 0.95). Patient's global assessment of pain severity showed a strong correlation with FAOS_{pain} and FAOS_{ADL} scores ($r=-0.56$ and $r=-0.50$). Pain at

night had good correlation with FAOS_{pain} and FAOS_{ADL} scores ($r=-0.56$; $r=-0.57$, respectively). Also a strong correlation with pain while ascending/descending stairs and FAOS_{pain}/FAOS_{ADL} was observed ($r=-0.53$ and $r=-0.59$). Pain severity while walking on rough surface had strong correlation with all five FAOS subgroup scores. There was no correlation between the time measurement of 100 meter walking test and FAOS ($p>0.05$). Difficulty in quick walking showed strong correlation with FAOS_{pain}, FAOS_{ADL} and FAOS_{QoL} ($r=-0.50$; $r=-0.52$ and $r=-0.58$). Patient's global assessment of functional capacity had moderate correlation with FAOS ADL scores. **Conclusion:** These results show that Turkish version of FAOS is reliable and valid in evaluating the symptoms, functional disability and quality of life of the patients with foot and ankle disorders.

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ASSESSMENT OF BALANCE IN DEAF AND HARD OF HEARING CHILDREN – CONVERGENT VALIDITY OF POSTUROGRAPHY

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Introduction: Deaf and hard of hearing children demonstrate inferior balance and gross motor skills compared to hearing children.(1–4) As balance is a fundamental skill for the motor development of children, a valid and reliable instrument to identify weaknesses in postural stability is essential. The aim of this study was to investigate the convergent validity between posturography data generated by the Basic Balance Master (BBM) (Neurocom® International Inc., Clackamas, OR, USA) and functional balance tests in deaf and hard of hearing children. **Patients and Methods:** The study involved 22 deaf and hard of hearing children (16 boys, 7 girls between 6 and 12 years) without cognitive developmental problems, neuro-motor or orthopaedic disorders. All subjects completed the modified Clinical Test of Sensory Interaction on Balance (mCTSIB) and the Unilateral Stance (US) on the BBM and three functional balance tests; One Leg Stance (OLS), balance beam walking and one-leg hopping. Spearman rank-order correlation coefficients were calculated to evaluate validity. The results could not confirm a one-dimensional balance concept because the correlations between posturography data and functional balance tests were poor and many not significant. This study can neither confirm a two-dimensional concept of static and dynamic balance. The results suggest that balance is rather a multi-dimensional than a one-dimensional concept. Therefore we propose an assessment protocol consisting of posturography and functional static and dynamic balance tests. Balance performance can only be interpreted in relation to the specific tests used in the assessment.

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BALANCE PERFORMANCE DURING SEMITANDEM STANCE IN STROKE PATIENTS

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Introduction: Balance impairment, characterised by increased sway and asymmetrical weight-bearing (WB) is common after

stroke (1). Assessments of balance often use a reduced base of support (BOS), e.g. tandem – (TS) and unilateral stance (US) (2). Patients unable to maintain a small BOS perhaps benefit from a semitandem stance (STS) test. *Aim:* To investigate the preferred foot placement, WB and balance performance during STS in stroke patients. *Methods:* 15 stroke patients (9 right/6 left paretic patients) took part. Balance performance was assessed during force platform measurements of WB and centre of gravity (COG) displacement during three tasks: 1) bilateral stance 2) preferred STS (choice of side as front leg) and 3) second STS (other foot in front). *Results:* Whereas only three patients (20%) could perform US and six (40%) TS, all patients could perform STS. Six patients preferred to put their paretic leg in front. No significant relation was found between hemiparetic side and preferred side of front leg ($p=0.58$). Repeated measures analysis of the mean COG sway velocity showed a significant difference ($p=0.013$) between the three conditions, whereby bilateral standing and the preferred STS (both $0.433^\circ/\text{sec}$) were more stable than the second STS ($0.533^\circ/\text{sec}$). No significant differences ($p=0.135$) in mean COG sway velocity was found between bilateral standing ($0.433^\circ/\text{sec}$), STS with the paretic leg as front leg ($0.4533^\circ/\text{sec}$) and as rear leg ($0.5133^\circ/\text{sec}$). The percentage of WB on the paretic leg did not show significant differences between the conditions. *Conclusion:* STS is a good alternative for stroke patients with inability to maintain a small BOS. Results suggest that there is no guideline for the front or rear placement of the paretic side in view of stability. A complete test for a comprehensive view on balance should embody both performances.

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MUSCULAR ACTIVITY OF DELTOID MUSCLE DURING COADMAN'S PENDULAR EXERCISES

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Introduction: Deltoid muscle establishes, evidently, the shoulder's projection morphologically formed by three bundles, clavicular, acromial and spinal. Glenohumeral joint stability is essential for daily activities, and pendular exercises are self mobilization techniques that use gravity to separate humerus from glenoid cavity, and it's a very important ally to the treatment of this joint. *Aim:* Analyze the effects of Coadman's pendular exercises with halter, shin pad and without load in the muscular activity of deltoid. *Method:* 30 volunteers were assessed, both gender, submitted to surface electromyographic analysis of deltoid muscle with MIOTEC model miotool 400 of 4. Surface electrodes of Ag/ClAg, round, pre gelded and auto adhesive from MEDITRACE, during the execution of Coadman's pendular exercises for one min, without load, and just after with a shin pad of 1kg tied to wrist and afterwards carrying halter of 1 kg. Variance tests (ANOVA) and Turkey non pared test were performed with a significance level of 0.05 (5%) with a confidence interval of 95%. *Results:* In the comparison of voluntary maximal isometric contraction (VMIC) with free exercise, shin pad and halter exercises, it was showed p -value of 0.001, however, in the comparison of free exercise and shin pad exercise, it was obtained a p -value of 0.117; in the comparison of free exercise and halter it was showed p -value of 0.015; and in the comparison of halter exercises and shin pad exercise it was obtained p -value of 0.093. It was verified the percentage of exercises values over VMIC, where it was obtained 1.85% in free exercise, 1.90% in exercise with shin pad and 3.08 in exercise with halter. *Conclusion:* It was concluded that these three studied ways

of exercises are effective due to low muscular activity showed in EMG; however these results show a significant higher activity of deltoid muscle in the exercises with halter.

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ACTIVITY OF SCALENE MUSCLE DURING VENTILATORY FUNCTION

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Introduction: The function of scalene muscle during respiratory mechanic is conflicting in literature, and is considered an accessory musculature of ventilation by some authors (1, 2). Surface electromyography (EMG) is a safe, effective and non invasive method for assessment of respiratory musculature. *Aim:* The aim of this study was to investigate the activity of scalene muscle during quiet breathing through EMG. *Methods:* 52 subjects were randomly selected for this study, both gender, mean age 21 (-1 ± 6). Electromyographic data of scalene muscle (ESC), external intercostals (EI) and rectus abdominal (RA) were randomly collected during quiet breathing. *Results:* It was observed statistically significant differences for electromyographic values, media value as well as peak value when comparing rectus abdominal (RA) to the others ($p<0.001$); however, there wasn't any difference between external intercostals (EI) and scalene (ESC) when compared during quiet breathing ($p<0.148$). *Conclusion:* The recruiting of scalene muscle showed present and constant in quiet breathing in all subjects, suggesting that this musculature can't be classified as accessory.

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LATISSIMUS DORSI AND ITS ROLE IN BREATHING PROCESS

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Introduction: The legitimacy of this theme is founded in the fact that latissimus dorsi muscle is continuously showed as an appendicular trunk muscle, which function would be hypothetically restricted to shoulder joint and upper limb cingulum, disregarding its possible action over the thoracic wall and consequently participation in breathing process. *Aim:* The goal of this study was to verify the recruiting of latissimus dorsi during deep inspiration, confirming its possible participation as an accessory breathing muscle. *Methods:* The subjects of this study were young adults, no smoking subjects, not showing any kind of pathological process in the airways. For electromyographic analysis it was used a MIOTEC model miotool of 4 channels and surface electrodes of Ag/ClAg, from MEDITRACE. It was also utilized a volume inspiration stimulator, in order to facilitate the deep inspiration. The situations the subjects were measured were: 1) subject sitting, breathing freely; 2) subject sitting, breathing with the aid of the stimulator; 3) subject standing, breathing with the stimulator. In the three situations, the volunteer kept the upper limbs along the

body, in order to isolate the action of latissimus dorsi over the shoulder joint. *Results:* According to results showed below, it was confirmed the action of latissimus dorsi during deep inspiration, specially in sitting position with the aid of a stimulator, what could be evidenced by a huge difference between peak values between the three situations, confirming the recruiting of this muscle in deep inspiration. *Conclusion:* The participation of latissimus dorsi in deep inspiration was confirmed by the results of this study. This way, when an adequate bibliographic revision is done and data collection is made through surface electromyography and through a volume inspiratory stimulator, the study can contribute for the human biomechanic conditions to be enlarged, specially referring to a primordial act, the breathing.

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COMPARATIVE STUDY OF ELECTROMYOGRAPHIC ACTIVITY OF VENTILATORY MUSCLES DURING MAXIMAL SUSTAINED INSPIRATION EXERCISE, FLOW AND VOLUME RESPIRATORY STIMULATOR

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Introduction: Evidences suggest that deep inspirations exercises could be so effective as respiratory stimulators (RS), which are contradictory in clinical practice when referring to the use of flow respiratory stimulator and volume respiratory stimulator. *Aim:* The objective of this study was to investigate the activity of some ventilatory muscles as scalene (ESC), external intercostals (EI) and rectus abdominal (RA) during the utilization of a flow respiratory stimulator, volume respiratory stimulator and maximal sustained inspiration exercise throughout EMG. *Methods:* 57 subjects, 38 women; 14 men was evaluate with a EMG MIOTEC model miotool 400 of 4 and surface electrodes of Ag/ClAg, round, pre gelled and auto adhesive from MEDITRACE. Electromyographic data were randomly collected during quiet breathing and pulmonary reexpansion exercises. *Results:* It was observed statistically significant differences in the electromyographic values for media and peak when comparing maximal sustained inspiration exercises to respiratory stimulators ($p < 0.001$), however there wasn't significance between flow and volume respiratory stimulator for external intercostals ($p = 0.672$) and scalene muscle ($p = 0.943$). *Conclusion:* Maximal sustained inspiration exercises as well as respiratory stimulators provoked muscle recruiting in the analyzed respiratory musculature, once electromyographic activity was higher when the devices were utilized.

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SHOULD SYSTEMATIC EXAMINATION OF THE FOOT AND ANKLE COMPLEX BE PART OF PHYSIOTHERAPY ASSESSMENT OF MEDIAL COMPARTMENT OSTEOARTHRITIS OF THE KNEE AND HIP OSTEOARTHRITIS?

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Background: The relationship of foot posture to medial compartment osteoarthritis of the knee (MCOA) and hip osteoarthritis (OA) has not been explored although in other medical fields, such as neurology and sports medicine, the relationship between foot posture, lower limb pain and function has been acknowledged. *Objective:* This descriptive study aimed to explore the possibility of a relationship between foot posture of patients with MCOA, with hip osteoarthritis (OA) and a healthy control group, using the Foot Posture Index (FPI) and goniometric measurement of talocrural dorsiflexion. *Methods:* (Ethics ref 06/Q1607/1) Sixty participants took part: twenty patients with MCOA, twenty patients with OA hip (both demonstrating radiographic and clinical evidence of grade IV OA), and twenty age-matched healthy volunteers as a control group. A one way Analysis of variance (ANOVA) was used to investigate any differences between the 3 groups for foot posture using FPI scores and talocrural dorsiflexion measurements. *Results:* Results indicated significant differences between the groups ($p < 0.001$). Patients with MCOA had a high positive FPI score (indicating a pronated foot), patients with hip OA had a low negative FPI score (indicating a supinated foot). The healthy controls had a normal score distributed over a wider range than the other two groups. In addition, the results of the Pearsons test indicate that foot posture correlated positively with talocrural dorsiflexion ($r = 0.55$, $p < 0.001$). *Conclusions:* Differences in foot posture between patients with different sites of lower limb OA has been noted. However, a causal relationship is very difficult to establish without a longitudinal study. Nevertheless, from the evidence presented, if patients with lower limb OA present with feet which are at the extremes of normal range, advice on footwear, orthoses and gait reeducation and stretches as well as strengthening exercises may be useful. In view of the current high incidence of lower limb OA, any investigation that may lead to improved assessment and conservative management is worthy of consideration.

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IATROGENIC INJURY TO THE LONG THORACIC NERVE – A CLINICAL CASE

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Introduction: The long thoracic nerve innerves the serratus anterior muscle, which is responsible for stabilizing the scapula against the thoracic wall. Injury to the long thoracic nerve is a common cause of winging scapula. This condition, causing paralysis or weakness of the serratus anterior muscle is serious and potentially disabling. Patients present with pain followed by amyotrophy, destabilization of the scapula and functional impairment, what represents a severe handicap as it limits activities of daily living. *Aim:* To report a case of iatrogenic injury to the long thoracic nerve and review physiopathology, clinical and differential diagnosis and therapeutic approaches of the long thoracic nerve iatrogenic injury. *Patient:* Authors report the case of a 54-year-old woman with breast ductal carcinoma who presented with scapular winging (scapula alata) due to iatrogenic injury to the right long thoracic nerve following upper outer quadrantectomy with axillary lymph node dissection. She had pain and amyotrophy that affected her posture and function, with limitation in abduction and flexion of the shoulder above 90°. The diagnosis was confirmed by an electromyographic study of the right arm. She started a conservative rehabilitation program with progressive functional recuperation. *Conclusions:* Data on literature states that surgical procedures, including mastectomy with axillary dissection, are one of iatrogenic injury causes. Conservative treatment allows the recovery in most patients, although it may take a long time.

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P284**COST OF INPATIENTS REHABILITATION**

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Introduction: Public rehabilitation services in Greece are belonging to National Health System. Studies on cost of rehabilitation, international, are very few and depend on each country's health system. **Aim:** We conduct this study in order to investigate factors influencing cost of rehabilitation, in euros, like length of stay, age, disability category, functioning in admission, functional improvement. **Patients and Methods:** One hundred and thirteen patients with neurological and musculoskeletal disabilities were evaluated. They were admitted consecutively to the Asklepieion General Hospital inpatient rehabilitation unit during the last 4 years (2004–2007). Functional status was evaluated with the Functional Independence Measure (FIM) on admission and discharge. Cost of services were derived from the financial offices of the hospital. Patients in vegetative state were excluded from the study. **Results:** The daily average cost of rehabilitation for the average length of stay of 104.4±99.4 days, was euros 69.4±13.4. The FIM score improved from 66.5±22.2 on admission to 91.6±24.3 at discharge, gain of 25.1±16.4. The cost of rehabilitation for the average functional improvement of FIM score was euros 368.6±397. The daily average cost of rehabilitation was correlated negatively with FIM score on admission ($r=0.192, p=0.04$). The overall cost of rehabilitation was correlated negatively with the FIM score on admission ($r=0.302, p=0.0012$) and with the FIM score on discharge ($r=0.197, p=0.036$). FIM efficiency (FIM gain/LOS) was 0.509. **Conclusion:** The main factor that rises the cost of rehabilitation is the functional status. The more disability the more expenses.

P285**HIGH RESOLUTION ULTRASOUND IN CLINICAL APPROACH TO ANKLE SPRAIN INDUCED SURAL NEURITIS**

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Introduction: The sural nerve is a purely sensory nerve, and sural neuritis is uncommon in clinical practice. Sonography may be applied as an additional examination to improve diagnostic accuracy. **Aim:** The purpose of this case report is to emphasize that electrophysiological examination is a gold standard tool for peripheral nerve lesion diagnosis. High resolution ultrasound (HRUS) can also provide a noninvasive and objective test for diagnosis nerve problem. **Patients and Methods:** A thirty-year old female dancer came to our hospital outpatient clinics due to right ankle pain and swelling. She expressed numbness and parasthesia that extended to the right dorsolateral foot. She dated the onset at 8 weeks earlier when she fell during dance practice and sprained her right ankle. High resolution musculoskeletal ultrasound showed focal hypoechoic change in right sural nerve around ankle region. Nerve

conduction studies and electromyography (NCV/EMG) showed normal except mild prolongation of right sural distal latency and decreased conduction velocity compared to left side sural nerve (normal side). Right sural neuritis was diagnosed after the above examinations were completed. **Result:** We arranged physical therapy including transcutaneous electrical nerve stimulation and therapeutic ultrasound applied over her swelling and numbness area of right ankle. At the 12-month follow-up point, the patient no longer exhibited any right ankle pain nor any sensory impairment. **Conclusion:** Ankle sprain is a very common problem in clinical practice; it may cause muscle, ligament, and soft tissue injury. Ankle sprain-induced sural neuritis is uncommon and can easily miss detection. Diagnostic accuracy can be improved if examination techniques combine NCV, EMG and HRUS.

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P286**A ROMANIAN EXPERIENCE ABOUT THE REAL EFFICIENCY OF THE COMPLEX AMBULATORY REHABILITATION AT THE OLD PATIENT**

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We consulted 1890 aged patients with different locomotor diseases in three different important Romanian centers of rehabilitation in Bucharest. The appreciation of the real potentialities of the rehabilitation had established the treatment's objectives and the concrete therapeutic means (with regard to the age, the functional remaining and the associated diseases). It was applied and individualized physical and kinetic treatment, in 12 days' series. We had compared the initial with the final valuation, for each patient. We found: – the electro-analgesia by low frequency electrotherapy has a very good tolerance and efficiency at the aged subject (73.27%); – the local thermotherapy is useful, as symptomatic and also, as pathogenic therapy; – the kinetotherapy, correctly individualized, is more hardly accepted (43.24%) but it has a certain positive effect at the aged subject; – the other physical means are useful but no compulsory; – the effect of these means is less evidently at the aged subject. The advisability of the ambulatory physical treatment at the aged patients is proved by the low number of hospitalizations (7.4%) for continuation or completion of the rehabilitation, and also, by the clinical improvement for six months minimum of the majority of the chronic locomotory aged patients (about 80%).

P287**STROKE PATIENTS AND MAIN FACTORS THAT AFFECT DRIVING ABILITY**

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Introduction: When a stroke occurs it can affect the skills necessary for independent driving. Returning to driving after a stroke is an important part of rehabilitation. **Aim:** To evaluate the driving

ability of stroke patients using clinical examination and driving-related tests and to record the most common reasons which cause inability to drive after a stroke. *Patients and Method:* Our study took place in 'INIOHOS' Center located in Athens. All participants were assessed at least six months after the onset of stroke. Our sample included 183 participants (151 men and 32 women) aged from 28 to 65 who had sustained a stroke during the years 2003–2007. All participants were assessed at least six months after the onset of stroke. Driving assessment was comprised of two parts: the off-road and the on-road assessment. *Results:* At first assessment, 120 out of 183 patients (65.5%) were judged as able for driving, 43 (23.4%) were found potentially able and 20 (10.9%) not able to drive at all. Main elements that had a severe impact on the off road behavior were, perceptual limitation, cognitive deficiencies, visual field deficits and motor disabilities. On the on road test severe impact had the inappropriate driving speeds, slow or poor decisions, getting lost, trouble in paying attention to signals, road signs and pavement markings and poor road position. Participants who undertook and passed the off and on road assessment, had score in Mini Mental State Examination higher than 25. The side of lesion influenced driving ability. Factors such as pre-stroke driving frequency, functional independence and marital status induced individuals to resume driving earlier. *Conclusion:* Mobility is an equal right for every person. The target is a) to identify stroke patients who may be at risk when they drive a motor vehicle, due to impaired functional status, through assessment and b) maintain safe and independent driving for as long as possible.

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LONG LASTING IMPROVEMENT OF FUNCTIONAL STATUS OF PATIENTS WITH KNEE OSTEOARTHRITIS AFTER PHYSICAL THERAPY AT – 6 MONTHS FOLLOW-UP

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Introduction: Physical therapy is important part of therapy programme of knee osteoarthritis. It can improve functional status of patients by decreasing pain and improving muscle strength, knee mobility and stability. *Aim:* To test efficacy of physical therapy in a long lasting improvement of functional status of patients with knee osteoarthritis (6 months follow-up period after treatment). *Patients and Methods:* 60 patients (42 women and 18 men) with knee osteoarthritis were treated in out-patient clinic only with physical therapy (10 electro therapy treatments, 10 pulsating magnetic field treatments and exercise program during 4 weeks). Patients were 40–69 years old (mean 58.1 ± 6.5), disease duration was 1–20 years (mean 7.33 ± 6.9). Functional status has been measured using WOMAC index (pain, stiffness and function subscale) before (Visit0–V0) and after physical therapy (Visit 1–V1), three (Visit 2–V2) and six (Visit 3–V3) months after the treatment period. Difference in functional status before and after therapy was calculated using Wilcoxon's test. *Results:* After physical therapy, functional status of patients was improved, i.e. Womac index (Wi) was significantly lower (Wi 2.70 ± 0.52 at V0; and Wi 1.69 ± 0.45 , at V1; $p < 0.0001$). Three months after treatment Womac index was the lowest (Wi 1.33 ± 0.22 at V2) and compared to Wi at V1, there was significant improvement ($p < 0.0001$). Additional improvement in comparison to V1 was noted even six months after treatment (Wi 1.43 ± 0.29 at V3, $p < 0.01$). There was no statistically significant difference in Womac index three and six months after therapy. *Conclusion:* Functional status of patients with knee osteoarthritis who were treated by physical therapy remains improved at least 6 months after treatment.

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USEFULNESS OF ULTRASONOGRAPHY IN DETECTION OF RADIOCARPAL JOINT SYNOVITIS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Introduction: Assessment of disease activity is the most important in the clinical management of RA patients. *Aim:* To examine the significance of ultrasonography (US) in detection of radiocarpal joints synovitis versus clinical examination, in patients with rheumatoid arthritis (RA). *Patients and Methods:* 29 consecutive patients (10 male, 19 female), mean age 52 ± 14.3 (range 29–75 years), disease duration 4.6 years (range 1–14) with RA (ACR criteria), were included. In each patient radio carpal joint was evaluated. Clinical assessment consisted of joint tenderness and swelling detection. US examination consisted of synovitis detection (synovial fluid or hypertrophy, using OMERACT preliminary definition). US was performed by two independent investigators blinded with regard to the clinical findings at the same day. AU5 Harmonic (Esaote) equipped with linear probe 10–14 MHz was used. Joint swelling (presence or absence) was compared to synovitis detected by US. In statistic analysis, interobserver reliability was assessed using an unweighted Kappa test, also US and clinical findings were assessed using an unweighted Kappa test. *Results:* Kappa coefficient of US findings obtained by the two investigators was 0.69. Kappa coefficient of US correlated with clinical examination was 0.37. From the total of 58 joints in 58% (33 joints), findings were the same, but in 42% findings were different. 39 joints were clinically inflamed, of which US detected synovitis in 23 joints. From the rest of 19 joints, which were not clinically inflamed, US detected synovitis in 9. *Conclusion:* There was fair correlation between US and clinical findings. US showed to be more sensitive than clinical examination in detection of joint inflammation in patients with RA.

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FUNCTIONAL OUTCOME IN A PATIENT WITH TRANSIENT PARAPLEGIA FOLLOWING EXCISION OF MENINGIOMA: A CASE STUDY AND LITERATURE REVIEW

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Objective: To evaluate the functional outcome of a patient with transient paraplegia following excision of meningioma. *Method:* Case study and literature review. *Case Description:* Our patient was a 38-year-old female who presented to an outside ER complaining of headache and new onset seizure. CT scan showed a fronto-temporal mass. Patient underwent bi-frontal craniotomy/tumor resection. Biopsy revealed a meningioma. Postoperatively, she was paraplegic. CT scan showed no new bleed or ischemia. She was transferred to our acute TBI unit on 3/11/04 for rehabilitation. She was non-ambulatory with BLE muscle strength of 1/5 for hip flexion and 0/5 for the knees, ankles and toes. BUE muscle strength

was 5/5. DTRs were hypoactive on bilateral lower extremities. Babinski, Hoffman's, and clonus were negative. Sensory was intact. On admission, she complained of right-sided chest pain. A spiral CT scan showed pulmonary emboli on the right. She was transferred to Medicine for further management, stabilized medically and readmitted to acute TBI unit. Neurological exam showed increased muscle strength of 3/5 in all muscle groups on the RLE but unchanged on the LLE. She was discharged on 4/16/04 ambulating 150 feet×2 with rolling walker and left ankle foot orthotic with supervision. Her muscle strengths improved except dorsiflexion/plantar-flexion on the left at 2/5. Outcome was measured using Functional Independence Measure (FIM) on admission and on discharge. *Conclusion:* There have been reports in the literature of functional improvements with brain tumors. To our knowledge, this is the first reported case of a patient who underwent craniotomy presenting with transient paraplegia with significant gains in FIM score after inpatient rehabilitation.

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LONG-TERM EFFICACY OF OLIGOMINERAL SPA THERAPY IN RHEUMATOID ARTHRITIS

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Introduction: Rheumatoid arthritis (RA) is an inflammatory rheumatic disease, for which treatment regimens are complex and include, besides disease modulating and symptomatic drug therapy, physical and/or occupational therapy, specific exercises, surgery, orthopaedic aids, together with psychosocial care. RA rehabilitation aims particularly to inhibit the inflammation, to relieve pain, to preserve the remaining functions and to develop compensatory function and coping strategies. Oligomineral spa therapy is an integral part of physical therapy of RA. *Aim:* The aim of our study was to demonstrate that: The complex rehabilitation program including oligomineral spa therapy is effective in relieving pain, increasing mobility and decreasing functional and psychosocial limitation; The oligomineral spa therapy has long-term benefits. *Patients and Methods:* The study was designed to evaluate the efficacy of rehabilitation treatment, including hydrokinetotherapy in oligomineral thermal water in Felix Spa Romania versus rehabilitation program including only physiotherapy in an in-patient rehabilitation hospital. 71 patients with RA (on the 1987 Revised American College of Rheumatology Criteria) were randomized in two groups (oligomineral thermal group and control group). Data were collected at admission, on completion of treatment (3 weeks) and 6 months thereafter. The Arthritis Impact Measurement Scales (AIMS) was used to describe the physical and psychosocial consequences of RA, pain intensity was measured on a Visual Analog Scale (VAS) and Health Assessment Questionnaire (HAQ) was used to assess the quality of life. *Results:* Both groups showed good treatment effects at discharge, concerning pain intensity ($p < 0.02$ in oligomineral group and $p < 0.05$ in control group). The AIMS and HAQ improved more in oligomineral group than in the control group but the difference is not statistical significant (AIMS: $p > 0.05$ for both groups, HAQ: $p > 0.05$ for both groups). The oligomineral group had better values 6 month after the end of rehabilitation compared to baseline whereas the control group had already declined to values. *Conclusions:* The results confirm the suggestion that rehabilitation program including hydrokinetotherapy in oligomineral thermal water induce beneficial long-term effects in RA although the underlying mechanisms are not yet fully understood.

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ULTRASOUND FINDINGS IN PAINFUL SHOULDERS

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Aim: Our aim was to find out the most frequent ultrasound findings i.e. the most frequent morphological background in patient with painful shoulders. *Patients and Methods:* 25 patient, aged 27 to 82, were examined in this study. These patients' main complain was painful shoulder. They were assessed clinically and by ultrasound imaging. Ultrasound examination of the shoulder comprised long head of biceps brachii muscle tendon, rotator cuff tendons, supraspinatus insertion, subacromial bursa, joint effusion, acromioclavicular joint, as well as looking for less frequent findings such as foreign bodies and tumors. *Results:* Acute trauma was the cause of the pain in only 20%. In 50% of the patients that had not suffered acute injury, partial rupture of the supraspinatus muscle has been found. All of them had signs of tendinopathy in supraspinatus muscle, while tendinopathy (or tendinosis) in other rotator cuff tendons has been found in less than 20%. Hyperostosis, calcifications in supraspinatus insertion, and subacromial bursitis frequently accompany tendinosis with or without partial rupture of the supraspinatus. *Conclusion:* Tendinopathy of the supraspinatus muscle is the most common US finding in painful shoulder that has not acutely injured. It is often accompanied with its partial rupture. Osteoarthritis degeneration of supraspinatus insertion is commonly found in ruptured as well as in non-ruptured tendons. Other rotator cuff tendons' tendinosis is less frequent isolated, but possible cause of painful shoulder

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FUNCTIONAL ASSESSMENT IN ALS PATIENTS IN A BRASILIAN PM&R UNIVERSITY CENTER IN THE PERIOD OF 2006-07 - PRELIMINARY REPORT

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Introduction: The amyotrophic lateral sclerosis (ALS) is the disease with greater impact on the degree of functional dependence known. The improvement in respiratory care to that population increased their survival, leading change in the focus of attention for motor disabilities until this, neglected. Thus, the functional assessment became mandatory to build the rehabilitation program. Historically, categorical observational classifications were used, making difficult to analyse and compare as horizontally as vertically. Since 1999, have been published an standardized and internationally validated toll (ALSFS-r), allowing a comparison between the research groups. *Objective:* To compare the categorical classification used in ELA with the clinical toll ALSFS -R (in the original version). *Patients and methods:* we applied the ALSFS-r, in a 23 subjects population with confirmed ALS diagnosis, attended sequentially in the SMFR-HUCFF-UFRJ between 1/1/2006 and 31/12/2007, from the regional centre of reference for the disease. The statistical review was done using SPSS software 7.0. *Results:* The Group is formed of 23 individuals, 12 (52.17%) female and 11 (47.82%) men with mean age of 57.52 years, 5 (21.73%) have been classified as independent (phase I), 9 (39.13%) as semi dependent (phase II) and 9 (39.13%) as dependent (phase III). The

average time of progression of the disease was 5.1 years. The scoring average of ALSFRS-r was 19/44 points. The Spearman test showed correlation between the groups of 0.781 with significance of 0.01. The ANOVA differentiated the group dependent from the independent/semi dependent group with a significance level of 0001. *Conclusion:* The tested instrument proved to be useful and allowed a numeric continuous classification of the degree of disability in the ALS patients.

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EFFECTIVENESS OF TREADMILL TRAINING WITH PARTIAL BODY WEIGHT SUPPORT ON GAIT AND OTHER MOTOR FUNCTIONS AFTER STROKE: A RANDOMIZED CONTROLLED STUDY

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Introduction: The major goal of rehabilitation after stroke includes restoration of gait and other motor functions. Treadmill training with partial body weight support (BWS) is a task-specific new rehabilitation technique which can improve gait pattern in stroke patients, especially during early phase of rehabilitation. *Aim:* To investigate whether treadmill training with partial body weight support (BWS) improves gait and other motor functions including activities of daily living after stroke. *Patients and Methods:* This is a prospective, assessor-blinded, randomized controlled trial. 30 inpatients with acute or subacute stroke were allocated randomly to either an experimental group ($n=15$) or a control group ($n=15$). Both groups participated in a conventional stroke rehabilitation program, 5 days a week, 2–3 hours/day for four weeks. Our conventional program is tailored to patient's needs and consists of neurodevelopmental facilitation techniques, physiotherapy, occupational therapy, and speech therapy. Physiotherapy focused on positioning, postural control, range of motion and progressive resistive exercises, together with endurance, and gait. The experimental group received a 6-weeks treadmill training with BWS five times per week with a session duration of 30 minutes in addition to the conventional rehabilitation program. Functional Independence Measure (FIM), Rivermead Motor Assessment Scale (RMAS), Motor Assessment Scale (MAS) and time-distance parameters of computerized gait analysis were recorded before and after treatment. The Vicon 370 Motion Analysis System with 5 cameras has been used for gait analysis. *Results:* The trial included 18 patients with a mean age of 59.5 years and mean time since stroke of 2.2 months. 8 patients in the experimental group and 10 patients in the control group completed the study. There were no significant differences between the two groups with respect to socio-demographic characteristics and baseline clinical parameters. Although the experimental group had significant within-group improvements in gait velocity, cadence, stride length, double support time, motor subscore of FIM, leg and trunk subscore of RMAS and MAS, there were no significant differences between the groups. *Conclusion:* Treadmill training with BWS together with a conventional rehabilitation program did not further improved time-distance parameters of gait and other motor functions as well as activities of daily living.

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TETRAPLEGIA AND DRIVING ABILITY

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Introduction: Driving more than other activities of daily living, signifies independence, freedom and a first step into adult responsibilities. At most neurologic levels of injury, individuals with spinal cord injury (SCI) have the potential to return to independent driving with the appropriate adaptive equipment. *Aim:* To correlate SCI level, age and driving ability in people with tetraplegia and to find out the association between driving ability and social activity. *Patients and Methods:* Fifty-five drivers with tetraplegia, due to traumatic SCI, were evaluated during the period 2000–2005. The SCI level, age, functional status of activities of daily living and driving ability were recorded by the medical team of 'INIOHOS' center. Vocational status and engagement in sports activities were investigated by questionnaire. *Results:* The SCI level and age mainly influenced the patients' car driving ability. The highest neurological level of injury, for patients to achieve independent driving was C6. 80% of the people with tetraplegia who had a job could drive independently and 70% of the independent driving persons have found a job. 40% of the independent driving persons were participating in sports activities. *Conclusion:* Driving ability is one of the most important factors that permits the tetraplegic drivers to participate in professional, social and sports activities.

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BRUNNSTROM INDEX FOR FUNCTIONAL ASSESSMENT OF PATIENTS WITH STROKE AND ASSOCIATED CARDIAC DISEASE

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Purpose: Measurement of Brunnstrom index for the assessment of functional improvement of patients with stroke and associated cardiac diseases, compared with Functional Independence Measure evaluation. *Material and Method:* The study involved 70 hospitalized patients (INRMFB, Medical Rehabilitation Clinic III) admitted in a program of precocious medical rehabilitation; all the patients have associated cardiac disease (other than hypertension). We determined demographical, general medical, neurological and functional data at admission in the rehabilitation program, after 4 weeks and after 12 weeks. The rehabilitation program was conducted according to the existing protocol for precocious neurological rehabilitation. Functional assessment was made on FIM, Brunnstrom scale and EQ-5D. For statistical analysis we used 'u' test, 'chi-patrat' test and statistical correlation tests. *Results and Discussions:* For global assessment of FIM we determined a highly significant amendment ($p<0.001$, 1 freedom grade) at 4 and at 8 weeks. For Brunnstrom scale, the modification determined was statistical insignificant at 4 weeks but statistical significant at 12 weeks ($p<0.05$). *Conclusions:* There is a significant statistical correlation between FIM and Brunnstrom index for functional assessment of patients with stroke and cardiac disease, on medium term follow up. On short term FIM has better results on functional assessment.

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METHODS AND EQUIPMENT TO DETERMINE AND CORRECT THE ENERGY EXPENDITURE IN WALKING OF PATIENTS WITH OSTEOARTHRITIS OF THE LOWER LIMBS

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Introduction: Osteoarthritis (OA) affects people more than other chronic condition. It has extremely significant and far reaching health, psychological, and socio-economic consequences. The impact of OA is exacerbated further by the lack of clear causes or cure. Given these facts, it is surprising that little emphasis has been placed on developing methods and technologies to address these consequences and improve the quality of life and independence of those affected. The aim of this paper is to present CALORCRO, a project designed to address these aspects with a view to prevention, early diagnosis, improved prognostics, reduced treatment/therapy times, and increased quality of life of for those with OA. Central to the objectives of CALORCRO are cost-cutting in healthcare, social and community services expenditure. **Material and Methods:** The first medical concept of this project stems from the need for objective analysis methods in our era of evidence-based medicine. The second medical concept of the project derives from the fact that the patient becomes an active member of the team, involved in therapy. Walking is a reflexive activity; involving the patient requires them to be aware of the modifications of walking induced by OA and those severities and voluntary correctness of these modifications, to reach an economic walking pattern. The third medical concept of the project is based on biofeedback, in an audio and visual manner. **Results:** The biofeedback approach will be beneficial in: - Training of correct orthostatic posture; - Correction of walking pattern; - Answering a number of key questions when using a walking/gait assist device; - Informing and educating OA patients. Biofeedback help the patient learn how to control the amount of physical exercise, conserve his stamina and optimise function. **Conclusions:** The project technical concept will comprises the development of a mathematical model for computing energy expenditure during walking, based on the measurement of ground vertical reaction forces, instantaneous coordinates of their resultant applied position, number of steps taken and the application of this mathematical model for monitoring and correcting the walking energy expenditure with OA of the lower limbs.

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CASE REPORT OF ISOLATED RECTUS FEMORIS ATROPHY

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Introduction: Non-traumatic neuromuscular lesions of only one muscular portion of the quadriceps are rare and poorly described in literature. **Aim:** The goal of our study was to investigate the possible causes of this pathology and to objectively quantify the functional consequences of this isolated atrophy from the rectus femoris on the total muscular performances of the quadriceps. **Patient and Method:** A male patient, 44 years old, presented an isolated atrophy from the right rectus femoris without pain nor history of previous traumatic event. He reported occasional paraesthesias on anterior right thigh. Electromyographic exploration of the lower limbs, imagery (echography and MRI) and isokinetic test were undertaken by the patient. **Results:** Imagery explorations showed the atrophy of the right rectus femoris combined with fatty degeneration but this exam did not allow determining the actual etiology. Therefore, a precise diagnosis was not allowed, even if the EMG confirmed the presence of important signs of specific and isolated denervation in the only right rectus femoris. The isokinetic test, performed in the classical sitting position, highlighted symmetrical performances for flexors of the knee and a moderately decrease in the right concentric quadriceps torque (-10%). A complementary isokinetic assessment, in a lying supine position,

demonstrated a more marked deficit of this right quadriceps (higher than -30%). **Conclusion:** No precise etiology was shown for this isolated atrophy from the right rectus femoris. Nevertheless, we brought back the importance to lay the patient in a lying supine position in order to preferentially investigate the rectus femoris performances through an isokinetic test.

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ISOKINETIC ASSESSMENT OF THE SCAPULAR MUSCLES IN SERRATUS ANTERIOR DYSFUNCTION

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Introduction: Scapular winging as result of isolated serratus anterior dysfunction represents a rare pathology. Long thoracic nerve injury causing serratus anterior dysfunction can be functionally disabling and present with pain and decreased shoulder elevation [1]. **Aim:** To evaluate the muscular strength deficit and to analyze the electromyography conducted results in the case of symptomatic winging scapula. **Patients and Methods:** 10 patients (8 men and 2 women) suffering from scapular winging secondary to a possible serratus anterior dysfunction were involved in that study. They performed an isokinetic assessment, an electromyography conducted exam (EMG) and a scapular positioning measurement at rest. The isokinetic concentric evaluation (closed kinetic chain – Biodex system 3), allowing protraction (PROT) and retraction (RET) movements, included, after a warm-up, 2 sets of 3 maximal contractions at 12.2 cm/s. The EMG signal on the serratus anterior was analyzed using needle and surface electrodes. The scapular positioning on the thoracic wall was determined by the tape measurement between the scapular spine and the inferior angle of the scapula and the closest spinous process. **Results:** Within the bilateral comparison, the PROT showed a weakness (-28 %) on the pathological side. The PROT/RET ratios were lower on the injured side (0.7 versus 0.81) due to the imbalance between the antagonist muscle groups. The EMG confirmed the etiology of scapular winging as being caused by serratus anterior dysfunction. A good level of correlation ($r=0.81$) existed between the muscular deficit on the PROT and the reduction of the amplitude recorded (needle EMG) on the serratus anterior. The scapular positioning in more external rotation on the pathological side is related with a prolonged latency on the serratus anterior (needle EMG). Likewise, that rest position of the scapula is linked ($r=0.71$) with the PROT level of strength, confirming the resting posture modification of the scapula due to the muscle atrophy. **Conclusion:** Isokinetic and EMG assessments represent complementary exams, allowing defining an individual profile in the case of serratus anterior dysfunction. Our study highlighted relationships between scapular positioning at rest and muscular dysfunction assessed by isokinetic and EMG.

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SYSTEMATIC REVIEW OF DIAGNOSTIC TESTS OF SACROILIAC JOINT IN PHYSIOTHERAPY: RELIABILITY

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Introduction: In the present, there are a wide variety of SIJ tests available to diagnose dysfunction, from test used to asses movement of SIJ to tests used to stress SIJ structures. In spite of this,

there is no agreement on the validity of such tests because of the conflicting results they support. So it is important to provide an overview of the findings of the current relevant studies. *Aim:* To identify the available evidence in the scientific literature about the reliability of diagnostic tests of SIJ in Physiotherapy. *Methods:* A structured search for relevant studies on physical therapy diagnosis was performed by extensive reference tracing and hand searching. Databases searched included MEDLINE (Pubmed using Clinical Queries), CINHALL, Embase, PEDro, IME and ENFISPO between January 1996 and September 2006 written in Spanish or English. The keywords used to identify the study population and diagnosis process were: sacroiliac joint–SIJ, reliability, reproducibility, physical examination, assessment, clinical tests, management, physiotherapy, orthopedic physical assessment and dysfunction. A qualitative research was carried out reviewing all the current clinical research and systematic review. To describe the reliability was identified the percentage agreement (% agr.) and the kappa coefficient (k). *Results:* The more relevant individual and cluster of tests enunciated in the articles and their data collections were the following: Distraction; Compression; Gaenslen's test; Sacral thrust; Thigh thrust; Patrick's sign; Overtake phenomenon; Spine test; Lateroflexion test; Gillet; Long-sitting; Standing flexion; Prone knee flexion; Sitting flexion; Joint-play test; Distraction, compression, thigh thrust, Gaenslen's tests and Patrick's sign; Distraction, posterior pelvic pain provocation (P4), Patrick's sign, bilateral internal rotation and one-sided internal rotation tests; Posterior pelvic pain provocation (P4), Patrick's sign and one-sided internal rotation tests. *Conclusions:* Sixteen different tests with analysis of reliability to identify dysfunction SIJ. Tests more reliability are Patrick's sign, Thigh thrust and Gaenslen's test (% agr.=93.59, k=0.70).

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SYSTEMATIC REVIEW OF DIAGNOSTIC TESTS OF SACROILIAC JOINT IN PHYSIOTHERAPY: VALIDITY

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Introduction: There are a wide variety of SIJ tests available to diagnose dysfunction, from test used to assess movement of SIJ to tests used to stress SIJ structures. In spite of this, there is no agreement on the validity of such tests because of the conflicting results they support. So it is important to provide an overview of the findings of the current relevant studies. *Aim:* To identify the available evidence in the scientific literature about the validity of diagnostic tests of SIJ in physiotherapy. *Methods:* A structured search for relevant studies on physical therapy diagnosis was performed by extensive reference tracing and hand searching. Databases searched included MEDLINE, CINHALL, Embase, PEDro, IME and ENFISPO between January 1996 and September 2006 written in Spanish or English. Keywords used were: sacroiliac joint–SIJ, validity, diagnostic accuracy, physical examination, assessment, clinical tests, management, physiotherapy, orthopedic physical assessment and dysfunction. A qualitative research was carried out reviewing all the current clinical research and systematic review. To define the validity was described in terms of sensitivity (se.) and specificity (sp.). *Results:* The more relevant individual and cluster of tests enunciated in the articles and their data collections were the following: Distraction; Compression; Gaenslen's test; Sacral thrust; Thigh thrust; Patrick's sign; Resisted abduction; Standing flexion, the prone knee flexion, the supine long sitting tests and palpation of PSIS heights in a sitting position (at least three positive); Distraction, compression, thigh thrust, Gaenslen and sacral thrust tests (three or more positive); Distraction, compression, thigh thrust, Gaenslen's tests and Patrick's sign (three or more positive). *Conclusions:* Ten different tests with analysis of validity to identify dysfunction SIJ. Individually the tests more

validity are distraction (se. 0.60, sp. 0.81) and compression (se. 0.69, sp. 0.69) tests and cluster test of distraction, compression, thigh thrust, Gaenslen and sacral thrust tests or Patrick's sign (three or more positive se. 0.85, sp. 0.79).

P302

EFFECTS OF AEROBIC TRAINING ON QUALITY OF LIFE IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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Introduction: Patients with systemic lupus erythematosus (SLE) report greater fatigue and depression that reduced their quality of life. Physical deconditioning may be caused by reduced physical activity and indeed some patient information leaflets recommend frequent periods of rest to cope with the fatigue of SLE. There has been little research into the effects of aerobic training on fatigue, depression and quality of life in SLE. *Aim:* To determine if supervised aerobic training improves fatigue, depression and quality of life in patients with systemic lupus erythematosus (SLE). *Methods:* Twenty-five women with SLE (ages 39.74±10.58), remain of disease 6.8±2.9 year, were evaluated using Fatigue Severity Scale (FSS), Beck Depression Inventory (BDI) and Short Form 36 (SF36). Patients had aerobic training on bicycle ergometer for 15 min, 3 times a week for 6 weeks. FSS, BDI and SF36 were analyzed at baseline and after 6 weeks. Disease activity was measured using the Systemic Lupus Activity Measure (SLAM). Statistical analysis included Wilcoxon's rank sum test. *Results:* After 6 weeks of aerobic training all patients were in steady state measured by SLAM, with no side-effect. Training group showed a decrease of fatigue measured by FSS -19 patients (76.0%), improvement of Beck Depression Inventory score 17 patient (68.0%) and improve quality of life- 19 patients (76%). *Conclusion:* This study showed significant improvement in fatigue, depression and quality of life, after a supervised aerobic training program in patients with SLE and can be safely prescribed without exacerbating disease activity.

References:

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2. Clarke-Janssen A, et al. Effects of supervised aerobic exercise in patients with SLE: a pilot study. *Arthritis Rheum* 2005; 53: 308–312.

P303

INSTRUMENTAL GAIT ANALYSIS METHOD IN EVALUATION OF RESULTS OF SURGICAL TREATMENT OF IDIOPATHIC SCOLIOSIS PATIENTS

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Introduction: For the patients with idiopathic scoliosis (IS) fusion of vertebra is serious decision to change one pathological condition to another and this question is under the discussion for many years. Usage of the gait analysis is an innovative method for the evaluation of IS patients before and after surgery to assess the results of treatment. *Goals:* To evaluate the effects of surgery on the gait of patients with IS. *Patients and Methods:* 21 IS patients (12–18 years old) were enrolled in the investigation. They were assessed before and after the surgical fusion, the follow-up were done after one year. All of them were evaluated in the Gait laboratory with 6 Proflex 240Hz cameras, AMTI force plate, EMG interconnected with C-motion Qualisys software. Results were compared with the Gait laboratory standards. *Results:* The results show that there were no statistically significant signs of asymmetric gait and also EMG

was symmetric. The mild difference between ROM of hips was observed in two cases, both of them with major lumbar curves. *Conclusions:* Results of Gait analysis are controversial and needs more investigations in the future.

References:

1. Chockalingam N. Kinematic differences in lower limb gait analysis of scoliotic subjects. *Stud Health Technol Inform* 2002; 91: 173–7.
2. Wilk, Bryan MS. The Effect of Scoliosis Fusion on Spinal Motion: A Comparison of Fused and Nonfused Patients With Idiopathic Scoliosis. *Spine* 2006; 31: 309–314.

P304

SCALES THAT MEASURE THE AWAKENING FROM COMA: A CRITICAL REVIEW

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Introduction: progresses in intensive care have lead to a better survival of patients with severe cerebral injuries. These patients exhibit very divergent outcomes, from chronic coma, through persistent vegetative state (PVS), or minimal conscious, state (MCS), up to fully relational abilities with moderate disabilities. Evaluating the level of arousal and awareness throughout the recovery course of these patients is still more a matter of bedside scales than a matter of radiology or electrophysiology. *Aim:* Numerous scales have been proposed to evaluate the level of arousal and awareness of these patients. This study is a comparative and critical review of these scales. *Methods:* An extensive literature review has been performed using multiple databases (Medline, Embase, Web of Science). Articles that describe, validate, or compare scales used to score the level of arousal, responsiveness or awareness during the awakening from coma, have been kept for in depth analysis and comparison. *Results:* The Glasgow Coma Scale is still the most popular scale despite its lack of sensitivity. Several short scales have a better ability to disentangle low levels of recovery, and PVS versus MCS states: the JFK Coma Recovery Scale-Revised, the Glasgow-Liege Coma Scale, the Edinburgh-2 coma scale, Innsbruck Coma Scale, or the Full Outline of UnResponsiveness (FOUR) scale. Other scales have been designed for a more chronic stage, with a better sensitivity to minimal changes but have a long examination time: the Wessex Head Injury Matrix (WHIM), Western Neuro Sensory Stimulation Profile (WNSSP), the Rancho Los Amigos Levels of Cognitive Functioning, or the Sensory Modality Assessment and Rehabilitation Technique (SMART). *Conclusion:* Despite a recent methodological effort to develop and validate scales to evaluate the level of arousal and awareness of patients awakening from coma, most of the proposed short scales are still suffering from a lack of sensitivity, especially to disentangle between PVS and CVS states. Longer scales tend to cover the complete range of outcome but have a long examination time that prevents their daily clinical use.

P305

POST TRAUMATIC STRESS DISORDER AFTER SLIGHT TRAUMATIC BRAIN INJURY: AN EVALUATION OF THE ESPARR COHORT SIX MONTHS AFTER THE CRASH

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Introduction: ESPARR is a prospective cohort study of road accident victims, based on a real-time systematic inclusion and a long-term follow-up (at 6 months, 1, 3 and 5 years), in order to study the medical, social and family consequences of these

victims and their family. *Objectives:* In this paper we interested ourselves more specifically to post traumatic stress disorder (PTSD) 6 months after the accident in the ESPARR population who suffered from mild traumatic brain injury (TBI). *Method:* The mild traumatic brain injury were so considered when their Glasgow Score was between 13 and 15 and if no loss of consciousness was reported, or less than 15 min. Diagnosis of PTSD was assessed with the 'Post Traumatic Stress Disorder Checklist Scale' French version. (1) Descriptive statistics (mainly chi² tests) were used for the description of the mild TBI population. PTSD and associated variables were analysed using multivariate logistic regression models. *Results:* Among the 301 mild TBI included in the cohort, 55.8% answered back 6 months after their accident. 22% of TBI suffered from PTSD. Sex (RR for women=2.1, 95% confidence interval=1.1–4.3) and age (RR for the 25–34 years old=2.5; 1.1–5.9 compared to the 16–24 years old) were associated to PTSD. The injury gravity (RR_AIS3+=2.1; 1–4.5) was associated to PTSD too. The multivariate analyses enabled us to associate different variables to the PTSD, which were: sex, age, gravity, antidepressant consumption before the accident, and not remembering the accident. After-effect pains and taking of medicines were also associated with the PTSD. *Conclusion:* PTSD is almost frequent in people suffering from Mild TBI. Some short questionnaire should be useful for family doctors to help them to better spot people suffering from PTSD after a mild traumatic brain injury in the aim of proposing them a better follow up (specific prise en charge, psychological help) or appropriate medical treatment.

M-AIS = Maximum Abbreviated Injury Scale

Reference:

1. Ventureyra V, et al. The validation of the Posttraumatic Stress Disorder Checklist Scale in Posttraumatic Stress Disorder and Nonclinical Subjects. *Psychotherapy and Psychosomatics* 2002; 71: 47–53.

P306

CARE NETWORK AND ONE-YEAR OUTCOME AFTER A SEVERE TRAUMATIC BRAIN INJURY (TBI) IN THE PARISIAN AREA

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Objectives: To study care network and one-year outcome after a severe TBI in the Parisian area. *Methods:* Patients with severe TBI were included prospectively in the study by mobile emergency services (SAMU). Criteria for inclusion were: adults with TBI and a Glasgow Coma Scale score of 8 or less before admission to the hospital. Data on injury severity, management in the acute care unit and in rehabilitation unit (if available) were collected. Surviving patients were contacted by telephone one year after the injury. Global disability was assessed with the GOS-Extended (GOS-E). Cognitive and behavioural modifications in everyday life were assessed with the Dysexecutive Questionnaire (DEX). Quality of life was assessed with the SF-36. *Results:* 519 patients were included from July 2005 to April 2007. The mortality rate was 37%. To date, 72 patients have contacted for one-year follow-up interview. Most of them (87.8%) were living at home. Only 42% have been referred to a rehabilitation unit. According to the GOS-E, 21% were classified as «Good Recovery», 39% as «Moderate Disability», and 38% as «Severe Disability». About one-third of patients (36%) returned to work before one-year. The most frequent cognitive and behavioural changes were the following: deficits in decision-taking abilities; poor emotional appraisal; poor planning abilities. *Conclusions:* This is the first prospective study of severe TBI in the Parisian area. The results showed that surprisingly only a minority of patients (42%) were referred at one time or another to a rehabilitation facility, despite persisting difficulties.

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PITUITARY DYSFUNCTION IS FREQUENT IN PATIENTS WITH TRAUMATIC BRAIN INJURY

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Introduction: Hypopituitarism has been reported after traumatic brain injury (TBI) [1, 2], and could contribute to late cognitive disorders. **Aim:** To determine the prevalence of pituitary dysfunction in patients keeping with cognitive disorders at least one year after TBI and analyse the relations with initial severity, and late autonomy and quality of life (QoL). **Patients and Methods:** We recruited 50 patients (42 men, mean age 36, range 20–59 years, mean BMI 25, range 17–42 kg/m²) who survived severe ($n=38$), moderate ($n=2$) or mild TBI ($n=10$) at a mean of 59 months (range 13–247) post-event; 52% had moderate and 32% severe disability (GOS score: 2 or 3, respectively). Each patient underwent a complete assessment of pituitary functions, initial Glasgow Coma Scale (GCS) and CT scan lesions, late Glasgow Outcome Scale (GOS), autonomy (EBIS questionnaire), and QoL (AGHDA). **Results:** No patient showed posterior pituitary dysfunction, hyperprolactinemia or gonadotrophin deficiency. Twelve percent of patients showed TSH deficiency and 20% had partial ACTH deficiency (diagnosed by ITT or metyrapone test). Severe GH deficiency (GHD) was diagnosed in 44.5% (glucagon stimulation test confirmed by ITT or arginine+GHRH test) and was isolated in 40% of cases. GHD was associated with higher BMI, triglycerid, and insulin plasma levels. Totally, 46% of the patients showed at least one anterior pituitary deficiency requiring substitutive treatment. Hypopituitarism was not related to GCS score, initial CT scan lesions, GOS score, QoL, autonomy and resumption of work. **Conclusion:** In TBI patients with persistent cognitive disorders, the high risk of anterior pituitary deficiency, especially of GH secretion, justifies systematic assessment with reference tests. Endocrine disorders seem to be relatively independent from the global outcome.

References:

1. Kelly DF, et al. Hypopituitarism following traumatic brain injury and aneurysmal subarachnoid hemorrhage: a preliminary report. *J Neurosurg* 2000; 93: 743–52.
2. Leal-Cerro A, et al. Prevalence of hypopituitarism and growth hormone deficiency in adults long-term after severe traumatic brain injury. *Clin Endocrinol* 2005; 62: 525–32.

P308

DOES THE SERVICE MEET THE NEEDS: POINT OF VIEW OF PERSONS WITH A TRAUMATIC BRAIN INJURY, CLOSE RELATIVES AND HEALTH CARE PROFESSIONALS

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Background: Traumatic brain injury (TBI) is a major public health problem, both in Quebec and in France. In Quebec, the development of an integrated care and services continuum in traumatology improve the survival rate of individuals with TBI. Furthermore, links between the care stages (from acute care to rehabilitation) showed themselves decisive factors of social integration of indi-

viduals with TBI, by assuring a global vision shared by institutions of TBI individuals' needs and of services. In France, hardly any regions have an integrated traumatology network. The organization of services remains insufficient and poorly adapted to the TBI population, and is characterized by the gaps between care stages and organizations. The Circular of June 2004, relative to the sanitary, medical and social care for TBI individuals, aims at giving guidelines for the organization of the TBI care network. This network looks like that of Quebec but contains a number of variants. Few studies have investigated the way the services meet TBI individuals' and their family's needs. **Objective and Methods:** This paper presents preliminary results from a study carried out in three France regions: Bordeaux, Paris, and Lyon. The study aimed at: 1) identifying TBI individuals' and close relatives' needs and concerns; 2) investigating the way their needs are fulfilled or not by existing services. An exploratory qualitative design using focus groups with TBI individuals, close relatives and health care professionals was realized in autumn 2007. A semi structured discussion guide was developed and concerned information, support, teamwork, and services for each care stages: acute care, rehabilitation, post-rehabilitation. The preliminary results of this study will be presented.

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SECOND LANGUAGE IMPAIRMENT AFTER SEVERE TRAUMATIC BRAIN INJURY IN POLYGLOTS

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Background: Recovery of second language after cerebro-vascular pathology in bilinguals and polyglots has been widely documented in the literature but little is known about what happens after severe traumatic brain injury (TBI). **Objective:** To document impairment in verbal fluency and linguistic processes observed in polyglot patients with severe TBI. **Methods:** Six patients with severe TBI (mean coma duration: 5,5 weeks) were compared to 20 control subjects, among which 10 were, like the patients, Polish-English bilinguals. Verbal fluency was assessed by 2 fluency tasks (phonological and verbal semantic) as well as in the ratio between sound production versus silence in retelling 2 short stories. Language switching was assessed by a specific test investigating switching between the second language (L2) and the native tongue (L1). Language mixing, a linguistic impairment characterised by inserting words and/or syntactic structures of one language while speaking the other, was observed during a picture description task in both languages. **Results:** Although the size of the patient sample was too small to allow statistical control, we observed that in the fluency tasks the TBI patients were more impaired than the controls in L2 than in L1. The difference was larger for the phonological task. In spontaneous speech, verbal fluency in L2 with regard to L1 was largely reduced in comparison with the controls, and in the same proportion (67%) that in the phonological task. Language switching process failed in 45.4% in the patients and only in 7% in the controls. One patient failed to respond to L1 questions and provided all his responses in L2. Mixing the 2 languages was observed in 2 patients. Both had the lowest experience in English of the group, and suffered damage in the frontal lobes. Mixing never occurred in controls. **Discussion:** Severe TBI does impair L2 recovery in polyglots, probably to a greater extent than L1. Specific abilities, such as code switching and inhibition of mixing seem more sensitive to TBI than general linguistic processes, such as verbal fluency. As Wang et al recently suggested, this might be related to the special vulnerability of frontal neural networks to the traumatic insult.

P310

NEUROMUSCULAR PROBLEMS ASSOCIATED WITH HIGH VOLTAGE INJURY: CASE SERIES: FOUR-YEAR (2003–2007) EXPERIENCE IN A REHABILITATION HOSPITAL

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Case 1: A 36-year-old male farmer was shocked by high voltage electricity while on a combined harvester and lost consciousness. The current entered through the right parietal area and exited through the left wrist and toes of both feet. ENMG revealed lesions in the left median, ulnar, radial, both peroneal and tibial nerves. The patient had upper motor neuron type findings in the upper and lower extremities, suggestive of a brain injury. *Case 2:* A 45-year-old male ringer was shocked by electricity when the tree that he cut hit the high voltage line. The patient was unable to walk. Examination findings were compatible with complete spinal cord injury. *Case 3:* An 18-year-old male farmer was shocked by electricity while climbing to a high voltage pole and fell from 4-m height. The current entered through his left arm and exited from both legs. The patient suffered T9 vertebra fracture. The diagnosis was complete SCI at the T9. *Case 4:* A 28-year-old male construction worker fell from 6-meter height upon hitting a high voltage line at work. High-voltage current entered through his head and exited from the left foot sole. He suffered loss of consciousness and had findings of upper motor neuron syndrome. The graphs and cranial CT findings of the patient were normal. The findings were compatible with a brain injury. *Case 5:* A 32-year-old male construction worker was shocked by electricity while repairing plugs. The current had entered through his left hand and he had fallen into water. He received 45-min cardiopulmonary resuscitation. The patient was in a comatose state for 2 months. The cranial MRI and CT findings were normal. The diagnosis was hypoxic ischemic encephalopathy. *Case 6:* A 25-year-old male was shocked by electricity from a transformer. He had upper motor neuron findings in the lower extremities. No definitive diagnosis could be made. *Case 7:* A 15-year-old male shepherd was shocked by electricity upon holding a high voltage wire with his right hand. The current exited from both feet. EMG revealed median and ulnar nerve lesions at the wrist level. *Conclusion:* High voltage electrical injuries usually cause devastating consequences for patients, most of which result in permanent disability.

P311

PROFESSIONAL QUESTS OR POST-GRADUATE INDIFFERENCE?

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Aim: The purpose of this study was to evaluate the interests and quests of modern Greek physiatrists in the internet era. *Patients and Methods:* We studied the 2007 statistical data of traffic to the Hellenic PRM Society site, looking for the frequency of visits as well as the interests of Greek users. The sites were classified by subjects, post-graduate, professional and of general interest, according to their content. *Results:* The total number of visits ranged from 2119 to 3664 a month (m: 2875.42), which corresponds to an average of 99.58 visits per day and 34505 visits a year. In 2007, out of the 84 registered members, 24 did not visit, even once, the pages, where the use of a member code is necessary, in 2007. Only 24.5 members visit the Society's pages regularly every month. The pages for exchanging views on professional matters presented the greatest traffic (69.2%). The educational sector accounted for 25.3% of the total number of visitors. The percentage of profes-

sional issues is certainly much higher, as it concerns members with passwords, only. *Conclusion:* Although there are no comparative works to earlier times, the interests of physiatrists seem to be geared to the general climate of the society new models and may influence the educational standards of tomorrow's doctors and, consequently, scientific benefits.

P312

AN ANALYSIS OF THE EDUCATIONAL EFFECTIVENESS OF AN INSTRUCTIONAL VIDEO TO PERFORM NEUROLOGICAL ASSESSMENT IN SPINAL CORD INJURY

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Introduction: The American Spinal Injury Association (ASIA) classification is a standardised measure to assess spinal cord injury in emergency, rehabilitation and follow-up care. Rehabilitation team members often perform the ASIA classification without former training. Inconsistencies in management are common, are unacceptable and may even lead to unnecessary medical investigations due to perceived deterioration in impairment level. An instructional video, issued by ASIA, provides training for clinicians and investigators working in spinal cord injury to assure a high degree of accuracy and reliability in the application of International Standards for Neurological Classification of Spinal Cord Injury (ISNCSCI) in neurological examinations, and subsequent scoring and classification. *Objective:* To test if viewing the ASIA video increases the reliability of completion of the ASIA classification by all members of the rehabilitation team. *Methods:* 20 volunteers from our rehabilitation team (including doctors, nursing staff, physiotherapists and occupational therapists) in the National Rehabilitation Hospital of Ireland completed a questionnaire based on the ASIA classification. After watching the ASIA video the participants repeated the questionnaire. Pre and post video questionnaires were analysed and compared. *Results:* The detailed results on the poster show that the ASIA video not only improved the rehabilitation team's accuracy of completing the ASIA classification but their confidence in using it. *Conclusion:* We were concerned with the variety of ASIA recordings on the same patient by different assessors. Our study shows that the ASIA video is a useful and reliable tool to ensure accuracy in classification by all members of the rehabilitation team. We plan now to introduce this to all members of the spinal cord injury team at induction.

Reference:

1. Reference Manual for the International Standards for Neurological Classification of Spinal Cord Injury 2003.

P313

AN ANALYSIS OF THE EFFECTIVENESS OF REHABILITATION EDUCATIONAL PROGRAMME IN SPINAL CORD INJURY

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Introduction: Spinal cord injury (SCI) can result in complex problems. We feel that education is a core pillar of rehabilitation care. SCI patients should be encouraged to learn as much as they can about their injury so they can confidently manage their ongoing medical needs. Having a thorough understanding helps patients take full advantage of the rehabilitation process and can prevent further hospitalisation. They may need to instruct their carers and healthcare professionals to ensure their optimal care. Until now, the National Rehabilitation Hospital (NRH) of Ireland lacked a formalised education programme in SCI. *Objective:* To test if a formalised

education programme significantly increases spinal injury patients understanding of deep vein thrombosis (DVT) and pulmonary embolism (PE). *Methods:* 40 spinal injury patients in the NRH completed a questionnaire based on the causes, symptoms, signs, dangers and prevention of DVT and PE. They all underwent formal teaching on DVT and PE and then repeated the questionnaire. Pre and post teaching questionnaires were analysed and compared. *Results:* The detailed results on the poster show that the education intervention is effective and acceptable to this patient group. *Conclusion:* This study suggests that a formal education programme is an effective method of increasing knowledge of DVT and PE, potentially life threatening illnesses in SCI. We postulate that an extension of this education programme will be effective in increasing competence and knowledge of other unique issues pertaining to SCI.

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SURVEY ON PHYSICAL AND REHABILITATION MEDICINE TRAINING IN EUROPEAN UNION COUNTRIES

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Introduction: The World Action Plan for Initial Education in Physical and Rehabilitation Medicine (WAPIE.PRM), which has been proposed and accepted by the delegates of PRM Section and Board of European Union of Medical Specialists (UEMS), has three main targets: (a) to promote the teaching of PRM activities in undergraduate medical training of all medical schools, (b) to diffuse knowledge and recent medical advances to PRM trainees and (c) to involve all the PRM trainees in research activities. *Aim:* The working group on Education of the European Board of PRM has decided to examine the differences in PRM training among the participating in European Board countries, aiming to investigate the existing needs in PRM training, as well as the way these needs should be addressed in order to fulfil the concept of harmonization of PRM training among the European Union (EU) countries. *Methods:* A structured questionnaire was sent in 2007 to all European PRM Board participating countries, in order to collect information on the following topics: 1) Undergraduate PRM teaching and training programs; 2) Postgraduate PRM teaching and training programs; 3) Participation in research programs; 4) Mobility of trainees within their country or/and Europe. Completed questionnaires were returned by 19 out of 27 countries. Collected data were extensively tabulated by country and by topic and analyzed. *Results & Conclusion:* In the report several generalizations are made, collective tables on common findings are mostly presented, select highlights are provided and interpretation of selective findings is emphasized. The authors plan to publish a more comprehensive analysis of this data set in the near future. Further research is needed in order to investigate specific aspects of PRM education and training within EU countries and help us define the future educational policy of European PRM Board.

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INTEREST OF A 'MOBILE REHABILITATION TEAM' FOR MEDICAL AND SURGICAL UNITS IN A REGIONAL HOSPITAL – EXPERIENCE CONDUCTED IN LILLE (FRANCE)

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Introduction: Many patients remain a long time in medical or surgical units despite they need no more acute care. The main reason is the lack of places in rehabilitation units. Furthermore, acute units are often unaware of the interest and activity of rehabilitation teams. *Aim:* The Regional Hospital of Lille has created in 2006 the Rehabilitation-Readaptation and Orientation Mobil Team for their medical and surgical units. The objectives were to provide rehabilitation advices for inpatients, help organise their return home and advise patients who need further care at home or in rehabilitation units. *Methods:* 2 PRM doctors, 2 occupational therapists and one secretary compose our team. We have reviewed our activity since January 2007. *Results & Discussion:* Our team is usually called on by the units who work alongside Physical Medicine and Rehabilitation (rheumatology, neurology). We are gradually starting to be known in other units (intensive care or surgery units for example) that are not acquainted with Physical Medicine 'culture'. They appreciate our know-how in orthosis, installations, rehabilitation's prescriptions and our global vision of problems (medical and physical problems, reorientation after hospitalisation in short term units, a possible return home...). Often, due to the need for information and training, a long time is spent with each patient and with his nursing team. Actually, we did not really achieve one of the goals of our team, that is the orientation of the patients who stay too long in short term units. This is because our intervention does not impact on medico-social facilities. *Conclusion:* The 'mobile rehabilitation team' is a new concept for general hospitals that can reduce the duration of hospitalisation in acute units and help Physical Medicine to be known by the medical and paramedical teams or by the patients.

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FACTORS DETERMINING QUALITY OF LIFE FOR PATIENTS WITH SPINAL CORD INJURY

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Purpose: The aim of the study was to evaluate various factors influence quality of life index in individuals with motor complete spinal cord injury. *Methods:* Study group comprised of 55 males, age range 20–48 years, median 34.05 years, injury level from C4 to L3, who were examined at Physical Medicine and Rehabilitation Centre of Vilnius University Hospital Santariskiu klinikos. The time after spinal cord injury was 1–19 years (mean 6.18 years). We evaluated patient's quality of life, physical activity and functional level. Quality of life was measured by using Ferrans and Powers Quality of Life index (QLI) and physical activity level was determinate according physical and social activity in daily life, gathered by questionnaires. All patients underwent rehabilitation program at Vilnius University Hospital Santariskiu klinikos. *Results:* Spinal cord injured patients with higher functional level had significant higher QLI ($p \leq 0.001$). Patient with paraplegia were more satisfied in there life quality than persons with tetraplegia. Data shows that higher physical activity level determines better quality of life index score ($p \leq 0.001$). *Conclusion:* It is more likely, that main deterrent factor for quality of life is spinal cord injury level. Other factors, like as functional level and daily physical activity also have influence on patient's quality of life. Daily physical activity is more or less dependent on patient himself, rehabilitation staff, patient family or social conditions of patient and could be changed into higher level, same improving patient's quality of life level.

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OLFACTORY COMPLICATIONS OF BRAIN INJURY, CASE REPORT, REVIEW OF LITERATURE, INVESTIGATIONS AND MANAGEMENT STRATEGIES

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Introduction: Disorders of sense of smell result through different processes, but commonly occur from upper airway infections, trauma and rhinosinusitis. Diagnosis and management of olfactory disorders is neglected topic in otolaryngology. This article describes case report of posttraumatic anosmia (PTA), provides literature review of diagnosis, management and prognosis of PTA. We also aim to highlight safety aspect following anosmia, nutritional problems due to lack of taste for already at risk brain injury patients. **Aim:** To describe a case of PTA. Identify problems and risks associated with PTA to the person. Formulate investigations and management guidelines for this common problem. **Patient & Method:** Written consent was obtained. Case history of a 68-year-old male with traumatic brain injury, clinical findings and investigations were documented. Literature searches, Pubmed, keywords posttraumatic anosmia. A 68-year-old male was admitted with mild traumatic brain injury (GCS 13/15). CT brain scan revealed: occipital fracture, haematoma over cerebellum, left frontal lobe. He was treated conservatively. He had full functional and cognitive recovery. **Results:** He was also noticed to have total anosmia and was reviewed by specialist. Diagnosis of PTA was established. He was reassured and discharged with caution regarding gas safety, nutritional maintenance and was followed up. **Conclusion:** Olfactory dysfunction is common and can recover following head injury and its management varies across UK. Chemosensory testing is optimal and forced-choice and threshold testing is needed for objective evaluation. On Brain perfusion SPECT, PTA corresponds to hypoperfusion in orbital frontal cortex and is helpful due to low cost, technical ease, obtaining quality information. Systemic corticosteroids are helpful but research is needed to establish dose and length of treatment. Advances in olfactory science can provide to develop studies to improve quality of life for these patients.

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SLEEP DISTURBANCES AMONG INPATIENTS AND OUTPATIENTS IN A REHABILITATION CENTER

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Introduction: People with disabilities experience difficulties in maintaining sleep. Studies have reported insomnia in MS patients, in Parkinson and in Brain Injury patients using various scales and indexes. **Aim:** To compare the sleep complaints in inpatients and outpatients individuals with various disabilities undergoing a rehabilitation programme. **Patients and Methods:** Twenty-nine patients (11 inpatients and 18 outpatients) took part in the study. Pittsburgh sleep quality index (PSQI), was used to evaluate the sleep disturbances. Demographic and disability variables were also evaluated as factors for insomnia. T-test and

correlation coefficient used for statistical analysis. **Results:** The mean global Pittsburgh Sleep Quality Index (PSQI) score of all patients was 5.5 ± 3.7 . No statistically difference found between inpatients and outpatients (5.6 ± 3.7 vs 5.4 ± 3.8 , $p=0.859$), neither between male and female (5.8 ± 3.9 vs 5 ± 3.4 , $p=0.573$), nor between wheelchair users and non wheelchair users (6.6 ± 4.2 vs 4.6 ± 3.0 , $p=0.141$). Sleep efficiency had no relation with age ($r^2: 0.3$, $p=0.3$), with disability duration ($r^2: 0.06$, $p=0.17$). Patients with stroke had no difference in global score compared to spinal cord injured patients (4.3 ± 3.5 vs 6.3 ± 3.6 , $p=0.091$). **Conclusion:** Sleep disturbances seems to be unaffected by any of factors investigated in this study.

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FROM AN INSTITUTION TO A NURSING HOME

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Introduction: Rehabilitation services in Greece are mainly provided in hospitals and secondary in institutions. A project of developing nursing homes is working. Rehabilitation services in Greece are mainly provided in hospitals and secondary in institutions. A state project of developing nursing homes is developing nowadays. **Aim:** The purpose of this study is to determine which demographic of which functional characteristic of patients with cerebral palsy and spina bifida is associated with discharge from an institution to a nursing home. **Patients and Method:** Fifty-three patients, 46 with cerebral palsy and 7 with spina bifida, residents in an institution took part in the study. All of them were provided by long-term rehabilitation services. Functional status was evaluated with cognitive and motor Function Independence Measure (FIM) to select 12 of them (group A), which would be capable for discharging to a nursing home. **Results:** Patients mean age was 20.47 ± 5.6 (from 10 to 38) years. Mean length of stay (LOS) was 17.4 ± 4.3 years. Group A discharged to a nursing home had an average cognitive FIM of 32.16 ± 3.8 , whereas group B, stayed at the institution, had an average cognitive FIM of 13.51 ± 8 ($p=0.0001$). Group A discharged to a nursing home had an average motor FIM of 61.83 ± 28.1 , whereas group B stayed at the institution had an average motor FIM of 47.07 ± 26.69 ($p=0.09$). Age and LOS did not interfere with the decision of discharging. **Conclusion:** Cognitive FIM seems to be more reliable for predicting discharge from an institution to a nursing home.

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A MODEL OF REGIONAL NEUROREHABILITATION SERVICE DELIVERY

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Introduction: With a population of approximately 3 million residents, Greater Manchester have developed a unique model of service delivery for neurorehabilitation services which is functioning well for over the last three years. The Greater Manchester Model: The model comprises of 3 tiers. 1) An acute neurorehabilitation unit based in the Greater Manchester Neurosciences Centre; 2) Four inpatient intermediate neurorehabilitation units attached to district general hospitals in different regions of Greater Manchester, catering to patients from their specified catchment areas. 3) Community neurorehabilitation teams in each region; The acute unit gets patients from the neurosciences centre (neurology and neurosurgery) and once they are medically stable, are transferred to the respective intermediate care centres and then into the community. **Discussion:** The acute neurorehabilitation unit deals mainly with neurology and neurosurgery patients addressing specific rehabilitation issues like tracheostomy management, management

of patients in post traumatic amnesia, early intervention to prevent the complications of immobility etc. The staffing and philosophy of the unit enable us to cope with the patients who need complex medical and rehabilitation needs. The unit plays a valuable part in maintaining a throughput of patients in neurosurgical and neurology beds and at the same time ensuring the patients are not denied specialised rehabilitation services in the acute phase of the illness. With continuing inpatient rehabilitation in the intermediate units, the process of transfer into the community can be optimally phased according to the needs of the individual patient. *Conclusion:* We recommend the Greater Manchester model of service delivery with a regional acute neurorehabilitation unit with intermediate care centres for more localised inpatient services. This ensures the rehabilitation needs of the patients are catered for adequately at each stage of the illness and seamless transfer of care into the community.

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THE DISABLED ASSOCIATIONS AND THEIR CONTRIBUTION TO QUALITY OF LIFE IN PARAPLEGICS

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Aim: Do the disabled associations contribute with their many activities in the improvement of the physical and psychological status of the Spinal Cord Injured patients with parallel reduction of medication and medical complications? *Material and Method:* In the past 5 years were admitted in our clinic 139 spinal cord injured patients, 89 men and 50 women aged 19–60 years and spinal cord level C6–L1. We have followed them after their discharge every 3 and 6 months. From the 89 men 27 of them aged 19–45 apply for an association. From 50 women 8 of them aged 22–36 apply for an association. *Results:* The patients (females and males) that perform athletic, (basket -ball, swimming,) artistic activities like theater, dance performers had less complications, did not use antidepressive drugs also their behavioral attitude was much different from the patients that were not involved in any activity. *Conclusion:* The participation of people with spinal cord injury in multiple activities enhances the wellbeing of these persons.

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PATIENTS' PERCEPTIONS ABOUT REHABILITATION PROGRAM THAT AFFECT PERCEIVED QUALITY

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Introduction: Within healthcare, there is a growing interest in patient's perspective in care delivery. The patient's perceptions about the clinical based program have been shown to have an important influence in treatment adherence and the improvement of clinical results in post acute care. *Aim:* To explore patients' perspectives, opinions and points of view about their experiences in rehabilitation program that affect perceived quality. *Patients and Methods:* Qualitative study using focus groups. A total of fifty-seven patients participated in this research. Inclusion criteria were: subjects older than 18 years old that have been hospitalized after surgery and have received at least 10 physiotherapy sessions. Nine focus groups, ranged between 6 and 7 patients chosen by a purposeful sample from three centres. Audiotape, videotape and field notes taken during discussions were sources for data collection. The data were analyzed in successive steps: selection of significant

sentences; grouping significant sentences in categories; analysis of category content. *Results:* Five characteristics of rehabilitation program that affect patients' perceived quality were identified: completeness of treatment (the clinical based program includes a group of diverse physiotherapy techniques), appropriateness of techniques, flexibility of the program (the physiotherapist adapts the program to the patient evolution or an isolated clinical situation), supervision of the exercises and the treatment is done without interruptions or delays. *Conclusions:* This information can be useful to develop a patient questionnaire to detect problems and intervene if possible to improve the clinical based program and treatment adherence in post acute care. Therefore, further work to identify the full spectrum of issues relating to patients' perceived quality with their outpatient care is indicated. *Funding Acknowledgements:* This work was supported by Ministry of Health (project number PI060836).

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THE PATIENT REPORT ON REHABILITATION AFTER POST-ACUTE CARE PROGRAM (PROREPAC-P)

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Introduction: Trends in quality improvement involve asking patients about their experiences with health care services. Although patients can provide objective and factual data, surveys of patient subjective satisfaction have become standard procedures for many rehabilitation settings. Measurement of patient objective perceptions presents more advantages for evaluation than satisfaction itself. There is a need for instruments to measure these perceptions. *Aim:* To describe the development of a self-report questionnaire, the Patient Report on Rehabilitation after Post-Acute Care Program (PROREPAC-P), designed to find out what patients perceive on their post-acute rehabilitation program. *Patients and Methods:* Questionnaire was developed by a three-step process involving a total of 541 patients. The item-generation process utilized input from 57 outpatients who participated in a qualitative study. Field pretest using 94 outpatients was used for initial item reduction by means of several cutpoint criteria (variance, important in the patients' satisfaction, clear and answered). Pilot testing was conducted by a survey on 300 patients who attended outpatient rehabilitation units in several hospitals. Various statistical procedures were used to assess the reliability and the validity of the items and the subscales. *Results:* Contents of the PROREPAC-P are relevant and comprehensible for patients in pretesting and pilot testing. Most of the items satisfied the cut-off criteria: standard deviation >0.6, determination of the patients' satisfaction rate over 70%, a clarity rate greater than 94%, and a response rate over 94% too. Validity was shown by positive relations of each item and the subscales with satisfaction. The instrument and subscales are internally consistent. *Conclusions:* The PROREPAC-P is a generic instrument which can be used for clinical, quality assurance and research purposes. *Funding Acknowledgements:* This work was supported by Ministry of Health (project number PI060836).

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CAUSES OF DISCONTINUITY OF CARE FROM HOSPITAL TO COMMUNITY: A QUALITATIVE STUDY USING PROFESSIONALS' PERCEPTIONS

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Introduction: Continuity of care occurs when the diverse attentions given to the patient are connected and complementary. Continuity may be conceptualized: informative continuity, relational continuity and management continuity. To know the perception the professionals about causes of discontinuity is important to improve it. **Aim:** To explore professionals' perspectives of acute hospitals about the continuity of care of patients after discharge and its causes. **Patients and Methods:** The study was carried out in a Spanish public hospital. Thirteen professionals participated (physiotherapists, nursing and physicians). Professionals were from traumatology, neurology and rehabilitation services. Qualitative study was conducted using focus groups and in-depth semi-structured interview. The data were analyzed in successive steps: Selection of significant sentences; Grouping significant sentences in categories; Analysis of category content. **Results:** Professionals suggested several causes as well related with the time of preparing discharge of patients as time after discharge. In relation to informative continuity, professional identified as causes: the poor transfer of information about physiotherapy treatment from hospital's providers to community providers. In relation to management continuity, professionals identified three causes and several sub-causes of each one: the long time for follow visits after discharge (due to an excessive number of implied professionals and interruptions in the process); inadequate coordination between hospital professionals preparing discharge (due to absence of clinical protocols) and inadequate complementariness provider-patient (due to patients' clinical status and absence guidelines for patients' self care after discharge and follow visits). **Conclusions:** The professionals perceive problems in the continuity of care of physiotherapy of the hospitalized patients. The problems happen during discharge preparation and post-discharge. They report like causes a poor transfer of information from the hospital to other centres and inadequate complementariness between providers and patient-provider. **Funding Acknowledgements:** This work was supported by project number PIEMCA06-12.

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HOW PATIENT AND HIS RELATIVES BEHAVE, IN THE REHABILITATION UNIT

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Aim: To study the compliance and behavior of patient and his relatives while being inpatient in the PRM unit according to the Physiatrist. **Material and Methods:** 142 patients (from a total of 538) who were inpatients participated in a 3-year study. Diagnosis was SCI=45, TBI=42, CVA=37, neurological disease=13 and other=5. The physiatrist in charge recorded his opinion in a special structured questionnaire regarding patient's and his relatives' compliance and behavior, which could influence the outcome. For statistical analysis we used the SPSS package and the chi-square test (statistical significance $p < 0.05$). **Results:** The 96.5% of patients and 91.5% of relatives followed instructions. 13.4% interfered to

instructions and 7% to rehabilitation program. The initial trust was 96.5% and was maintained to the 90.1%. Complaints expressed about: medical issues the 17%, nursing care 20%, and physical therapy 29.6% and about the overall rehabilitation program 19.7%. Good relationships maintained 95.8% with medical and 92.3% with nursing staff. Negative opinions expressed the 10.6%. Concerns had the 43% and 14.1% sought for another opinion. Inappropriate behavior showed the 14.1% and 12.7% had extreme demands. Trust maintenance was correlated with diagnosis ($p=0.031$) and with Barthel Index ($p=0.475$). Educational level was correlated to negative comments ($p=0.031$) and having concerns ($p=0.026$). Diagnosis with asking for others opinion ($p=0.003$) and with having excessive requirements ($p=0.040$). **Conclusions:** The majority of patients and their relatives showed good behavior and cooperation. Complaints were mainly related to physical therapy issues. High school educated patients had more questions and concerns about rehabilitation process ($p=0.026$) and were more probable to do negative comments ($p=0.031$). S.C.I. patients, were more probable to have excessive requirements ($p=0.031$) ask for others opinion ($p=0.003$) and lose their initial trust to the rehabilitation team ($p=0.040$).

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PATIENT'S EVALUATION AND THEIR OPINION ABOUT REHABILITATION SERVICES

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Aim: To evaluate the satisfaction of the patient, with severe motor deficit and long term hospitalization, from the rehabilitation services and his functional outcome. **Material and Methods:** 142 patients (in a total of 538) who were inpatients in the PRM department of KAT Hospital were studied through a period of 3 years. The mean time of hospitalization was 77.8 ± 56.8 days. A special structured protocol was completed in which, beside patient's clinical parameters, 10 questions relative to patient's satisfaction were included, regarding satisfaction from clinical care, medical team, nursing staff, physiotherapists, wards, gym and medical insurance's supplies. Also another questionnaire was completed, regarding patient's requirements and evaluation of the outcome, the significance of initial sincere informing and prognosis determination, the goal achievement and other. A fifth graded scale was used (1=minimum, 2=over minimum, 3=moderate, 4=over moderate, 5=maximum). Correlation with clinical data was done. Data's statistical analysis was made with the use of the SPSS package and the statistical significance was controlled with the chi-square test. **Results:** Patient's satisfaction was high (rated with 4 and 5) about clinical care (73.3%), medical team (78.8%), nursing staff (71.1%), and moderate about physical therapy (58.5%) and the rehabilitation program (58.5%). Dissatisfaction was noted regarding the wards, the gym and the medical insurance's supplies where the 53.5%, 49.3% and 34.5% respectively, rated with 1, 2 and 3. The mean satisfaction was 3.805 ± 0.67 . There was no statistically significant correlation to the diagnosis, age, functional outcome or hospitalization time, but was found to be lower when complications were more than 3 ($p=0.021$). Patient's evaluation of the outcome was good (62.7 rated with 4 and 5). Initial sincere informing and prognosis determination, were of great importance for the 77.5% and 69.7% respectively. 68.35% thinks that achieved the best possible from the rehabilitation program. The mean of requirements was 3.504 ± 0.57 . There was no statistically significant correlation to clinical parameters. **Conclusions:** Patients were satisfied enough from the rehabilitation team and rehabilitation program while there was a dissatisfaction for the PRM premises and the medical insurance's facilities. Patient appreciates the initial honest informing and demands better rehabilitation services and infrastructures.

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PATIENT'S FAMILY CONCERNS ABOUT REINTEGRATION

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Aim: To study relative's concerns about the reintegration process of their patient and the factors that create disappointment and are related to his motor and functional deficit. **Material and Methods:** 142 patients (from a total of 538) who were inpatients participated in the study, which lasted 3 years (12th 1999 to 10th 2002). The mean hospitalization time was 77.8±56.8 days. Diagnosis was SCI=45, TBI=42, CVA=37, neurological disease=13 and other=5. A protocol was consisted of questions regarding the relatives' problems about their patient's reintegration process. Correlation to Barthel Index at discharge was also made. For statistical analysis we used the SPSS package and the chi-square test (statistical significance $p<0.05$). **Results:** The 83.8% of the relatives raised problems about patient's functionality, 59.2% about ability to work and 71.1% about his level of disability. 46.5% were pondered about patient's possibility to participate in recreational activities, the 61.3% for the changes in his habits and only 43% worried about communication restriction. 62% were concerned about changes in future plans. 61.3% about patient's dependence on them. 51.4% of the relatives were concerned about patient's new role, while 39.4% about sorrow. Only 34.5% worried about the lack of reliance to their patient. Relatives were disappointed from: disability of their patient to perform (73.2%), restriction in initiative (47.9%), personality change (40.8%), disability to work (47.2%), their difficulty to understand patient's needs (40.8%) and 40.1% from delay in rehabilitation program. Only 19.4% were concerned due to the discharge. The correlation of the Barthel Index at discharge was not statistically significant with the above mentioned parameters except the reliance change ($p=0.037$). **Conclusions:** Relatives' concerns were directed to motor and functional deficit more than the aspects of occupational and recreational participation and other parameters related to the patient-relative relation. Relatives declare disappointment due to patient's restriction in participation.

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PATIENT'S FAMILY EVALUATION AND SATISFACTION FROM REHABILITATION SERVICES

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Aim: To evaluate the satisfaction of the patient's relatives, from the rehabilitation services and their evaluation of rehabilitation program and functional outcome. **Material and Methods:** 142 rehabilitation inpatients (in a total of 538) were studied over 3 years. Diagnosis was SCI=45, TBI=42, CVA=37, neurological disease=13 and other=5. A protocol was completed in which, beside patient's clinical parameters, 10 questions about patient's relatives satisfaction were included. Also another questionnaire was completed, regarding patient's relatives requirements and evaluation of the outcome. The questionnaires were completed using a fifth graded scale (1=minimum, 2=over minimum, 3=moderate, 4=over moderate, 5=maximum). Correlation with clinical data was done. Statistical analysis was made with the SPSS package and the chi-square test (level of significance $p<0.05$). **Results:** Patient's relatives satisfaction was high (rated 4 and 5) about clinical care (83.8%), medical team (86.6%), nursing staff (74.7%), and moderate about physical therapy (64.9%) and the rehabilitation program (69.7%). Dissatisfaction was noted regarding the wards, the gym and the medical insurance's supplies (57.1%, 52.1% and

38.0%, respectively, rated with 1, 2 or 3). The mean satisfaction was 3.820 ± 0.71 . There was no statistically significant correlation to the time until admittance, age, number of complications, hospitalization time or functional outcome. But relatives of patients with tetraplegia was more probable to have higher grade of satisfaction ($p=0,033$). Patient's relatives evaluation of the outcome was good (69% rated with 4 and 5). Initial sincere informing and prognosis determination, were of great importance for the 85.2% and 77.5%, respectively. The 79.6% thinks that their patient met the goals of rehabilitation. There was no statistically significant correlation to clinical parameters. **Conclusions:** Patients relatives were satisfied from the rehabilitation team and rehabilitation program while there was dissatisfaction for the PRM premises and the medical insurance's facilities. Patient relatives appreciates the initial sincere informing and demands better rehabilitation services and infrastructures.

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PATIENT'S THOUGHTS THAT GIVES HIM HOPE OR DISAPPOINTMENT DURING INPATIENT REHABILITATION

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Aim: To study the factors that offer hope or disappointment to patient with severe motor and functional deficit. **Material and Methods:** 142 patients (in a total of 538) who were inpatients in the PRM department of KAT Hospital were studied through a period of 3 years (12th 1999 to 10th 2002). The mean time of hospitalization was 77.8 ± 56.8 days. 102 were men and 40 were women with a mean of age 42.1 ± 17.8 years old. Diagnosis was various, like: SCI=45, TBI=42, CVA=37, neurological disease=13 and other diseases=5. Patient recorded his opinion in a special structured questionnaire regarding factors that gave him hope or disappointment. **Results:** Factors that give hope include, the ability to perform tasks (77.5%), return at work (62.7%), ability to have sex (58.5%), participation in recreational activities (64.1), people who express interest on their situation (80.3%), meeting of loving ones (78.2%), making plans and dreams about the future (73.2%), to be trusted (71.8%), reintegration (60.6%), feeling useful (62%) and being equal without sorrow (57%). Factors that create disappointment are functional disability (64.8%), restriction of their initiative (48.6%); lack of understanding of their needs (33.1%), lack of appreciation of their skills (35.2%), and personality change (21.8%). The 38.7% of patients expressed their disappointment for the delay of the rehabilitation program and the 17.6% for the discharge. The correlation of the Barthel Index at discharge with the above parameters was not statistically significant. **Conclusion:** The capability to perform different tasks, the active participation and especially, the expectance of re-establishing human relations gives hope to the patient. On the other hand, disappointment occurs when disability restricts participation.

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QUADRICEPS FEMORIS MUSCLE FUNCTION AND QUALITY OF LIFE IN WOMEN WITH EARLY KNEE OSTEOARTHRITIS

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This studies aim was to investigate the quadriceps femoris (QF) muscle function and quality of life in women with early knee osteoarthritis (OA) in the course of two years. Women with OA

participated in low-intensity exercise therapy training twice per week, except for 3 summer months. Seven female patients with OA (mean±SE age 44.3±2.8 years) were tested twice per year. The control group consisted of 6 age- and gender-matched asymptomatic women, who were tested once. Isometric maximal voluntary contraction (MCV) force and voluntary activation (VA) of the QF muscle and power output (PO) during isokinetic knee extension at angular velocities 60°/s and 180°/s were measured on both legs. Sit-to-stand performance was assessed by the duration of 5 fast sit-to-stand movements. Quality of life (Q), sports and recreational (Sp/ Rec) activities were evaluated with the questionnaire of Knee Injury and Osteoarthritis Outcome Score. Isometric MCV and VA of the QF muscle, PO during isokinetic knee extension at both measured angular velocities, and sit-to-stand performance did not change significantly following the two-year period in patients with OA. In patients with OA, isometric MCV and PO during isokinetic knee extension at both measured angular velocities were greater ($p<0.05$) during the first measurements compared with controls, whereas they did not differ significantly between the measured groups during the next measurements. The indicators of Q and Sp/Rec activities were lower ($p<0.05$) in patients with OA than in control group, whereas these parameters in patients did not change significantly during the two-year period. In conclusion, two years of low-intensity exercise therapy had a positive effect on the motor functions of lower limbs in 34–55 years old women with early knee OA, maintaining these functions on relative by stable level.

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DISADLED ATHLETE'S HEART

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Introduction: Sudden Death in athletes during sports activities usually occur due to underlined and undiagnosed heart diseases like hypertrophic cardiomyopathy, coronary artery anomalies and arrhythmogenic right ventricular cardiomyopathy. **Aim:** The purpose of this study is to investigate the heart dimensions of athletes with disabilities in order to prevent sudden death. **Patients and Method:** Eight Hundred and seven athletes with disabilities of all kinds took part in this study. They underwent a thorough cardiological examination included ECG and Heart ultrasound. The purpose of the examination was to obtain Athlete's License that was a rule of The Panhellenic Sports Federation for People with Disabilities. **Results:** Athletes had average heart dimensions of aortic root size 29.3 mm, right atrial size 32.17, ventricular septal wall thickness 9.09 mm, left ventricular posterior wall thickness 9.07 mm, left ventricular diastolic cavity dimension 47.24 mm, left ventricular systolic cavity dimension 38.62 mm and ejection fraction 66.36%. Forty five out of the 807 athletes showed heart dimension that were over the normal values were excluded from the competitive sports. **Conclusion:** Heart ultrasound is the one and only vital examination which can prevent the sudden death in athletes.

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DETERMINING THE INITIAL POTENTIAL OF REHABILITATION BY PATIENTS AFTER STROKE

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The potential of rehabilitation of insult patients is determined by the degree of their overall functionality (physical functioning and mobility) using a range of medical and social indicators. The more basic indicators are: the nature and progress of the insult, overall functionality of the organism, the degree of functional

deficiency, the patient's daily activities prior to current deteriorated health condition, degree/level of possible compensation i.e. active physical adaptation. The aim of this study is to assess that of gross body movements in early stage of rehabilitation depends exit of it. **Material and Methods:** 112 patients were observed (39 men and 73 women) in nursing home Sue Rider, Bitola in period of first tree of 12 months. The patients were observed immediately after hospitalization and after one year with assessment of gross body movements with next: basic movements: Feeding, dressing, them selves, mental condition. **Results:** The 38.14 had a basic movements, feeding dressing, is achieved by 63%, 20% difficult in dressing themselves, and only 4% homeless brain insult and were generally good condition, everybody after initial hospitalization. The patients had variation in condition after three months. Brain insult survivors can be classified into three groups based on the research and its results: Group A: Index of completion of mobility of upper limbs is 81,46% (this reflects 80,02% of the surveyed patients). Group B: Index of completion of mobility of lower limbs is 64,07% and reflects 38%of the surveyed patients). Group C: Index of completion for gross body movement (walking) without assistance 55.5% reflects 85.25% of the surveyed patients. **Conclusion:** The data base showing that initial potential of rehabilitation varies by patients. It depends on: ordinary health condition and mental condition after stroke, the out come rehabilitation index is very lore, feeding is with correlation with mental physical condition; early stage of rehabilitation is with high risk and dependent of functional and mental deficiency.

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ENVIRONMENTAL RISK FACTORS AND POSTMENOPAUSAL OSTEOPOROSIS INCIDENCE

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Objectives: Bone mass evolves continuously throughout our lifetime, genetic factors and environmental factors having their controversial role in postmenopausal osteoporosis incidence. The study intends to show the correlation between environmental risk factors and postmenopausal incidence of osteoporosis. **Material and Methods:** Along 2 years, 2006–2007, we observed a group of 165 Caucasian women, age 45–80 years. They have been diagnosed with postmenopausal osteoporosis: T score <-2.5 SD on DXA analysis (lumbar area/left hip). We excluded patients with severe diseases of heart/liver/kidney. This is a retrospective study regarding the environmental risk factors and its correlation with the T score and the bone density measured by DXA osteodensitometry to identify the incidence of postmenopausal osteoporosis. We chose as risk factors the following (as data from current literature indicates): bone fractures, smoking, body mass index (BMI), lack of exercising, reduced sun exposure, nutritional deficit (alcohol/malnutrition). **Results:** Our study reveals that the highest incidence of postmenopausal osteoporosis appears in women over 65 years of age, with over 10 years of menopause (menopause started before the age of 50). 53.3% of patients had bone fractures in the past, three times more frequent vertebral fractures over hip fractures in our patients' pathological antecedent events. Low BMI was not relevant as a risk factor, but relevant as a predictor factor for postmenopausal osteoporosis severity, as was smoking (33.3% incidence of bone fractures in smokers versus 22% incidence in non-smokers). Height <160 was a risk factor, for 58.06% of our patients. 78% of patients are sedentary persons. Alcohol and

caffeine were not relevant as risk factors. Age over 65 implies associated pathologies in 67.75% of patients (e.g. hypertension), and medication for these pathologies increases the risk of falling (and fractures). *Conclusions:* Identifying environmental risk factors is important for a correct diagnose of postmenopausal osteoporosis. Adopting a new life style and reducing the influence of risk factors is essential in preventing and treating osteoporosis.

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FALLS AND OSTEOPOROSIS IN ELDERLY

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Introduction: Vitamin D deficiency is associated with a higher incidence of hip and other fractures and vitamin D is required to maintain optimal blood levels of calcium and phosphate, which are needed for normal mineralization of bone, muscle contraction, nerve conduction and general cellular function. *Aim:* The aim of this study was to investigate the association of blood vitamin D₃ level, bone mineral density (BMD) and fall risk assessment tests between the elderly inpatients whom had or did not have falls and/or fractures. *Method:* Twenty-one patients (1 man and 20 women), age 61 to 86 (mean age 72.3) were included in our study. Patients included in our study if they were aged 60 and over, were able to walk with or without aid and were able to complete the fall risk assessment tests. For fall risk assessment, timed get up and go, tandem walk, gait speed and stand-up from chair tests were performed. Patients' last one year femur neck and lumbar 1-4 (L1-4) dual energy X-ray absorptiometry (DXA) T-scores and blood vitamin D₃ level were noted. *Results:* Patients whom had fall history and non-fallers performed get up and go test in a mean time of 16.0±4.9 s and 13.1±3.7 s, respectively. There was not significant difference between fallers and non-fallers ($p=0.138$). The mean vitamin D₃ level was 19.0 U/l and 21.2 U/l in fallers and non-fallers respectively. The difference between fallers and non-fallers was statistically non-significant ($p=0.682$). The mean gait speed was 1.71 m/s in fallers and 1.63 m/s in non-fallers ($p=0.437$). Fourteen patients whom did not have any fracture history had the mean DXA femur neck and L1-4 T-scores were -1.81±1.36 and 0.88±2.13, respectively. There was not any significant difference between the DXA T-scores of non-fractured and fractured patients. *Conclusion:* For the reason of small sample size we could not find any significant difference as regards to the fall risk assessment tests, vitamin D₃ level and DXA results between fallers vs. non-fallers and patients whom had vs. did not have fracture.

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ADVANCED IMAGING ASSESSMENT OF GLUCOCORTICOID-INDUCED OSTEOPOROSIS (GIO)

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Advanced bone imaging techniques provide structural information, beyond bone mineral density (BMD), and evidence indicates that BMD partially explains bone strength and fracture resistance. In assessing GIO, especially, the documentation of glucocorticoid (GC) impact on trabecular and cortical bone, and on macro and micro structure is important. For assessing macrostructure of bone volumetric quantitative computed tomography (vQCT), high resolution computed tomography (hrCT), high resolution magnetic resonance imaging (hrMR) and for assessing microstructure micro computed tomography

(μ CT) and micro magnetic resonance imaging (μ MR) are used (1). Chappard (2) reported micro architectural changes in GIO, using histomorphometry and μ CT; and found that trabecular plate perforations could be observed by μ CT. Lill (3) used vQCT and μ CT to examine osteoporosis induced by ovariectomy, malnutrition and GC in sheep; and found correlations between vQCT density, μ CT structural parameters, and biomechanical properties. Akahoshi (4) studied the modulation of bone turnover by alfacalcidol and alendronate in preventing GIO in minipigs, using vQCT, μ CT and histomorphometry; and found that GC reduced age-dependent bone growth, bone formation rate and activation frequency. Rehman (5) examined PM women with GIO and HRT to determine the best measure of BMD to predict vertebral fractures; and found that spinal BMD by vQCT, but not by DXA, was predictive of fracture. Lian (6) compared GC-treated and GC-naïve PM women for differences in hip BMD by vQCT and in strength by finite element analysis; and found GC treatment caused decreased hip BMD and reduced hip strength, through losses of both trabecular and cortical bone. Advanced imaging in GIO, are in early development; but their novelty is compelling and their utility is promising.

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THE EFFECT OF EXERCISE ON THE LOCOMOTOR ABILITY OF ELDERLY SUBJECTS

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Introduction and Aim: Considering that the locomotor ability of elderly patients determined the limits of independent existence and the degree of possibility of leading an unaided life the effect of rehabilitation treatment on the improvement of the locomotor ability and efficiency of walking was studied in this age group. The impairment of the locomotor function in the studied group of elderly patients was due to a number of causes, rather an extensive range of diagnoses. The most frequent causes were: 1) difficulty to maintain equilibrium in erect position; 2) pain felt on placing a load on the extremity; 3) paralysis or weakness of the muscles of the lower extremities and trunk; 4) disturbances of neuromuscular coordination; 5) limitation of the movements of lower extremity joints; 6) development of articular contractions. These disturbances caused limitation of walking efficiency, with regard not only to this efficiency but also the mode and aesthetic aspect of locomotion. *Patients and Methods:* The analysis concerned 1000 patients aged over 60 years undergoing therapeutic rehabilitation in the Metropolitan Rehabilitation Centre in Konstancin near Warsaw. At the beginning and at the end of the rehabilitation treatment the locomotion ability of the patients was assessed by means of 6-degree functional test. *Results and Conclusion:* Increased strength of the muscles of the basic dynamic complexes responsible for maintenance of erect position, increased range of articular movements, improvement of the neuromuscular coordination and application of technical aids walking, have contributed to improvement of the locomotor ability in the studied group of elderly subjects. The period of rehabilitation varied from 6.2 weeks in spinal painful syndromes to 9.6 weeks after amputations for vascular diseases, and 10.6 weeks in spinal cord diseases, and it was indispensable for achieving locomotor efficiency sufficient for discharging the patients and for providing them with the necessary abilities for living in home conditions. The experiment has been performed within the scope of statutory research (Ds-97) financed from the Warsaw Academy of Physical Education funds.

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RESULTS OF LOCOMOTOR FUNCTION REHABILITATION IN ELDERLY PATIENTS**Targosiński P., Grossman J.***University of Physical Education, Warsaw, Poland*

Patients and Methods: The studied material comprised 1000 patients aged over 60 years. At the beginning and end of the course of rehabilitation treatment the patients were subjected to testing by mean of the locomotion function test. **Results and Conclusion:** For investigating the form of possible correlations the function of regression was tested. In injuries and diseases of the spinal cord the improvement of the locomotor efficiency depended, in the first place, on the improvement of the neurological status, and, in a much lower degree, on adaptive rehabilitation, possible for use in paraplegics in younger age group. In the amputee walking ability was determined in a high degree by the general condition, by the local condition of the stump and of the contralateral extremity and the time at which prosthesis adaptation and training in walking was undertaken. Of essential importance was the attitude of the elderly patients to the rehabilitation treatment. On admission, the most essential factor influencing the recovery of locomotion in this group was the effect of general fitness, pain and range of articular movements. On discharge from hospital, the value of the regression coefficient, with pain as the explanatory variable decreased six fold, and for the range of movements this decrease was threefold. This indicates the degree in which the rehabilitation treatment could have decreased the effect of these factors. In the new situation locomotor activity was determined to a greater extent by muscle strength in the groups of muscles responsible for walking. Decreased pains in arthroses, spondyloses and post-traumatic states influenced favorably walking improvement. Of greatest influence on the locomotion pattern in regression equations estimated on admission and on discharge in these patients was the range of movements. This effect was, however, less evident in the second equation, which could be related to better estimates given to this variable on discharge. The experiment has been performed within the scope of statutory research (Ds-97) financed from the Warsaw Academy of Physical Education funds.

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RELATION OF BODE INDEX TO FUNCTIONAL TESTS IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE**Costa D., Regueiro E.M.G., Pires Di-Lorenzo V.A., Basso R.P., Pessoa B.V., Jamami M.***Spirometry and Respiratory Physiotherapy Laboratory of Federal University of São Carlos, São Carlos, Brazil*

Introduction: Chronic Obstructive Pulmonary Disease (COPD) is characterized by ventilatory and peripheral muscle limitation, dyspnea and reduced exercise capacity as a consequence of diminishing functional capacity; compromising the performance Activities of Daily Living (ADL) due to the reduction in ventilatory and metabolic reserves. This limitation may be related to significant weight loss, respiratory muscle weakness, reduced strength and endurance of the upper (UL) and lower limbs (LL) and increases mortality and lowers quality of life. The mortality risk for individuals with COPD has been evaluated by the BODE Index (B: body mass index; O: airflow obstruction; D: dyspnea and E: exercise capacity) which is considered the best predictor of survival for these individuals. **Aim:** To correlation the BODE Index to the performance in the ADL test, Lower Limb tests (LLT) and degree of impairment in UL peripheral muscles, for individuals with COPD. **Patients and Methods:** Ten men (age from 58 to 80 years old), with moderate to very severe obstruction (GOLD, 2007) were evaluated and classified by the BODE Index. They were evaluated by pulmonary ventilation (V_E), oxygen consumption (VO_2), and carbonic gas production (VCO_2) on the ADL

Test, Distance Walking (DW) in the Six Minute Walking Test (6MWT) and the Six Minute Walking Test on Treadmill (6MWTT), number of repetitions in the Sit-to-Stand Test (STST) and Hand Grip Strength Test (HGT). Correlations were done between the classifications and the tests performed (Spearman test, $p < 0.05$). **Results:** The mean of the total score BODE Index was 2.80 (± 1.03), with 3 individuals scored in the first quartile (Q1) and 7 scored in the second quartile (Q2). This Index presented a strong negative correlation to the 6MTWT ($r = -0.86$), STST ($r = -0.66$) and HGT ($r = -0.83$). **Conclusion:** These results showed that the lower the BODE Index score, the greater the hand grip strength, the greater the DW in 6MWTT and greater the number of repetitions in STST. These findings suggest that these tests are also good predictors of function evaluation when related to the Bode Index and can be utilized to calculate such an index in individuals with COPD. Ethics Committee no 46/2007.

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RELIABILITY OF FORCEPLATE MEASURES IN ELDERLY**Swanenburg J.¹, De Bruin E.D.^{1,2}, Favero K.², Uebelhart D.^{1,3}***¹University Hospital Zurich, Dept. of Rheumatology and Institute of Physical Medicine, Zurich; ²Institute of Human Movement Sciences and Sport, ETH, Zurich; ³University Hospital Zurich, Centre of Osteoporosis, Zurich, Switzerland*

Objective: To determine the reliability of a forceplate based postural balance protocol in a group of elderly fallers and non-fallers. The measurements were performed under single and dual-task conditions. **Methods:** 37 elderly (mean age 73 \pm 6 yrs; 29 female) community-dwellers were included in this study. All were tested in a two-legged stance (single) and in a two-legged stance while counting backwards aloud in steps of 7's (dual-task) condition. An AMTI forceplate registered postural balance variables; the maximal displacement in medio-lateral (ML), anterior-posterior (AP) direction and the average sway velocities (V). Intraclass correlation coefficients (ICC), 95% limits of agreement (LoA), and the smallest detectable difference (SDD) were used as outcome measures. **Results:** The ICCs for inter-rater and test-retest reliability of the balance variables were $r = 0.61$ and 0.89. The SDD values for ML and AP were between 0.37cm and 0.83 cm. V revealed values between 0.41 cm and 1.21 cm. The LoA analysis by Bland-Altman plots showed no systematic differences between test-retest measurements. **Conclusion:** This study showed good reliability results for group assessment and no systematic errors of the measurement protocol in measuring postural balance in elderly in both a single- and dual-task condition. This measurement protocol could be used in prospective studies that investigate the predictive value for subsequent falls in forceplate measurements.

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MUSCULOSKELETAL COMPLAINTS AND INDIVIDUAL CHARACTERISTICS, PHYSICAL, PSYCHOSOCIAL RISK FACTORS AMONG NURSING PERSONNEL IN SHIRAZ HOSPITALS**Gholamzadeh S.***Shiraz Medical University, Fatemeh Nursing and Midwifery College, Shiraz, Iran*

Introduction: Work-related musculoskeletal disorders have been described as one of the main health problems among healthcare workers. **Objective:** To investigate the relationships between physical, psychosocial, and individual characteristics and musculoskeletal complaints among nursing personnel in Shiraz University Medical Science hospital, Iran. **Methods:** In this study a questionnaire survey was carried out among 467 nursing personnel in 3 teaching hospitals in Shiraz, Iran. The questionnaire

involved information on the respondent's job and employment history, weekly working hours, individual characteristics, physical and psychosocial risk factors at work, the occurrence of musculoskeletal complaints in the past 12 months. **Results:** The subjects consisted predominantly of women (80%), with ages less than 35 years (81%). A high proportion of nurses (83.5%) reported more than two musculoskeletal complaints, in the past 12 months, with low back pain being the most common condition (77.5%). This was followed by MSD of the knee (65.6%), upper back (55.8%), shoulder (55.6%), neck (52.8%), wrist (47.0%). Excessive work load (with adjusted odds ratio of 6.87 (95% CI: 1.17–2.96) and employment status (with adjusted odds ratio of 8.2, $p < 0.03$) was identified as a significant risk factor for muscle skeletal complain during our studies. Lifting, moving or transferring patients and manual handling were identified as significant risk factor for LBP and knee pain, upper back. BMI in majority of persons (65.7%) was normal (between 18.5–24.9). **Conclusion:** This investigation suggests that MSD is more frequent among nursing personnel in Shiraz university Medical Science hospital in Iran, when compared to around the world.

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THE COMPARISON OF THERAPEUTIC TOUCH AND PHYSIOTHERAPY IN PATIENT WITH LOW BACK PAIN IN HAFEZ HOSPITAL, SHIRAZ, IRAN

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Background: Low back pain is the second leading chronic pain condition for physician visits, and the morbidity with back pain is the most cause of work absenteeism. Physiotherapy has been used for lower back pain. Touch therapy may effectively treat lower back pain as it has been shown to reduce pain in other painful syndrome. **Aim:** To evaluate therapeutic touch versus physiotherapy effects on chronic low back pain in female referred to physiotherapy ward of Hafez hospital in Shiraz, Iran. **Method:** This is a clinical trial study. The sample included 63 female with low back pain of duration of at least 6 months. The participants divided in two groups by simple randomize allocation: there were 30 patients in case and 33 in control groups. Patients who had undergone surgery for there back pain and patients with sciatic nerve involvement or legal action ending. Such as workmen's compensation. The case group received therapeutic touch; 15–20 min daily for 5–10 days by touch therapists. Physiotherapy way conducted by a specialist physician for each patient with hot pack and diathermy or hot pack and TENS (Transcutaneous Electrical Nerve Stimulation) for 15–20 min daily in 10 sessions. Another person on a double blind fashion compared the effect of treatments by interviewing the patients of both groups. The severity of pain was measured by a 10-degree visual analogue scale for 3 times. 30 min before intervention, immediate and one month after the last session of intervention in both groups. Descriptive inferential statistics method with SPSS soft ware was applied for data analysis. **Result:** Analysis of the findings showed that there was no significant differences between two groups on reducing of pain immediately after the last session of treatment ($p=0.1$) follows up of the patients after one month showed that the severity and duration of pain were significantly decreased in therapeutic touch group ($p=0.02$). In addition, the result after one month of treatment showed significant differences between two groups according their level of activities ($p=0.04$) the

usage of analgesic drugs. And sleep disturbance ($p=0.06$) in other hands. Touch therapy has more effective than physiotherapy one month after treatment in patients with low back pain. **Conclusion:** Regarding to the results we conclude that therapeutic touch is a safe of effective intervention in reducing of pain. In term of costs of treatment touch therapy has no extra costs and is applicable everywhere and every time. More importantly, that it promote human relationship.

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MEDICAL FOODS AS COX/LOX INHIBITORS – THIS IS NOT THE 'LOX' YOU EAT

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Introduction: Arachidonic acid (AA) metabolism into prostaglandins/leukotrienes cause inflammation and pain, and traditional NSAIDs/selective COX-2 inhibitors have significant cardiovascular (CV)/gastrointestinal (GI) safety concerns. The 5-lipoxygenase (LOX) pathway (producing Leukotriene-B4) contributes to inflammation similarly, and dual COX/5-LOX inhibitors are currently in phase III drug trials. Flavocoxid (Limbrel) is a medical food (MF) product FDA-approved for the dietary management of osteoarthritis (OA). MFs differ from dietary supplements and require physician supervision and prescription. Limbrel nonselectively inhibits COX-1/COX-2/LOX, and this balanced downregulation produces AA metabolites at equal levels potentially decreasing CV/GI side effect risks. Therefore, its application to other inflammatory processes may prove beneficial. **Aim:** Patients status-post orthopedic procedures often have inflammation but cannot take traditional NSAIDs/COX-2s due to medical comorbidities or concerns about bone-healing inhibition. This preliminary/pilot study examines effects of Limbrel in patients status-post lower extremity surgery. **Patients and Methods:** Setting: Large urban hospital rehabilitation unit. Methods: retrospective evaluation of eleven consecutive patients on Limbrel with data analyzed for pain control, adverse/favorable side effects, blood pressure, length-of-stay (LOS), discharge destination, and functional-independence-measure (FIM) scores. Patients had unique diagnoses including various fractures (pelvic/hip/femur), malunions, and joint arthroplasties. Gastritis and gastroesophageal-reflux disease, in addition to other comorbidities, were present. Patients received 500 mg BID flavocoxid while an inpatient. **Results:** Cohort: 7 females and 4 males with an average age 76.6 years, BMI 28.6, LOS 10.5 days. No baseline changes in hematology/chemistry. No gastrointestinal side effects, no frank bleeding. Systolic blood pressure decreased an average of 3.0mmHg. 81.8% (9/11) reported decreased pain, with visual-analog-scale (VAS) decrease of 2.7 points. 45% (5/11) reported decrease in edema. No increase in edema, pruritis, vertigo, increased joint pain, insomnia, or upper-respiratory complaints. Only one patient dropped out of the study after experiencing generalized headaches which resolved after stopping Limbrel. All patients had improved functional outcomes and all but one was discharged home. **Conclusion:** This is the first study to examine flavocoxid in post-operative orthopedic patients. Preliminary findings show it appears safe and well-tolerated while improving pain control, stiffness, and edema despite the short treatment. Limbrel appears to be a potential alternative to traditional NSAIDs/COX-2s and may play a role in pain management. While a promising preliminary study, further studies are needed including comparisons with NSAIDs/COX-2 inhibitors.

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PHYSICAL TREATMENT OF CHRONIC NON-MALIGNANT MUSCULOSKELETAL AND PERIPHERAL NEUROPATHIC PAIN

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Introduction: Treatment of chronic non-malignant musculoskeletal and peripheral neuropathic pain is longterm, a challenge and often with poor results, either by pharmacological or non-pharmacological approach. Certain physical modalities have consistent positive effect on this type of pain. **Patients and Methods:** Retrospective study performed at the Institute for physiatry and rehabilitation of the University Clinical centre of Sarajevo involving 100 patients analysed use of certain physical modalities in the treatment of chronic non-malignant musculoskeletal and peripheral neuropathic pain. **Results:** Results showed high usage of electroprocedures (44%), followed by thermal procedures (24.5%), kinesiotherapeutic procedures (16.5%), massage procedures (13.5%), ultrasound therapy (7.8%), magnetotherapy (4.5%) and laserotherapy (1.7%). **Conclusion:** We found that electro and thermal procedures are strongly represented in physical treatment of chronic non-malignant musculoskeletal and peripheral neuropathic pain.

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TOPIRAMATE EFFECTIVENESS IN THE TREATMENT OF VISCERAL PAIN SECONDARY TO MULTIPLE SCLEROSIS

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Background: Pain is a common clinical problem in multiple sclerosis (MS) as 66% of patients report pain as an important feature of their illness. Pain can be due to several causes such as central pain, spasms or trigeminal neuralgia. Visceral pain is a rare association of Multiple sclerosis seen in approximately 2% of cases, however its intensity and the fact that it is extremely difficult to treat make it one of the most feared symptoms. The pathogenesis of visceral pain in MS is unclear. **Case Report:** We present a case of a 68-year-old lady who had been diagnosed as multiple sclerosis twenty years ago and presented with 12 years history of vaginal pain, which had a severity of 9/10. The patient was thoroughly investigated and urological and gynaecological causes were excluded. She was tried on Carbamazepine, Gabapentin and large doses of opiates with no improvement. She had a sacral root stimulator inserted surgically but even this did not benefit her at all. Eventually, Topiramate was added to Gabapentin and her response to this combination was dramatic. **Comments:** Topiramate is an anti epileptic medication. Its record in pain management is mixed with most studies reporting using it for neuropathic pain failing to detect any consistent favourable response to it. However there have been instances when it has been used for treatment of Glossodynia and post ejaculatory penile pain successfully. Topiramate has been recently licensed for use in Migraine prophylaxis. We feel that our case in conjunction with the previously published reports may indicate that

Topiramate can possess an analgesic effect for severe visceral pain syndromes with a primary neurological aetiology. The rarity of this symptom may render large controlled trial unpractical. However the severity of visceral pain in most cases may justify a therapeutic trial of Topiramate in selected patients.

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RELIABILITY AND VALIDITY OF A LEAN BODY MASS-BASED ÅSTRAND BICYCLE TEST

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Introduction: In patients with non-specific chronic low back pain (CLBP) deconditioning is thought to be both a cause and a consequence of non-specific CLBP. The degree of deconditioning can be quantified by measurement of aerobic capacity. In non-specific CLBP patients aerobic capacity is usually estimated from the sub maximal Åstrand bicycle test. However, a substantial number of patients cannot perform the test because the initial workload and the increase of workload are too high. This problem can potentially be avoided if the predefined initial workload and increase workload is based on lean body mass (LBM). It is suggested that LBM reflects the state of deconditioning related to avoidance of activity in non-specific CLBP patients. **Aim:** Aim of this study was to determine the reliability and validity of a lean body mass-based Åstrand test. **Method:** For the reliability evaluation, non-specific CLBP patients and healthy subjects were assessed with the LBM-based Åstrand test twice, with a 2-week interval. For the validity evaluation, 19 healthy subjects were assessed with the LBM-based Åstrand bicycle test and the maximal bicycle test with a 2-week interval. Reliability was determined by calculating intra class correlations (ICC) between measurement 1 and 2 and by calculating the limits of agreement. Validity was determined by calculating ICC between the LBM-based Åstrand test and the maximal bicycle test. **Results:** The LBM-based Åstrand bicycle test shows good reliability, reflected by an $ICC \geq 0.90$ in patients and reflected by an $ICC \geq 0.97$ in healthy subjects. However, the limits of agreement in patients were 50% higher than in healthy subjects. The feasibility was high, 95% of the patients could perform the test. Validity in healthy subjects was good ($ICC \geq 0.88$). **Conclusion:** The present study shows that the LBM-based Åstrand bicycle test is a reliable and valid instrument with a high feasibility for patients with non-specific CLBP. However, a substantial amount of natural variation should be taken into account in individual patients when interpreting the test results clinically.

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MULTIDISCIPLINARY MANAGEMENT OF NEUROPATHIC PAIN FOLLOWING ABDOMINOPLASTY

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Setting: Freestanding chronic pain rehabilitation clinic. **Patient:** 55-year-old non-obese female with chronic pain. **Case description:** Subject underwent hysterectomy and abdominoplasty in June 2005. Following surgery, insidious onset, gradually progressive pain developed in left lower quadrant (LLQ) of abdomen. With failure of conservative measures to control pain, subject underwent an abdominal exploratory laparoscopy (Ex-Lap). Significant adhesions were noted and lyses of adhesions done. Subject had worsening of pain following Ex-Lap and was referred to this chronic pain rehabilitation clinic. On initial evaluation, patient was noted to have constant mechanical dysesthesia and

allodynia in LLQ; was sleeping 3 h/day; had restricted activity levels; and decreased quality of life over one-and-a-half years. Subject was enrolled in five-week multidisciplinary pain rehabilitation program. During the course of the program, subject was educated on proper nutrition, importance of internal locus of pain control, and pain intervention strategies including relaxation techniques and deep breathing exercises. She attended psychotherapy and biofeedback sessions. She participated in physical therapy program tailored to her anatomic area of pain and level of deconditioning. She benefited from the use of hot packs, therapeutic ultrasound, and manual energy-release techniques. Core strengthening was also started. Medications were adjusted. During the first two weeks of the program, her allodynia resolved. Subject was then noted to have hypoesthesia in LLQ. At the end of the program, she noted significantly decreased pain, improved duration and quality of sleep, increased activity level, and improved ability to function as wife and mother. Subject also noted intermittent pain-free days, first such days since June 2005. *Discussion:* Presence of mechanical dysesthesia at constant location left of mid-line in LLQ is thought to be due to local neuroma formation. Allodynia is believed to have developed due to central sensitization from constant, inadequately controlled pain. Manual mobilization of scar tissue has shown to reduce persistent chronic pain. *Conclusion:* Neuropathic pain, although a rare complication of abdominoplasty, can cause disability. Multidisciplinary treatment directed at breaking pain cycle and teaching patient coping strategies can result in significant improvement in pain intensity and duration.

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PAIN MANAGEMENT IN ELDERLY

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Introduction: Pain management in the elderly is an important health problem due to increasing number of older people and the high prevalence of pain in this age group. *Aim:* This study intends to underline the importance of a complex rehabilitation program for pain management in elderly. *Methods:* We studied 442 patients with the age between 65 and 94 years hospitalized between January and December 2006 in the Rehabilitation Clinic III Bucharest, with various degree of pain. We noted medical history, physical examination, pharmacologic and nonpharmacologic therapy, we assessed functional abilities using activities of daily living (ADL) questionnaire and we measured pain using a visual analogical scale (VAS). *Results:* More than 90% of elderly patients hospitalized had pain at the admission: 91.17% had chronic pain, 4.97% subacute pain and 3.84% acute pain; 23.98% had neuropathic pain; 7.46% post-traumatic pain and 68.56% musculoskeletal pain. The most frequent comorbid conditions were: cardiovascular diseases, diabetes mellitus, and stroke. Treatment of pain included: physical therapy (100%), kinetotherapy (100%), pharmacotherapy (86%) – non-opioids (78.5%), opioids (20.2%), benzodiazepine (72%). All patients have reported pain relief (as measured on VAS) in various degrees. *Conclusions:* In elderly patients from Rehabilitation Clinic it is usually necessary to combine pharmacologic and nonpharmacologic therapies in order to decrease pain and improve functioning.

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BACK PAIN DETECTION AND DIFFERENTIATION IN THE NEUROLOGICAL WARD

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Introduction: The most important for proper pain management is diagnosis. Back pain is common and brings patients to neurological wards in Russia (usually 43%–44% at our University Hospital). There are two main types of back pain (nociceptive and neuropathic) and they should be treated differently. Before starting physiotherapy and/or medications we should differentiate these types or find enough evidence to consider pain in particular patient to be mixed (combination of nociceptive and neuropathic). *Aim:* 1) To perform a screening of all patients of neurological ward twice at the Hospital of Bashkir State Medical University for prevalence of back pain using a short form developed for this study (3 questions). 2) To differentiate nociceptive and neuropathic pain using Pain Detect (1) as a diagnostic tool. *Patients and Methods:* Screening was performed twice. Each time there were 60 in-patients at our ward (65% women, mean age 56.6±2.7 years). We distributed questionnaires to all of them and collected filled out ones from all of them (100%). *Results:* Most of the patients (86.7%) experienced back pain in their lives earlier and 31.7% (86.8% women) had it at the moment. Pain was moderate (mean 4.5±0.39 out of 10) and neuropathic (probability >90%) in 21.1%. Less than half (42.1%) of patients less likely (<15%) had neuropathic pain. *Conclusion:* Back pain is common and must be well diagnosed before starting therapy. In cases when neuropathic component is present the special treatment with anticonvulsants (gabapentin, pregabalin) and antidepressants (amitriptylin, duloxetine) should be discussed.

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MIRROR BOX IN CPRS

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Introduction: CPRS is a major Neuropathic Pain Syndrome in PMR practice. The pathophysiology is unclear, but is common after some kind of traumatic episode. The PMR approach is diverse, with different clinical results, but there is no consensus about the best protocol in treating the patients. There are some references to Mirror Box in the context of Neuroplasticity, which is becoming one of the most important research fields in autonomic disability. *Aim:* Test the Mirror Box in patients with CPRS 1, following upper limb fracture. *Patients and Methods:* Retrospective study in patients with CPRS 1 after upper limb fracture, treated with conventional physical plus Mirror Box therapy. We evaluated pain, oedema and ROM at T0, T1 (1 month) and T2 (2 month). *Results:* All patients presented symptomatic improvement, namely at VAS Pain Score. The ROM limitation is still the most delayed response to treatment. *Conclusions:* The authors believe that it is possible to improve function with mental training. Neuroplasticity is probably the key in Pain Management and a promising field in autonomic disabilities. More randomised studies are needed to verify the effectiveness of this tool.

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P350**CHRONIC PAIN ASSOCIATED WITH SPINAL CORD INJURY****Erkin G., Aras M., Onat Sahin S., Ozel S.***Ankara Physical Medicine and Rehabilitation, Training and Research Hospital, Ministry of Health, Ankara, Turkey*

Introduction: Chronic pain is a common problem in patients with spinal cord injury (SCI). **Aim:** This study aimed to investigate the frequency of pain, characteristics of pain, and interference of pain with daily activities in patients with SCI. **Patients and Methods:** 571 consecutive patients with SCI aged 17 years or over were evaluated for the presence pain. The description of pain was assessed based on McGill Pain Questionnaire. The intensity of pain and the effects of pain on daily activities, social activities, and work-related activities were evaluated based on the results of Chronic Pain Grade Questionnaire. **Results:** Of 571 patients, 230 (40.3%) had pain at the time of the study. In 97% of these patients, the pain was below the injury level; in 2.2%, at the level of injury, and in 0.9%, above the injury level. The site of pain in 78.7% of 230 patients with pain was the legs and feet; in 13%, more than at one site; in 3.5%, the hips; in 2.2%, the arms and hands; in 1.3%, the back and lower back, and in 0.4%, the neck. Based on the results of Mc Gill Pain Questionnaire, the descriptions of pain were hot-burning (50.9%), aching (10.4%), throbbing (8.3%), aching-crushing (7.8%), and sensation of heavy load (3.5%). The mean characteristic pain intensity±standard deviation of the patients with pain was 56.55±18.49 on a scale from 0 to 100. The mean pain-related disability score was 32.05±27.34 (scale range, 0–100). Statistically significant differences were detected for presence of pain between the ASIA and educational levels ($p=0.004$, chi-square =13.17 and $p=0.007$, chi-square=13.98, respectively). No statistically significant differences were detected between male and female patients, acute SCI and chronic SCI patients, traumatic and non-traumatic SCI patients, complete and incomplete SCI, and tetraplegic and paraplegic patients for presence of pain ($p>0.05$). **Conclusion:** Most patients with SCI suffer from chronic pain. Chronic pain creates difficulties in the daily activities, social and work-related activities of these patients.

P351**EFFECT OF LOW POWER LASER THERAPY ON PAIN****Kos N., Sedej B.***Medical Rehabilitation Unit, University Medical Centre, Ljubljana, Slovenia*

Introduction: Because of the analgesic effect soft lasers are used at almost all painful conditions and diseases. The therapy is precise and accurate and offers safe and effective treatment. **Aim:** This prospective study was designed to assess the analgesics effect of low power laser with wavelength of 808 nm on acute pain localized in soft tissue. **Patients and Methods:** The laser system used was the Fotona XD-1 diode laser, delivering an out power at the distal fiber tip of 1000 mW in continuous wave at the wavelength of 808 nm. Patients with various musculoskeletal disorders presenting in the outpatients clinic were included into study. Their main problem was pain. The information's about the site, the duration and the localization of the pain were obtained. We used visual analogue scale (VAS) at the beginning and at the end of the therapy to evalu-

ate the intensity of the pain. The patients were treated every day ten times. **Results:** 56 patients were included in the study between April 2007 and December 2007. Among them 71.4% were women. The average age was 51 years (13–78). The main reasons for pain were degenerative changes (57.1%). All other patients had pain because of the trauma. The average duration of pain before the treatment was 4, 5 months (1–12). Most common localisation was shoulder, in 18 (32.1%) patients, 11 (19.6%) patients had problems with elbows and 11 (19.6%) patients had pain in fingers of hands or legs. Other localisations were less common. 3 patients did not complete the treatment, one because of the huge aggravation of the pain and two because of other illness. All the others completed 10 therapies. The mean VAS at the beginning of the treatment was 7.07 and at the end 3.21, the difference was statistical significant ($p<0.001$). Only one patient who completed therapy, reported a little aggravation of the pain (from 6 to 7 according to VAS), one reported no pain changes, all the others confirmed improvement. **Conclusion:** The results showed that the laser therapy had very good effects on the pain. With the use of Fotona XD-1 diode laser the pain diminished for 54% with regard to VAS.

P352**THE ACUPUNCTURE IN PAIN TREATMENT: A REVIEW****Atin M.A., De Crescenzo L., Martín P., Varela E.***Universidad Complutense de Madrid, Spain*

Introduction: Acupuncture consists in the diagnosis and treatment of different pathologies, applied by inserting needles in body surface. Acupuncture is spreading widely but there are no evidences about its efficacy because of the doubts about the placebo effect. **Aim:** To review the acupuncture efficacy in pain treatment. **Methods:** Selection criteria include reviews and articles from the last eight years from the Cochrane Library (11 reviews), PEDro (69 articles), MEDLINE (68 clinical trials and meta-analysis), and ENFISPO (11 articles). Key words were acupuncture and pain. **Results:** We have found references about acupuncture use in different pain treatments: Nociceptive: 1) Acupuncture may be useful in pain management of diverse dysfunctions: temporomandibular, neck, shoulder, epicondylitis, thoracic, low back, hip or knee osteoarthritis, patellofemoral syndrome and foot and ankle injures; 2) It could be an elective technique in abdominal and pelvic pain and dismenorrhea. It may help in oncologic pain, cephalalgia, migraines and chronic pain, including degenerative one, myofascial and fibromyalgia. Neuropathic: Acupuncture has been used in post stroke pain and periferic neuropathies, as carpal tunnel syndrome, or diabetical polineuropathy. Acupuncture acts increasing the somatosensitive threshold. This may reduce the intake of analgesic drugs, and it is also used in peri and post operative pain. For example, it decreases anxiety and depression in pregnancy, when taking drugs is always a risk. Moreover, acupuncture might improve the evolution of hiperhidrosis, pruritus, papilomas, ulcers and other dermic problems. It may ameliorate vascular, endocrin and neurovegetative regulation diseases and also delayed-onset muscle soreness. **Conclusion:** Acupuncture could be safe and useful in the management of different kinds of pain, with an improvement in patients' health and quality of life. However, levels of evidence of this technique are inconsistent. There are great variety in the methodology of the studies, obtaining contradictory conclusions, that should be confirmed in larger and more rigorous trials. Therefore, more well-designed researches are required.

P353**THE EFFICACY OF TOPICAL THIOCOLCHICOSIDE (MUSCORIL®) IN THE TREATMENT OF ACUTE CERVICAL MYOFASCIAL PAIN SYNDROME: A SINGLE-BLIND, RANDOMIZED, PROSPECTIVE, PHASE IV CLINICAL STUDY**

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Aims: To evaluate the efficacy of Thiocolchicoside ointment applied over the trigger point regions compared to trigger point injection and to determine whether the efficacy increased when ointment was applied together with the injection in pain control in patients with acute myofascial pain syndrome in the cervical region. **Patients and Methods:** Sixty-five patients with acute myofascial pain syndrome were recruited in the study. Patients were randomized into three groups. The first group received TCC ointment onto the trigger points, the second group received 8 mg TCC intramuscular injection to the trigger points, and the third group received both of the treatments. Treatment was applied for consecutive 5 days. Algometric and goniometric measurements, and pain severity assessments with VAS were repeated at the first, third, and fifth days of the treatment. **Results:** Pain severity measured with VAS was significantly improved after the first day in the monotherapy groups and after the third day in all groups. While significant improvement was observed in all three groups in right lateral flexion measurements, no significant changes were observed in the combined treatment group in left lateral flexion measurements. **Conclusion:** Thiocolchicoside can be used in the treatment of myofascial pain syndrome and the ointment form may be a good alternative particularly in patients who can not receive injections.

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CORRELATION BETWEEN TEMPOROMANDIBULAR DYSFUNCTION AND MUSCULOSKELETAL PAIN IN NEUROMUSCULAR DISORDERS

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Introduction: Little is known about pain associated with temporomandibular dysfunction in neuromuscular disorders. **Aim:** To assess the association between perceived pain and temporomandibular dysfunction in neuromuscular diseases. **Patients and Methods:** 134 inpatients with neuromuscular disorder diagnoses were recruited from a university ward and given questionnaires to estimate pain localization and intensity (numerical pain scale 0–10; categorizations of average, maximum, and minimum) 4 weeks prior, 1 week prior, on examination day, and at examination time. Part of the research diagnostic criteria for temporomandibular disorders instrument and the temporomandibular index were utilized to assess temporomandibular dysfunction. **Results:** Pain was reported by 116 patients (85.8%), with mean perceived pain recalled as higher in past time for values 5–10. Legs (52.2%) and arms (32.8%) were the most common locations for pain localization, but the highest Pearson correlations (temporomandibular index versus perceived pain) appeared for pain located in trunk and arms. Correlations of temporomandibular index and perceived pain (range: 0.23–0.6; $p < 0.01$) showed that mean pain was relatively constant, but both

minimum and maximum perceived pain were progressively lower the further back in time either was recalled. No correlation between temporomandibular index and diagnosis group existed except for acquired myopathy and other neuromuscular diseases. **Conclusion:** These results suggest that the degree of temporomandibular dysfunction does not correlate with pain according to disease. Instead, there might be a common mechanism responsible for pain development in specific body regions, which is connected with temporomandibular dysfunction. While perceived pain is subject to bias recall, chronic and episodic pain level, the higher the level of temporomandibular dysfunction, the higher the level of perceived pain.

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WHOLE BODY VIBRATION AND FIBROMYALGIA: INFLUENCE ON MUSCLE PERFORMANCES

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Introduction: Whole-body vibration (WBV) is a neuromuscular training method that has rapidly gained in popularity in health and fitness centres. However, limited data are available about the benefits of WBV on muscular performances. **Aim:** The aim of the study was to investigate the effects of WBV in the treatment of fibromyalgia patients. In that purpose, we have assessed tolerance of WBV sessions and consequences on physical function and quality of life in such patients. **Patients and Methods:** Eleven women (41 ± 8 years old, 69 ± 14 kg) suffering from fibromyalgia (FM) participated in the study. During a 5-week experimental period, all patients performed static exercises on a vibration platform (30–35 Hz, 1.5–3 mm, Gymna Fitvibe Medical®), three times a week. Outcome measures were recorded by means of the chair rising test, isokinetic measurements (strength and fatigue protocols), a static endurance test and the sit and reach test. Pain was evaluated by means of a Visual Analogue Scale (VAS) and a dolorimeter. Other endpoints were the Fibromyalgia Impact Questionnaire score (FIQ), the Fatigue Severity Scale score (FSS), the Hospital Anxiety and Depression score, the Borg scale and the Satisfactory score. **Results:** Benefits of aerobic rehabilitation in fibromyalgia patients have been documented previously [1]. In our study, muscle performance improved in FM patients at the end of the WBV training programs. Significant position effects with regard to pain (VAS) and penibility (Borg) scores were measured. The results of the satisfaction questionnaire indicated that the patients were favourable to benefit from additional WBV sessions. **Conclusion:** This study confirms that fibromyalgia patients can perform WBV exercises in safe conditions. The WBV could be incorporated into the multidisciplinary approach proposed in the treatment of FM patients.

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INPATIENT TREATMENT FOR FIBROMYALGIA IN A PRM DEPARTMENT

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Introduction: Fibromyalgia is an idiopathic multifactorial disease with a lot of difficulties in managing treatment of such patients. **Aim:** The aim of the study is to investigate the role of physiotherapy, occupational-therapy and intensive physical exercises as improving factors for patients with fibromyalgia. **Patients and Method:** Eight female patients with fibromyalgia were treated for 4 weeks in a physical medicine and rehabilitation department,

following an intensive program of physiotherapy, occupational therapy and intensive physical exercises under medical supervision, focusing on the continuous physical activity as possible. Taking into consideration that psychogenic factors contribute to the disease, caregivers and relatives were asked to have the least possible interaction and communication with the patients for this period. A specially constructed questionnaire has been fulfilled before and after treatment, as well as 3 months later in a follow-up. Pain was estimated with the Optical Analog Scale. Medication was excluded for this period for a better control of results. **Results:** All patients reported improvement, decreasing their score in the Optical Analog Scale from a mean of 6.3 to 3.1. Three months later the improvement decreased from the mean of 3.1 to 4.0. Only 2 patients reported that they were able to continue the mobilisation program after discharge. **Conclusion:** The use of an aerobic physical activity program in the Hospital environment supports the opinion that the appearance of symptoms of fibromyalgia is due to psychogenic and environmental factors. The long term improvement of such patients can change the prevalent opinion of ambulatory (outpatient) therapy versus inpatient therapy.

P357**PEDOBAROGRAPHIC FINDINGS IN PATIENTS WITH SENSORY DISORDERS OF THE FOOT**

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Aim: To evaluate pedobarographic findings in patients with pain, burning sensation and callus formation in the plantar area of the feet. **Patients and Method:** A total of 39 patients with burning sensation, callus formation and pain in the plantar area as well as 27 controls were included in this study. Pedobarographic measures were obtained from all patients and controls. Pain intensity of patients was measured using the Visual Analog Scale. The percentage of pressure on forefoot and rearfoot, the surfaces of contact and the points of maximum and medium load were measured using static pedobarography. The surfaces during walking, the maximum pressure and the existence of anterior or posterior instability were measured using dynamic pedobarography. The center-of-pressure sway as well as its variation was measured for evaluation of balance. **Results:** The percentage and the surface of pressure in the forefoot were positively correlated with the pain and burning sensation. The sway width in the patient group was higher than in the control group. The Visual Analog Scale score was negatively correlated with the existence of point of maximum load in the forefoot. Maximum pressure during walking was positively correlated with callus formation. The grade of maximum pressure in the forefoot was positively correlated with sway length and sway width ($p < 0.05$). **Conclusion:** Pedobarography may become a useful technique to determine foot pressures, walking and balance problems in painful feet with callus formation.

P358**PEDOBAROGRAPHIC FINDINGS IN POSTURAL SWAY, FOR PATIENTS WITH KNEE OSTEOARTHRITIS - A PERSPECTIVE STUDY, PRE AND POST OPERATION, FOR KNEE REPLACEMENT (PROTOCOL PRESENTATION)**

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Aim: Knee mobility is of tremendous importance in gait cycle, not only during swing phase, but in shock absorption and mid stance phase as well. Knee arthroplasty interferes with knee movement during gait cycle. Patients with osteoarthritis have usually difficulties in keeping their Center of Gravity in their supporting base, due

to the deformity of the knee joint and pain. As a result of this, they are moving anteriorly-posteriorly and side to side enlarging their body sway. The prosthesis type which will be used can modify the gait parameters (Andriacchi et al. 1986), as well as the body sway. Prostheses with mobile polyethylene have the advantage of applying less pressure to contact surfaces (Cheng et al. 2003). The aim of the study is to investigate whether subjects with knee osteoarthritis have reduced static postural sway after knee replacement, as well as to compare differences between fixed and mobile polyethylene. **Method:** Subjects with symptomatic and radiographic knee OA, undertaking knee operation, will be included in the study. A control group of at least 40 controls with asymptomatic and clinically normal knees, will be used. Patients will be divided in 2 groups: the first will use stable polyethylene wear and the second mobile polyethylene wear. The placement of the patients into the groups will be done alternatively, the day before the operation. evaluation of the static body sway and pressure distribution, will be done before the operation and 6 months after. The study will include static pedobarography and stabilometry. A force platform from physical support italia will be used. Findings will be compared with the control group. Differences between the 2 operated groups will also be recorded.

P359**CHANGES IN POSTURAL SWAY, IN PATIENTS WITH VARUS KNEE – PRE AND POST OPERATION FINDINGS WITH UPPER TIBIAL OSTEOTOMY – PERSPECTIVE STUDY, PROTOCOL PRESENTATION**

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Aim: In the knee, the articular compressive stresses can be decreased by diminishing the load or by enlarging the articular weight-bearing surfaces. The ideal treatment combines both possibilities. This can be attained by correcting any flexion contracture with the displacement of the patella tendon anteriorly and recentring the load. After correcting the flexion contracture, an upper tibial osteotomy is planned to bring the compressive force back to the centre of the weight-bearing surfaces, in order to re-establish a symmetrical distribution of the compressive stresses in the joint. Tibial osteotomy allows accurate correction of the varus deformity and anterior displacement of the patella tendon. Results are good if a sufficient overcorrection has been achieved. Distribution of the loads in a static pedobarogram must come back to the normal, as well as the surface and the velocity of the correcting movements in stabilogram. **Method:** Subjects with symptomatic and radiographic varus knee, undertaking knee operation, will be included in the study. A control group of at least 30 controls with asymptomatic and clinically normal knees will be used. Patients will be evaluated in body sway, as well as in static and dynamic analysis of the pressure distribution, before the operation and 6 months after. the study will include static and dynamic pedobarography and stabilometry. A force platform from physical support italia will be used. findings will be compared with the control group.

P360**COMPARISON OF EFFICACY BETWEEN LIDOCAINE ADMINISTRATION AND PHYSICAL THERAPY MODALITIES IN PATIENTS WITH FIBROMYALGIA DIAGNOSIS AFTER SURGICAL INTERVENTION**

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Objective: Fibromyalgia syndrome (FMS) is a disease, characterized by pain and tender points. Treatment of fibromyalgia includes several alternative methods, such as laser, acupuncture, hypnosis and administration of local anesthetics. We aimed to compare the effects of physical therapy modalities and injection of local anesthetics (LA) into trigger points and scar tissues due to previous surgery, in patients diagnosed with FMS after surgical intervention. **Patients and Method:** Demographic features of the patients were highly similar, and before the treatment there was no difference in measurement between the groups. Severity of pain ($p=0.011$), morning stiffness ($p=0.004$), sleeplessness ($p=0.001$), number of tender points ($p=0.012$), psychological status ($p=0.003$), functional evaluation (FIQ) ($p=0.006$) values were significantly lower in LA injection group compared to group who received physical therapy modalities. According to the control examination 4 weeks after the completion of the treatment, measures were also in favor of LA injection in terms of severity of pain ($p=0.001$), morning stiffness ($p=0.001$), sleeplessness ($p=0.001$), number of tender points ($p=0.001$), psychological state ($p=0.0031$), functional evaluation (FIQ) ($p=0.001$), in comparison with the physical therapy modalities. **Conclusion:** Injection into surgical scar and trigger points in patients diagnosed with fibromyalgia after surgical intervention, proved to produce a significant improvement in pain, morning stiffness, sleeplessness, lowering in number to tender points, and better psychological state and functionality, rather than physical therapy.

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IDENTIFICATION OF MYOFASCIAL TRIGGER POINTS BY COMPUTERIZED THERMOGRAPHY

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Introduction: Computerized thermography, system with ability to capture the infrared light emissivity of any reflexive surface, is part of the current arsenal of instrumentation in biomechanics. Using this methodology, it is possible to evaluate the physiology of thermal maintenance through its skin surface representation. **Aim:** The aim of this work is to evaluate the thermography as the identification method of myofascial trigger points, been chosen the trapezius muscle as study focus since it is one of most affected body regions concerning myofascial syndrome. This syndrome is highly prevalent and historically sub-diagnosed as it requires expert professionals to establish its diagnostic, through physical examination. **Patients and Methods:** The participants of this study were gathered as a sample of thirty persons, fifteen men and fifteen woman, ages between twenty three and seventy years (32.5 years in average). The algometry by pressure, highly validated method on previous works, has been used as part of physical examination to confirm the thermography events. The equipment used to collect the thermograms was an infrared camera with digital image processing, with thermal sensitivity for spectral ranges from 7 to 12 μm , appropriate for medical diagnostic utilization; the error index for measurement on this equipment is either 2% or 2°C. It has been used a dynamometer, clock type, for the algometry, commercially available for clinical use, which makes possible to evaluate the applied pressure to the focal point. The trigger point identification was based in a pain diagram filled by the own subject using previously validated parameters. The imaging evaluation was done using a descriptive analysis, having been taking in consideration the thermographic event corresponding to the trigger point, the hot spot or a discoid shaped surface, with one or more degrees Celsius hotter if compared to the neighbour reference point. Algometry was used in this work as reference method. It was applied descriptive statistics for evaluate sensibility and specificity in trapezius Myofascial Syndrome diagnoses. **Results:** A totality of 250 trigger points had been founded: 198 (79.20%) identified by algometry and thermography; 41 points (16.40%) by thermography only; 11 (4.40%) identified by algometry only. **Conclusion:** It was

concluded that the thermography is an appropriated method for Myofascial Syndrome diagnostic on trapezius muscle.

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BACK PAIN IN HEMODIALYSIS PATIENT

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Introduction: Access-related infections are a leading cause of morbidity and mortality among hemodialysis patients. Staphylococcus aureus bacteraemia accounts for 25% of these episodes and its haematogenous complications include endocarditis, pneumonia, osteomyelitis, abscess formation and empyema. The leading presenting symptom in epidural and paravertebral abscesses is back pain. Fever does not have to be present in hemodialysed patients with vertebral osteomyelitis or epidural abscess. **Clinical Case:** ARL, 63-year-old, female, Caucasian, with obesity, left lower limb amputation and type 2 diabetes mellitus undergoing chronic hemodialysis because of end-stage renal failure. In a session of hemodialysis the patient presented inflammatory signs around the central venous catheter (CVC). Samples were collected with cotton swab to perform culture that was positive to methicillin-resistant Staphylococcus aureus. The CVC was removed and intravenous vancomycin and gentamycin commenced. A week after hospital admission the PRM evaluation was requested. The patient started to complain of left back pain that was exacerbated by trunk movements and during nocturne period. Analgesic therapeutic offered only partial relief. There was no trauma history. On physical examination no neurological deficit was elicited or cutaneous lesions like vesicles were seen. Dorsal X-rays were non-diagnostic. A MRI of the dorsolumbar spine disclosed a left antero-lateral paravertebral abscess from D6–D9 with extension to the epidural space. **Conclusion:** Hemodialysis patients are often at risk from the complications of the bacteraemia. Back pain should raise suspicion of paravertebral and epidural abscesses. The authors present this clinical case to illustrate the importance of being aware of recent-onset back pain in hemodialysis patients with a recent or current episode of Staphylococcus bacteraemia because the most effective treatment of paravertebral and epidural abscess is early diagnosis of these pathologies.

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THE ROLE OF PHYSICAL AGENT MODALITIES FOR REDUCTION OF PAIN IN A PATIENT WITH CHARLIN'S SYNDROME

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Introduction: Charlin's syndrome has been rarely described in the general medical literature. Its incidence is 5/100 000 (2). It is manifested by severe pain (1) localized in the area of the nasociliary nerve and the sphenopalatal ganglion. Patients suffering from Charlin's syndrome pose serious difficulties to physicians, as far as the differential diagnosis is concerned, frequently resulting in misdiagnosis and use of ineffective therapies. **Aim:** The aim of the case-study was to assess the effect of a complex treatment, includ-

ing physical agent modalities for achieving a rapid pain relief and reducing the application of drugs in a patient with Charlin's syndrome. *Patient and Methods:* A 63-year-old female presented with an 8-year history of severe right-sided facial pain irradiating to the middle of the face that has caused discomfort and prevented her from performing everyday activities (eating, talking, washing her face, cleaning the teeth). The diagnosis was confirmed by an EMG test – stimulation electromyography found a prolonged latency time of the first reflex response – 41 ms, and by the positive Bonen test. For the evaluation of the results the Verbal Analogue Scale and McGill's Pain Questionnaire were used. According to V.A.S the patient was staged as III-IV rate; according to McGill's Pain Questionnaire she was determined to have 27%. The physical therapy applied included intranasal iontophoresis with Lidocain and ultraphonophoresis of a non-steroid anti-inflammatory drug. *Results:* After a 10-days treatment we achieved a rapid and lasting analgesic effect with a simultaneous reduction of drug utilization. The pain relief after the treatment was evaluated by: VAS – reduction to the I rate and McGill's Pain Questionnaire – to 12%. The numbness and the increased secretion also were reduced. The patient's abilities to perform everyday activities were restored with significant improvement of the quality of life. These results were valid at the follow-up after 4 months: the patient does not have any symptoms that disturb her everyday activities and she does not need any drugs. *Conclusion:* The physical agent modalities might be of great benefit in the complex treatment of Charlin syndrome.

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EFFECT OF BUTULINUM TOXIN IN TREATMENT OF HEMIPLEGIC UPPER LIMB PAIN: STUDY IN 18 PATIENTS WITH UPPER LIMB SPASTICITY

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Introduction: Upper limb pain is a common symptom in patients with stroke interfering with rehabilitation, motor function and quality of life (1). The most of the scientific literature regarding the causes of hemiplegic shoulder pain after stroke is focused on the role of the gleno-omeral subluxation (2) in the early stage after stroke. Only few data are reported to understand the etiopathology of shoulder pain in the chronic stage after stroke. *Aim:* To assess the effects of botulinum toxin A (BT-A) on upper limb pain associated with spasticity and on patient disability. *Patients and Methods:* We enrolled 18 patients (at least six months after stroke) with upper limb pain associated with shoulder adductor and elbow flexor spasticity. One-time injection of BT-A into the pectoralis major and biceps brachii on the hemiplegic side was performed. Outcome measures were Modified Ashworth Scale, Visual Analogue Scale, and Bhakta Questionnaire. Patients were submitted to two evaluation sections. The first consisted of 2 clinical evaluations performed in the month before treatment (baseline), the second consisted of 5 clinical evaluations performed immediately before, 15 days, 1 month, 3 months and 6 months after the treatment. *Results:* No significant changes there were in outcome measures during the first evaluation session, while a clearly significant ($p < 0.01$) pain and spasticity reduction and disability decrease occurred in the second evaluation session. *Conclusion:* Pectoralis major and biceps brachii BT-A injection were effective in the management of shoulder pain in spastic hemiplegic patients. The results suggest the role of spasticity in post-stroke shoulder pain.

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LASEROTHERAPY OF LOW BACK PAIN

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Lumbar syndrome includes symptoms and clinical signs during the degenerative disorders of lumbar spine which are developed after the irritation of the free nerve endings of the spinal nerve in soft tissues of a vertebral segment or after the compression of the spinal nerve root in the area of intervertebral canal or cavity. It is clinically manifested mainly in three forms: acute lumbago, acute compressive radiculopathy, lumbal insufficiency. Laser treatment has a lot of advantages: it is non-invasive, painless and shorter than other methods. The examination includes 40 patients, hospitalized at the Clinic of physical medicine and rehabilitation in Nis, Serbia, with acute lumbar pain syndrome and detailed diagnosis (history, clinical examination, X-ray of the LS, EMG, etc.) The first and second group patients were treated by semi conductive low power HeNe laser, output power 150mW diodes, 780nm wave length and 10–10 000Hz freq. (the freq. which was used was 70 Hz–5000 Hz). Total time is 6 min, and the total emitted energy is 30 J. 40 patients were treated by the laser radiation all suffering the LPS: the first group – 20 patients with low freq. 70 Hz, the second group 20 patients with high freq. 5000 Hz. According to the kind of the LS spinal disorder and the degree of the difficulties, the most frequent is lumboschiadica, 40% in the group treated by low freq. and 45% in the group treated by high freq. laser radiation. Ischiadica takes 27% of all laser treated patients, lumbago 20%; insufficiencia dorsi 7.5%, radiculopatia compressiva was the rarest disorder, 2.5%. There was no significant difference in the terms of statistics in the patients treated by the different freq. laser radiation. The intensity of the pain was graded after each session, both groups. The analgesic effect, shown in this study, is estimated as a very fast and powerful, with average reduction of pain after 5 treatments, and in 75%–90% patients the success is complete. The group treated by the low freq. laser (70Hz) had the elimination of pain after 7.05 treatments, the other group (5000Hz) after 8.04 for 15 pain-eliminated patients. The results show that low freq. has faster effect but the final results are individual due to the pathogenic state of the patient.

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PAGET BONE DISEASE: DEALING WITH OSTHEOARTHRITIS

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Introduction: Paget Bone disease is a localized disorder of bone remodeling that typically begins with excessive bone resorption followed by an increase in bone formation. This leads to a structurally disorganized mosaic of bone (woven bone), which is mechanically weaker, thus more susceptible to fracture than normal adult lamellar bone. Approximately 70–90% of patients with Paget disease are asymptomatic; however, a minority of patients experience various symptoms, including bone pain, secondary osteoarthritis (when Paget disease occurs around a joint), bony deformity (most commonly bowing of an extremity), excessive warmth, and neurological complications (caused by the compression of neural tissues). The disease typically does not spread or extend across joints. *Aim:* Diagnosis and dealing osteoarthritis secondary to Paget bone disease. *Patients and Methods:* A 50-year-old patient diagnosed Paget Bone Disease of the Iliac bone

(since May 2004) being treated with bisphosphonates presented with an unusual pattern of disease with pain and limited ROM of the shoulder joint (on leave?); MRI (October 2007) showed a slight acromial-clavicular arthritis. *Results:* The patient was submitted to a specific rehabilitation programme (40 sessions) after which he regained normal articular amplitude and was able to return to his professional activity. We present a quantitative assessment of the tracer kinetics pre-and-post rehabilitation programme. *Conclusion:* A well designed rehabilitation programme may represent a valuable role dealing with osteoarthritis due to Paget Bone Disease.

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EFFICACY OF STRETCHING EXERCISE IMMEDIATELY AFTER INJECTION OF METHYLPREDNISOLONE ACETATE IN THE TREATMENT OF TRIGGER POINTS

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Introduction: Trigger points have been described as a common cause of pain in clinical practice and an extremely common source of musculoskeletal pain. Indeed, epidemiologic studies have claimed that trigger points are the principal cause of pain in 85% of patients offending a pain center. *Aim:* Trigger points injection can effectively inactivate trigger points and provide symptomatic relief. Efficacy of injection in the treatment of trigger points depends strongly on the technique of trigger point injection. This study compares muscle stretching immediately after injection of methyl prednisolone vs. injection without stretching in the treatment of trigger points. *Patients and Methods:* Patients with trigger point in gluteal muscles were recruited using strict inclusion and exclusion criteria from Shiraz medical school clinics. Subjects under went 2 office visits and 2 phones follow up. All patients received injection of lidocaine and methyl prednisolone. In group A injections were performed without stretching. In group B stretching of injected muscle was done immediately after injection. Evaluation measure tools were 0-10 NRS, VAS and BPI. *Results:* In respect to VAS there was statistical significant difference between both groups 1 month after injection. In respect to NRS, there was statistical significant difference between both groups 1 month and 2 months after injection. But there was no statistical significant difference between both groups in all measurement aspects of BPI except mood. *Conclusion:* Muscle stretching immediately after injection was more effective at least up to 2 months than injection without muscle stretching in the symptomatic treatment of gluteal trigger points.

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THE OPPORTUNITIES OF ART METHODS AND TECHNOLOGIES IN REALIZATION OF THE REPRODUCTIVE FUNCTION OF HANDICAPPED PEOPLE

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The life quality of handicapped people ensures with a complex of rehabilitative measures which include medical, psychological, pedagogical and informative aspects. At first, after a trauma people had to solve a great deal of medical problems, but later, the creation of a family of full value became actual. Not long ago the only opportunity to solve this problem was adoption, which was rather difficult to realize, in its turn. Modern methods and opportunities of in vitro fertilization can help us settle this problem actually in every case. The most frequent diseases which make patients turn to the Clinic for help are: a spinal trauma in different levels of the column, tumors of the spinal brain, degenerative diseases of the nervous system. As a result of these diseases, our patients usually have either obstructive azoospermia or retrograde ejaculation. According to literature, it is possible to receive sperm in almost 100% of cases and make ICSI. There are several types of receiving sperm: – MESA – micro-epididymal sperm aspiration; – PESA – percutaneous epididymal aspiration; – TESE – testicular sperm extraction after surgical biopsy; – TESA – testicular sperm aspiration. The pregnancy rate by using this method is 28-32% and does not differ from the efficiency of IVF which was carried out in virtue of other reasons. One of the most frequent discussed questions is the risk of fetus abnormalities and pregnancy pathology. Numerous researches have proved that ICSI does not increase the probability of fetus abnormalities and the frequency of fetus pathology is the same as in the overall population. Considering the above mentioned information, we would like to begin to elaborate this problem and to offer our government a complex of measures regarding this theme.

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ELECTROSTIMULATION IN THE THERAPY OF THE POST-PROSTATECTOMY INCONTINENCE

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Introduction: The wide-spread application of the electrostimulation therapy in the treatment of post prostatectomy urinary incontinence is based on only very few prospective randomized controlled studies. The presented three-armed prospective randomized study compares an exclusive physiotherapeutic behavioural training with an additional anal or perineal electrostimulation therapy. *Aim:* Does the additional application of electrostimulation cause any advantage compared with physiotherapeutic behavioural training alone in post-prostatectomy incontinence? *Patients and Methods:* Each therapy modality covered 60 patients who were analyzed regarding parameters of incontinence, standardized quality of life parameters (QLQ-C30) and noted equipment data. The data acquisition took place with admission (T1), and dismissal (T2) from an inpatient rehabilitation program, as well as after three months (T3). *Results:* In each therapy arm a significant effectiveness could be proven regarding urinary incontinence and quality of life parameters. In the therapy comparison the additional application of the electrostimulation therapy proved superior to the exclusive behavioural training. However, these results could only be gained in a subgroup with high compliance because the analysis of the equipment data resulted in an unsatisfactory compliance and an extremely high rate of incorrect applications in particular in the case of ambulatory use of the electrostimulation therapy. The perineal electrostimulation therapy exhibited a clearly higher acceptance and a smaller side effect rate and was superior according to the parameters of incontinence. Improvements of the quality of life cores were obtained essentially only during the 4-weeks inpatient rehabilitation program. The quality of life items are not changed by the additional employment of the electrostimulation. *Conclusion:* An electrostimulation therapy is a sufficient therapy regimen for the treatment of third grade postprostatectomy urinary incontinence but only if the compliance is sufficient. An intensive supervision of therapy with regular control of the equipment use is indispensable.

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P370**QUALITY OF SEMEN IN PATIENTS WITH A SPINAL CORD INJURY - A CRITICAL REVIEW****Zemack G.¹, van Kuppevelt H.J.M.¹, Geurts A.C.²***Dept. of Rehabilitation Medicine, St. Maartenskliniek¹ and Radboud University Medical Centre², Nijmegen, The Netherlands*

Introduction: The practice of cryopreserving semen in patients with a spinal cord injury in the period between 2 weeks and 1 year after injury can be questioned. **Aims:** To answer the following questions; 1) is collection of fresh semen in the chronic (>1 year) phase after spinal cord injury (sci) to prefer above cryopreservation of semen in the acute (<2 weeks) or subacute (2 weeks-1 year) phase, 2) must semen be collected in the acute phase in order to obtain sufficient quality and, 3) is it always possible to collect fresh semen in the chronic phase. **Methods:** Critical literature review. Questions were compiled using the pico-method. A systematic search of free text and mesh terms regarding the condition of interest (sci and synonyms; 17 terms) and outcome measures (fertility measures; 38 terms) was carried out. There was no restriction regarding study design. databases searched were pubmed and central. **Results:** Of the 1266 records identified 1246 were excluded at level 1 (title or abstract) or level 2 (full text) if sufficient information pertaining to diagnosis, ejaculation or semen quality, or time after sci was not presented. The included articles relating to the first (5 articles) and second (2 articles) question presented insufficient evidence. 13 articles presented data on ejaculation failures in the chronic phase. **Conclusions:** There is insufficient evidence to support advice against ejaculating and cryopreserving semen in the subacute phase. Ejaculation failure occurs in the chronic phase, a setting in which cryopreserved sperm can be useful.

P371**OPTIMAL FREQUENCY OF ELECTRICAL STIMULATION TO PROMOTE BOWEL EMPTYING IN SPINAL CORD INJURED RATS****Joo M.C.***Physical Medicine & Rehabilitation, Wonkwang University, School of Medicine, Iksan Jeonra buk-do, South Korea*

Introduction: Loss of bowel function, that is, the difficulty of defecation is one of the major symptoms in spinal cord injured patients. It requires frequent attempts to empty the bowel and manual removal of stool to prevent fecal impaction. The sacral nerve electrical stimulation (SNES) has been used to promote bowel emptying in the spinal cord injured animals or patients. However, optimal parameter of SNES to promote bowel emptying was not established yet. **Aim:** The aim of this study was to investigate the effectiveness of promote bowel emptying at spinal cord injured rats and if it worked, we tried to find the optimal parameters for stimulation. **Patients and Methods:** A total of

31 adult Sprague-Dawley female rats were used. Animals were food-deprived for 15 h prior to surgery. A complete spinal cord trans-section was performed surgically at the T10 cord level. The electrodes for electrical stimulation were implanted to 24 rats in the sacral spinal cord region (S2–S4). Intensity of stimulation was determined by the half of the movement threshold and stimulation width was identically 300us. Frequencies were 10-Hz, 30-Hz, and 50-Hz, for each group. Electrical stimulation was applied 4 hours per day (2h/2h, morning/evening) from the first evening of the operative day. The sensory threshold was measured using touch test sensory evaluator (TTSE, Stoelting Co., U.S.A) and motor function was also measured according to BBB locomotor rating scales. We measured the body weight (BW), the amounts of consumed food and water in each animal, as well as the number and the weight of fecal pellet every morning. After 1 week, all rats were sacrificed for immunostaining of Fos protein. **Results:** The stool output was significantly higher in the group of 30-Hz stimulation from post-operated 2nd days to post-operated 6th days than other frequency groups or spinal cord injured only group. **Conclusion:** These results suggest that electrical stimulation could be used to promote bowel emptying in spinal cord injured patients and it is important to use an optimal frequency of stimulation for best improvement of bowel symptoms.

P372**NEUROGENIC BLADDER AND CENTRAL DIABETES INSIPIDUS IN A SINGLE PATIENT****Leonardo D., Melo P., Batalha I., Reis V., Vasconcelos M.A.***Centre of Rehabilitation Medicine from Alcoitão, Service of Paediatric Rehabilitation & Development, Estoril, Portugal*

Introduction: Neurogenic bladder (NB) refers to dysfunction of the urinary bladder due to disease of the central nervous system or peripheral nerves involved in the control of micturition. Diabetes insipidus (DI) is characterized by excretion of large amounts of diluted urine, which cannot be reduced when fluid intake is reduced. DI is caused by a deficiency of antidiuretic hormone (central DI) or by an insensitivity of the kidneys to that hormone (nephrogenic DI). **Aim:** To describe the rehabilitation approach in a clinical case where NB and DI are present in the same patient. **Patients and Methods:** 15-year-old male (birth date: June 5th 1992). Hydrocephalus diagnosed in the neonatal period. Ventriculoperitoneal shunt placement at 18 days of life. We present relevant clinical data from 2002 to the present date. **Results:** August 2002: episode of severe headache and vomit. MRI: cystic-like lesion with right thalamic local invasion. Surgery: tissue removal and placement of new shunt. Pathology: astrocytoma grade II. September 2004: progressive urinary incontinence. Urodynamic investigation: NB with low capacity, high reactivity of detrusor, low compliance, proprioceptive dysfunction, high-pressure voiding. Initiated oxybutynin. March 2005: hypopituitarism detected. After initiation of medication with growth hormone, clinical worsening of urinary incontinence. October 2006: lumbar right scoliosis detected. CT scan revealed L2 hemivertebra, incomplete posterior sacral fusion, end-sacral dysplasia, sacral stenotic central canal. Associated medullar compression. September 2007: central DI diagnosed and initiated desmopressin. Clinical improvement of urinary incontinence. **Conclusion:** The urinary incontinence is potentiated by two different causes: NB due to medullar compression from the L2 hemivertebra and central DI aggravated after initiation of growth hormone. The medication with oxybutynin and desmopressin improved the urinary symptoms.

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REHABILITATION TREATMENT IN URINARY INCONTINENCE IN MULTIPLE SCLEROSIS

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Introduction: Pelvic ground dysfunction affects an average of 50%–90% of Multiple Sclerosis patients during their evolution (1). Pelvic floor muscle weakness interferes with bladder reservoir and inadequate voiding coexists with an increased frequency. Urodynamic findings point out to detrussor neurogenic hyperactivity associated, in many cases, with bladder-sphincter dysinergia (2). Although there are many papers studying pelvic floor rehabilitation in non neurogenic population (3), there are not so many related to patients with partial denervation of pelvic ground. Some therapeutic methods such as pelvic floor training, biofeedback and electrical neuromuscular stimulation seem to achieve a significant improvement in the urinary symptoms of patients with MS (4). The objective of this study is to investigate the effectiveness of a program of pelvic control with biofeedback (5), pelvic floor training and both combined, with electrotherapy as a co-adjutant, to inhibit neurogenic bladder through stimulation of the posterior tibial nerve (6,7). **Material and Method:** 32 subjects (men and women) fulfilled the inclusion criteria. Patients were evaluated before treatment, at the end of the treatment and three months after, measuring: pelvic floor muscle, urodynamic, Pad-Test, mictional diary, incontinence impact questionnaires (IIQ-7), urogynecologic distress – UDI-6 and Multiple Sclerosis Quality of Life Questionnaires MSQoL-54. **Conclusions:** provisional results suggest treatment, can reduce urinary symptoms in the MS population studied. Results are yet to be evaluated before obtaining definitive conclusions.

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REHABILITATION PROTOCOL ON EFFORT URINARY INCONTINENCE IN PREGNANT WOMEN

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Introduction: The effort Urinary incontinence (UI) reach a important prevalence during pregnancy and post-childbirth (32% and a 64%). Main risk factors are biomechanical disturbances, hormonal changes and the childbirth traumatism, worsening with multiparity. LA IU appears with efforts that increase intra-abdominal pressure, when the intra-bowel pressure surpasses the maximum intra-urethral pressure, as cough and sneeze. In serious cases it appears with a minimum activity as deambulation. Numerous studies speak of Physiotherapy as post-childbirth UI treatment. Nevertheless it is not clear the paper it plays as preventive factor during pregnancy. We considered it necessary to study the position physiotherapy has in preventive UI incontinence after childbirth. **Material and Method:** Physiotherapy treatment objectives include decreasing pregnancy patho-mechanical disturbances and perineal automatism reeducation: Sacroiliac and/or sacrococccigeal joint dysfunctions treatment, thoracic diaphragm tone imbalance correction, abdominal and pelvi-trochanteric muscle tone imbalance treatment and pelvic floor muscular work. Guidelines for pelvic floor domiciliary exercises will

be provided. **Results:** Initial evaluation will be performed using: Pad-test, muscular pelvic floor evaluation with scales: modified Oxford and PERFECT; dynamic and passive surface electromyography; osteotendinous structures tensional tests to objetivate lumbopelvic biomechanical disturbances. Patients will be evaluated in the beginning and 24, 34 weeks and 3 months after childbirth. **Conclusion:** Should this protocol be included into a multidisciplinary treatment program of pregnant women with UI, it could be possible to diminish prevalence of post-partum UI improving pelvic floor conditions and increasing quality of life.

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A REHABILITATIVE TREATMENT FOR FLATFOOT: A CASE REPORT

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Introduction: Flatfoot is a confused concept including all foot alterations that are shown with a decrease in the height of the Internal Arch (IA), independently of its etiology and its repercussion on the whole body. Viladot defined it as the deformity in valgus of hindfoot associated with a collapse of the IA. Kapandji emphasized the muscular insufficiency. Principal etiological factors are hyperlaxity and muscular imbalances. We differentiate the functional flatfoot, reversible by the application of conventional treatments, corrected in unload by means of passive manoeuvres and influenced for genetics or external factors; and the structural one, not reversible, it's not correctable and it's influenced for congenital factors or for the first stages of the life. The functional flatfoot could be corrected by muscular rebalancing. Though the conventional treatment is the orthopaedic one, it is necessary an integrated, personalized and specific treatment with the combination of orthopedology and physiotherapy. **Aim:** Show the effectiveness of physiotherapy treatment in pediatric flatfoot. **Material:** We present a clinical case of an eleven-year-old patient with valgus flatfoot and juvenile hallux abductus valgus, without pain but with postural disbalances. Physiotherapy aims were to strengthen elevators of the AI, to rebalance the lower limb musculature and to re-educate posture, proprioception and gait. The patient follows a treatment of manual kinesitherapy and domiciliary re-education exercises. **Results:** After seven months with orthopaedic treatment and daily exercises, HAV diminished, AI increased, calcaneus valgus decreased (from 10°L and 6°R, to 1° and 3° respectively) and also varus of the distal third of the leg (from 7°L and 5°R, to 3° and 4°). Posture, balance and gait clearly improved. **Conclusions:** An alteration or deformity in the foot is always accompanied of anomalies of the top segments. We cannot tackle the foot and its pathology as an isolated case, but as an integral part of the body. Physiotherapy can improve the results of conventional orthopaedic treatment in functional flatfoot but more studies are needed.

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VIDEOURODYNAMIC FINDINGS IN PEDIATRIC PATIENTS WITH SPINAL CORD DISEASES

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Objective: Our aim is to evaluate the videourodynamic findings and methods of bladder emptying in children with spinal cord

diseases (SCD). *Patients and Methods:* Fifty nine pediatric SCD patients who admitted to our clinic were included in this study. Thirty patients were excluded because they were not evaluated with videourodynamic or their data were incomplete. The videourodynamic diagnosis and treatment were recorded. *Results:* Twenty nine patients (16 boys, 13 girls) with a mean age of 10.1±4.4 years, disease duration of 49 months (range 1–156 months) were evaluated. Thirteen of the patients had traumatic, 10 had spina bifida and 6 had other diseases. Majority of the patients used clean intermittent catheterization or diapers (10 patients in each group) as method of bladder emptying. All the patients had positive videourodynamic findings in the evaluation; 24 patients were diagnosed as detrusor overactivity, 5 patients were diagnosed as detrusor areflexia. Clean intermittent catheterization was the recommended method of bladder emptying in majority of the cases (28 patients); 22 patients were prescribed anticholinergic medication. *Conclusion:* Patients with SCD have severe problems due to neurogenic bladder. They should be closely monitored to decrease morbidity and mortality as their life expectancy is close to the normal population.

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PROSPECTIVE STUDY ON BOWEL CARE PRACTICES IN NEUROLOGICALLY DISABLED ADULTS AND THE ROLE OF PERINEOMETER AS AN ADJUNCT

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Introduction: Bowel impairment is understudied in progressive neurological conditions. It is well studied in Spinal cord injury patients. Bowel management is difficult in patients with progressive pathology as compared to bladder management and is a major problem in Neuro disability. It significantly affects quality of life and also increases carer's burden. If dealt inappropriately it affects rehabilitation leading to delayed discharge. *Aim:* Qualitatively analyse bowel problems, emphasize usefulness of digital rectal examination, Bristol stool scale, Perineometer and formulate a flow chart. *Patients and Methods:* Data collected: demographic details, diagnosis, mobility, medications, bowel care pattern, and stool consistency. Using Perineometer, resting pressure and pressure increments were measured at Internal & External anal sphincter and correlated with bowel pathology and continence. *Results:* Male: 67%, female: 33%, age range: 21–65 years. diagnosis: multiple sclerosis (35%), cva (23%), spinal pathology (25%), head injury (5%), miscellaneous (12%). Bowel evacuation frequency: daily (23%), alternate days (20%), twice weekly (37%), weekly (5%), fortnightly (5%). Perineometer readings: 50% had less than 50 cm h2o, 30% had eas more than 105 cm h2o. Pressure increment normal in 12% which correlated well with continence. *Conclusions:* Aim for regular, complete emptying and formed stools to prevent complications (tears/fissures). Encourage high fluid/fibre intake, mobilise if possible and review constipating agents. Use laxative combinations appropriately (osmotic, stimulant, bulking agent, stool softener) according to bowel pathology (spastic/flaccid). Avoid: Under or over use of laxative combinations and quick switchover. Use Bristol stool scale, digital rectal examination, X-ray abdomen and manual evacuation appropriately. Perineometer is a good adjunct for digital rectal exam, helps to assess anal tone and plan a bowel regime. Variable practices were noted in medical/surgical/rehabilitation/community settings. Colonic irrigation, sacral nerve root stimulator and colostomy are possible options in extreme circumstances.

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QUADRICEPS EXCISION: IS IT POSSIBLE TO WALK?

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Aim: Demonstrate the capability of a patient to develop functionality after quadriceps femoris total resection through muscle adaptations and compensations during a rehabilitation program. *Introduction:* Soft tissue sarcomas are rare malignant tumours. Two thirds occur in lower limbs. Amputation is being replaced by radiotherapy and conservative surgery with better functional outcomes. The quadriceps femoris is extremely important to gait as it is the main knee extensor. Despite that, its unilateral absence allows good functionality. *Patients and Methods:* The authors present a case of a female patient, 69 years old, evaluated by PM&R for sequelae of a high grade malignancy sarcoma of the left thigh, submitted to total resection of the quadriceps femoris. Before surgery she was on chemotherapy and after on radiotherapy. She started rehabilitation treatment on first week after surgery with the initial goals of alleviating pain and edema and avoiding complications of immobilization. At discharge from the surgery ward she was on a wheel-chair and an arthrodesis of the left knee was proposed, which she refused. *Results:* Maintaining active rehabilitation treatment, by the second month she presented mild thigh pain, conserved ROM, no active extension of the knee and ambulation with a walker. Two months later she feels no pain, and even though she has no knee active extension, she can walk with only one crutch in the outdoors, without any help in other daily life activities. She had great evolution from the oncological, surgical and rehabilitation perspectives. *Conclusion:* With an appropriate rehabilitation program and good cooperation of the patient, we were able to bring her to a fully autonomous life with few limitations despite the radical surgery to which she was submitted.

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GAIT ANALYSIS FOR MANAGEMENT OF FUNCTIONAL RECOVERY IN BIOLOGICAL RECONSTRUCTION OF FEMUR IN CHILDREN WITH BONE SARCOMA

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Introduction: In the long bones sarcoma, the intercalary defect is replaced by a massive deep-frozen bone allograft suitably prepared to receive on its endostal surface a vascularized fibula autograft (1). As this innovative technique is very engaging for possible clinical and mechanical complications and the long time of immobilization, it entails an adequate management. The aim of this study was to quantitatively assess the functional performance after the biological reconstruction of femur in order to highlight requirements for rehabilitation interventions. *Methods:* We evaluated 9 patients (12.5±3.9 years) at a follow-up of 60±25 months. Femur resections were proximal in 4 subjects and distal in 5. All the patients performed a customized rehabilitation training aimed at providing progressive recovery of limb load bearing, hip and knee range of motion, residual muscle strengthening, walking pattern recovery. A stereophotogrammetric system, two forceplates, a surface electromyography and an isokinetic dynamometry were used for assessment, MSTS and TESS were used for functional scoring. *Results:* Five patients had a physiological gait pattern in knee flexion extension pattern, two

distal patients had inadequate knee flexion during loading response and two proximal patients an inadequate knee extension during terminal stance phase. EMG findings evidence the compensative action of residual muscles. Mean score in functional scales were excellent. The isokinetic assessment showed strength deficit in quadriceps. **Conclusions:** Residual differences in gait pattern between the proximally and distally reconstructed patients are attributable to the removal of different muscle group due to the tumor location with different functional consequences. Gait analysis is useful to provide further information for rehabilitation management in individual patients identifying muscles functional behavior, possible joint overloading and general walking efficiency.

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LOW BACK PAIN: A HIDDEN LUMBAR CHORDOMA

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Introduction: Approximately 90% of all people experience low back pain (LBP) at some time in their life. History and physical examination are important in distinguishing potential causes and identifying ‘red flags’ for more serious conditions. **Aim:** The authors report the case of a patient with an intense and persistent lumbosciatica without relief with injectable non-steroidal anti-inflammatory drugs and muscle relaxants. **Patients and Methods:** RPM, 63-year-old, male, Caucasian, engineer, without any relevant family history and pathological background. He had a 4 week history of intense right lumbosciatica with no traumatic injury. On examination, straight leg raise test was negative but the stretching of the L3 root was painful. The L4 and S1 reflexes were bilaterally abolished. **Results:** The CT and MRI of the lumbosacral spine identified an isolated lesion at L3 body. Biopsy at L3 was performed and histology/immunohistochemistry revealed a chordoma. The patient was submitted to L3 vertebrectomy with interbody fusion and stabilization. He underwent postoperative radiotherapy. **Conclusion:** Chordomas are rare, slowly growing, locally aggressive tumours that arise from embryonic remnants of the notochord. These tumours typically occur in the axial skeleton. The vast majority are found at skull base and sacrum. Chordomas involving lumbar spine are rare. The authors present this case to illustrate that although the majority of cases of LBP have biomechanical causes and resolve promptly with little intervention, if symptoms have not improved within 4 to 6 weeks, re-evaluation and additional diagnostic workup should be considered.

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REHABILITATION NEEDS OF PATIENTS WITH CANCER

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Introduction: There is an underuse of rehabilitation services for cancer patients across the world. In our country, rehabilitation services for cancer patients are also limited. The main reasons include failure to identify functional impairments in these patients and lack of rehabilitation referrals. **Aim:** To identify the rehabilitation needs and functional status of patients with various cancer diagnosis. **Patients and Methods:** Three hundred patients at a state oncology hospital in Ankara, Turkey were included in this study. All patients (155 female, 145 male, mean age: 49.8±16.8, mean disease duration: 445.9±228.2 days) were evaluated for the presence of various rehabilitation needs such as deconditioning, pain, fatigue, ambulation difficulties, contracture, and lymphedema. Functional assessments were performed using Barthel Index (BI) and Karnofsky Performance Status Scale (KPSS). **Results:** The types of cancer in the study group is shown in Table I. The most frequent symptoms were fatigue (63.3%) and deconditioning (62.7%) followed by the ambulation difficulties (34%). Rehabilitation needs of the study group is shown in table II. KPSS showed that 225 (75%) patients were able to carry on normal activities; no special care were needed, whereas 72 (24%) patients were unable to work; able to live at home and various amounts of assistance were needed for personal cares. Three (1%) patients were unable to care for self and required hospital care; disease were possibly progressing rapidly. BI assessments showed that 57% of the patients were independent in daily activities, 39.4% were mildly to moderately dependent and 3.6% were severely dependent or bed-bound. Although 114 patients were actively working before the cancer diagnosis, 14 patients were able to continue working after cancer. Before the study, only two patients were referred for rehabilitation consultation. **Conclusion:** Patients with cancer have many unmet rehabilitation needs. Awareness of these needs should be increased and rehabilitation interventions be integrated to the comprehensive care of these patients.

Table I. Distribution of cancer types

Type of Cancer	n	%
Breast	75	25.0
Lung	48	16.0
Gastrointestinal system	46	15.3
Bone	31	10.3
Head and Neck	27	9.0
Genitourinary system	26	8.7
Soft tissue	14	4.7
Brain	10	3.3
Skin	8	2.7
Hematologic malignancies	8	2.7
Lymphoma	7	2.3

Table II. Distribution of rehabilitation needs.

Rehabilitation Needs	n	%
Fatigue	190	63.3
Deconditioning	188	62.7
Ambulation difficulties	102	34.0
Pain	79	26.3
Dysphagia	55	18.3
Transfer difficulties	55	18.3
Contracture	53	17.7
Lymphedema	18	6.0

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ISOLATED INFERIOR GLUTEAL NEUROPATHY: A CASE REPORT

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Purpose: To present a case of an isolated traumatic inferior gluteal neuropathy. **Setting:** Outpatient Sports Medicine Clinic. **Patient:** 45-year-old Caucasian female. **Case Description:** We report a case of a 45-year-old female patient who was referred to our clinic after sustaining a traumatic fall over her left buttock. The patient reported a sudden onset of pain after sustaining a fall from a flight of stairs seven months prior to our initial evaluation. Initial MRI results demonstrated left pars interarticularis edema

with disc bulges without evidence of herniations. The patient proceeded to have sacroiliac joint injections, which failed to resolve her pain. She was subsequently referred to our clinic for further work up for her source of pain. Initial evaluation showed that she had localized pain and atrophy over her left buttock region. The patient was sent for an electro diagnostic study for evaluation of a suspected lumbar radiculopathy. It showed a normal nerve conduction study, H-Reflexes and F-Waves. However, the electromyography (EMG) showed evidence of denervation without recruitment pattern and absence of motor unit action potentials (MUAP) over the gluteus maximus. The rest of the EMG study, including paraspinals, was normal. The patient was referred for further evaluation including a possible nerve grafting. **Assessment and Results:** These findings support an evidence of an isolated traumatic inferior gluteal neuropathy and excluding any lumbar radiculopathy, plexopathy or a sciatic neuropathy. **Discussion:** An isolated inferior gluteal neuropathy is a rare finding. The inferior gluteal nerve originates in the lumbosacral plexus (L4–S3). It arises from the dorsal divisions of the fifth lumbar and first and second sacral nerves, leaving the pelvis through the greater sciatic foramen, below the piriformis, and divides later into branches which then enter the gluteus maximus. **Conclusions:** To date, it has been reported 5 cases of an inferior gluteal mononeuropathy as an early representation of recurrent colorectal carcinoma. However, no report has been documented in the literature of an isolated inferior gluteal mononeuropathy following a traumatic injury making this a rare event.

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ENTRAPMENT NEUROPATHY OF THE LATERAL ANTEBRACHIAL CUTANEOUS NERVE (LABCN)

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Purpose: To report rare signs and symptoms of entrapment neuropathy of the lateral antebrachial cutaneous nerve (LABCN) at the elbow which can present as a rare sign of elbow pain. **Setting:** Outpatient Clinic. **Patient:** 24-year-old female. **Case Description:** A 24-year-old right hand dominant female presented to the outpatient clinic with a two-week history of numbness and paresthesia over the anterolateral aspect of her forearm without extension below her wrist. She reported no significant history and was given ibuprofen and tramadol by her primary physician. She reported subjective weakness with elbow flexion and extension. Physical examination revealed tenderness over her right antecubital fossa with reproduction of her symptoms. The remainder of her neuromuscular exam was unremarkable except for a positive Tinel's test at the right antecubital fossa. X-ray exam of the elbow and cervical spine were negative and it was decided to further evaluate the region using ultrasound examination. Ultrasound examination showed a 0.28 cm cyst overlying the lateral antebrachial cutaneous nerve which was subsequently aspirated without complication. Following this, the patient had complete resolution of her symptoms. She was given a short-term trial of pregabalin along with a home exercise program with good results. **Conclusion:** Radiating elbow pain secondary to lateral antebrachial cutaneous neuropathy can present similar to other common conditions. A positive Tinel sign at the lateral elbow can help localize the lesion to a peripheral entrapment. Electro diagnostic evaluation involving the LABCN can be helpful in identifying pathology of this nerve when symptoms present in that distribution with a normal evaluation of common tested nerves. **Discussion:** Elbow pain has many causes. An extremely rare cause which should be included in any differential diagnosis of elbow pain is pathology of the lateral antebrachial cutaneous nerve. It provides sensory innervation to the lateral forearm and therefore must be considered in any pain arising along the region. Patients often experience relief after anesthetic injection into the region of the bicipital tendon. Electro diagnostic testing often confirms the neuropathy.

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FACTORS INFLUENCING HOME MODIFICATION OF STROKE PATIENTS

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Introduction: Stroke is one of the leading causes of death and long-term disability in the world (1, 2). Home modification for stroke victims is often necessary to enable them to have the best quality of life possible with their new disability, in which the living environment is intentionally changed to increase safety, ease of use and the capability of the victim to help themselves (3, 4). **Aim:** To identify significant personal factors influencing the requirement for home modification in post-stroke patients. **Patients and Methods:** Post-stroke patients were recruited from 9 tertiary rehabilitation centers in Thailand. All patients received inpatient rehabilitation programs until either they reached the rehabilitation goals or registered two consecutive stable weeks as measured by their Barthel index score. Personal factors related to home modification were assessed at study entry, during hospital stay and at discharge. **Results:** 281 patients completed the study. The results of univariate analysis showed that a low Barthel Index score, low Brunnstrom stage of hand, arm or leg, a higher level of spasticity of upper and lower limbs, presence of shoulder pain, and intolerance to intensive rehabilitation programs indicated a necessity for modifications in the patient's home ($p < 0.05$). The results of multivariate modeling showed that a low Barthel Index score, low Brunnstrom stage of hand, arm or leg, and intolerance to intensive rehabilitation were significant predictors of a requirement for home modification ($p < 0.05$). **Conclusion:** The findings of this study indicate that a low level of physical functioning and intolerance to intensive rehabilitation are significant predictors for the necessity of home modifications in stroke victims.

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ROLE OF PHYSICAL AND KINETIC THERAPY IN MULTIPLE SCLEROSIS

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Introduction: Exist an increase of multiple sclerosis incidence and because this patients need to have health assistance all life, is very important to development interdisciplinary studies regards the opportunities of physical and kinetic assessment and intervention. Cardiovascular assessment, neuromuscular adaptations to effort for decrease muscle fatigue are only few elements that must be studied. **Aim:** We try to present a rehabilitation programme including physical, kinetic and medical therapy. This programme has been made for a lot of patients with multiple sclerosis. Is important the methods of assessment the rehabilitation programme using clinical, functional assessment before and after rehabilitation programme. **Material and Methods:** The research has been made in Rehabilitation Department during 2 years. We had 15 patients with multiple sclerosis in different stage of evolution. Clinical assessment, functional assessment, assessment of effort capacity V0, max, electromyographic assessment and kinetic assessment using SIMI Motion system 2D for gait and balance. We used specific scale for assessment like: Troiano; Ashworth; Penn scale, Kurtzke; Fugl-Meyers Berg and Tinetti. Objectives of programme were: induce of volutar motor activity; promote the sensorial feedback; reduce and inhibiting the wrong movement; prevent muscle retractions and joints deformi-

ties; reduce pulmonary deficiency; decrease spasticity; decrease sphincterian disorders. We used physical methods for reduce pain, spasticity and also kinetic methods for each objective. In each month we followed the evolution using specific scale for assessment. We must to say that during the acute episode the patients did not come to the rehabilitation programme. *Results and Conclusions:* After we applied the rehabilitation programme we observed an increase of effort capacity from 35% to 65%, and for that all patients can continue the programme because there exists a great tolerance to effort. Also we observed a good results of functional scores and parameters.

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SATISFACTION WITH THE QUALITY OF LIFE OF PATIENTS AFTER ACUTE STROKE

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Aim: Determination of the influence of rehabilitation – improvement of neurological deficit to the level of satisfactory life quality of the patients after acute ischemic stroke. *Working Hypothesis:* Improvement of neurological deficit leads to improvement of quality of life. *Patients and Methodology:* Prospective study included 106 patients (78 male and 28 female) age 35–60, in the Hospital 'St Sava' treated from 1st January to 31st August 2007. FIM tests were done to estimate the seriousness of neurological deficit, and QOL tests were done for estimation of the satisfaction with quality of life; at the reception, after 14 days and 6 months. Results were processed by standard statistic methods and scores were compared in the three periods mentioned above. Correlation between dynamics of the increase of TOTAL FIM score and QOL score was also determined. *Results:* Average value of TOTAL FIM score at the reception is 41.53. After fourteen days it is 58.17, and 98.92 after six months. There is statistically important difference – the increase of score after six months in comparison to the day of reception, as well as after six months in comparison to fourteen days of treatment. On the day of the admission the score of the QOL test is 44.7, after fourteen days it is 49.1 and after six months it is 78.9. There is no statistically important score increase when we compare tests taken on the day of the admission and after fourteen days. After six months we can notice significant increase of score in comparison to the value of the score on the check-up after fourteen days. There is no statistically important correlation between dynamics of the TOTAL FIM score and the QOL test score. *Conclusion:* After six months of treatment, there is significant improvement of neurological deficit and higher degree of satisfaction with quality of life. Dynamics of the degree of quality of life does not follow dynamics of neurological recovery. Satisfaction with the quality of life cannot be either explained or predicted by the pace of neurological recovery.

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DEVIC'S DISEASE: A CASE REPORT

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Introduction: Devic's disease, also known as neuromyelitis optica is a rare, severe, demyelinating disease of the central nervous system that preferentially affects the optic nerve and spinal cord. Devic's disease has been thought as a variant of multiple sclerosis. However is now well recognised that there are clinical, laboratory, immunological, and pathological characteristics that distinguish

this entity from multiple sclerosis. *Aim:* To report a case of Devic's disease. *Methods:* The authors describe a case of a 54-year-old man who was admitted in neurology department with a sudden paraplegia T4 level, bilateral deep and superficial hyposthesia and urinary retention. He was discharged with the diagnosis of viral transverse myelitis; the treatment was high-dose intravenous methylprednisolone. Eight months later, during rehabilitation program in our department, he developed a left optical neuritis and twelve days later a right one, and a tetraplegia ASIA-A C5 level. After in-patient investigation the diagnosis of Devic's disease was done, he was submitted a corticosteroid therapy and plasma exchange treatment but there were no clinical changes. The rehabilitation's goal was to improve functionality of the superior limbs. *Discussion:* Devic's disease associates unilateral or bilateral optical neuritis and acute transversal myelopathy; It is usually a relapsing disorder associated with early, severe, attack-related residual disability. In this patient the initial clinical, laboratory, and spinal MRI findings favoured the diagnosis of viral transverse myelitis. However, the clinical evolution was crucial to settle the definitive diagnosis. The program of rehabilitation – physiotherapy, occupational therapy and visual aids, can help to maximize the remaining functional abilities, improving the quality of live of a patient, with a poor prognosis disease in terms of the optic-spinal function, particularly in late diagnosis and treatment.

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EPIDEMIOLOGY OF SPINAL CORD INJURIES IN SERBIA

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A retrospective study of 250 patients with spinal cord injuries admitted to the Clinic for rehabilitation in Belgrade, Serbia from January 2000 to December 2004 was conducted. A total of 250 patients, 162 paraplegic (43 women and 119 men) and 88 tetraplegic (16 women and 72 men). The average age was 33.2±11.7 years (range from 16–68 years). Most subjects (72.4%) were aged between 25–45 years. About half of them had no associated injuries and had financial problems. 71 (28.4%) patients of the spinal cord injuries were caused by traffic accidents (car and motorcycle respectively). The 66 causes were falls (26.4%), 38 (15.2%) causes were TU, 20 (8%) causes after pathologic fracture of spinal, operations 8 (3.2%) causes, 12 (4.8%) causes were gunshot wounds, and another 20 causes (8%). The neurological classification was as follows: 134 (53.6) patients had ASIA A grade of injury, 38 had ASIA B (15.2%), 40 (16%) had ASIA C, 20 (8%) had ASIA D, Central cord syndrome 15 (6%) causes and Brown – Sequard syndrome 3 (1.2%) causes. Traffic accidents most frequently resulted in an complete ASIA A grade of neurological classification (40.3%). Males were more predominant for all causes of injury especially motorcycle accidents. The average Barthel Index score was 21.4±23.5 and 53.5±34.2 at admission and discharge respectively. The average length of stay for paraplegic is 180 days and for tetraplegic 270 days.

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SIGNIFICANT RECOVERY OF MOTOR FUNCTION OF A PATIENT WITH COMPLETE T 7 PARAPLEGIA ON ETANERCEPT: A CASE REPORT

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Objectives: Report an unusual case of significant motor recovery of a T7 complete paraplegia in a patient treated by etanercept. *Clinical Case:* A 41-year-old woman, was treated by etanercept (50 mg per week) because of an ankylosing spondylitis. A traffic injury led to a T10 complete paraplegia (American spinal injury association Impairment Scale A). Initial NMR showed a fracture of vertebrae T7, a T6-T7 dislocation with complete interruption of the spinal canal and

a fused spine. Surgical osteosynthesis was performed 5 hours after the accident. At day 1, paraplegia was motor complete and sensory incomplete, AIS B. Sensory level was T7. Sensory-motor recovery occurred during the following year (status at one year, ASIA motor score: 89/100, ASIA sensory score 84/112 for touch and 79/112 for prick, AIS D). *Discussion:* The initial spinal cord injury (SCI) triggers a series of molecular and cell reactions leading to 'secondary damage'. Tumor necrosis factor alpha (TNF α) is a key inflammatory mediator that is increasingly expressed after SCI. Etanercept is a recombinant dimer of human TNF receptor protein that inhibits TNF activity. It has shown an immunomodulatory effect in mice after traumatic SCI (reduction of post traumatic cord inflammation and the perilesional area, improvement of functional recovery) (1). In this case, a reduction of the secondary damage due to etanercept treatment could explain the dramatic motor recovery which is unusual since in 80% of AIS A lesions remain complete (2).

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ORGANIZATION OF REHABILITATION TREATMENT AFTER THE STROKE

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Introduction: Rehabilitation of patients after the stroke is a team work performed at clinics, ambulant and at patient homes. Organization of rehabilitation treatment depends on level of education of rehabilitation staff, is there enough bed in the hospital, and on conditions at patient homes. *Aim:* To show the organization of after stroke rehabilitation at UCC Tuzla, and to present the results of the rehabilitation treatment performed in the period of 2001–2005. *Subjects and Methods:* In the Stroke Unit we performed early rehabilitation for all subjects if the contraindications were absent. After the acute phase of the rehabilitation process the decision was made according to Pamela W. Duncan algorithms and the subjects were sent to the Clinic for physical medicine and rehabilitation (PR&M), ambulant or home treatment. During the period of 2001–2005 the UCC Tuzla treated 4265 subjects with stroke. Rehabilitation treatment (kinesio, electro and speech therapy) at the PR&M Clinic involved 576 subjects. The rehabilitation of all subjects during admission and discharge was evaluated using Barthel index and FIM. *Results:* All of the 576 subjects hospitalized at the Clinic for the PR&M had average value of Barthel index 35 points (admission) and 61 (discharge), while FIM was 70 and 89 points, respectively ($p < 0.01$). *Conclusion:* This study gave significant results by Barthel and FIM showing that the Clinic for PR&M, UCC Tuzla, has well organized after stroke early and hospital rehabilitation, however larger capacity of beds is needed to include all subjects who need hospital rehabilitation.

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SHOULDER PAIN AFTER STROKE AND ASSOCIATED FACTORS

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Objectives: Shoulder pain is a common complication of stroke that can cause some rehabilitation limitations to achieve functional goals. The information about its prevalence and associated factors is limited. This study was conducted to detect more details about its associated factors. *Methods:* This study was done on 191 stroke patients at physical medicine and rehabilitation ward of Shiraz-Medical School from 2001 to 2004. Every patient was followed for one year. A questionnaire was prepared containing information about shoulder pain complaint, thorough history and physical examination previous history of open heart surgery, scoliosis, limited neck range of motion type of stroke (based on MRI and brain CT), osteoporosis (based on bone mineral density and X ray) and shoulder adductor muscles and biceps, spasticity (based on Ashworth scale). In the following visits in every 2 months until one year, the questionnaire was filled again and if present, shoulder pain was recorded. *Results:* Most patients developed shoulder pain between 2 and 6 months after stroke. Forty-nine patients (32.2%) developed shoulder pain, 39 (79.6%) of whom had spastic tone and 8 (16.3%) had flaccid tone. In both groups, with shoulder pain and without shoulder pain, respectively 6.7% and 1.9% had a history of open heart surgery, 6.1% and 1% had scoliosis, 67.3% and 35.1% had Intracranial hemorrhage, 73.5% and 23.3% had limited neck range of motion, and 24.5% and 35% had osteopenia. *Conclusion:* Spasticity was significantly more common in the shoulder pain group ($\alpha < 0.001$), which can be due to capsulitis, soft tissue inflammation (especially ligament and rotator cuff muscle) and antero-inferior subluxation of the shoulder. There was a significant statistical correlation between Intracranial hemorrhage reduced neck range of motion, and hemiplegic shoulder pain. It seems that treatment and rehabilitation of spasticity and underlying cervical area problems are helpful in preventing hemiplegic shoulder pain.

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ROBOT MEDIATED PHYSIOTHERAPY CAN DECREASE SPASTICITY

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Aim: Stroke and traumatic brain injury often lead to spasticity. Exercises executing with a slow and constant velocity can be beneficial in reducing muscle hypertonia. This kind of exercises can be more accurately managed by a robot than by a human. A robot mediated physiotherapy system – called REHAROB – was developed for supporting shoulder-elbow exercises of patients with spastic hemiparesis. *Patients and Methods:* 30 patients with spastic hemiparesis were randomly divided into two groups. Members of both groups received the same amount of traditional physiotherapy on twenty consecutive workdays, while the experimental group received 30 min long robot mediated sessions on the same days, in addition. Six motor impairment and two functional scores were assessed by a blinded physiotherapist. The difference in the scores between the assessments were statistically evaluated by t-test for dependent variables in case of parametric and Friedmans's test in case of non-parametric data. Differences of scores, which showed a statistically significant change in both groups were compared with the Mann Whitney test. Differences were considered significant at the level of $p < 0.05$. *Results:* The modified Ashworth score of shoulder adductors and elbow flexors showed a statistically significant improvement only in the robotic group. No significant improvement was found in shoulder girdle anteflexion of either group. The other five scores improved significantly in both groups. Comparison of the changes in these scores showed, that the improvement of the shoulder – elbow subsection of Fugl-Meyer score was significantly higher in the robotic group. As for the other four parameters the difference was statistically non-significant between the two groups. Subjects received altogether 150 h of robot mediated therapy. No adverse events occurred. *Conclusion:* Supplementation of the traditional methods with this kind of robot

mediated therapy can be beneficial in decreasing spasticity and improving motor impairments of the upper limb.

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ULTRASONOGRAPHIC FINDINGS OF CARPAL TUNNEL SYNDROME IN PATIENTS WITH PARAPLEGIA

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Objective: The aim of this study is to assess the diagnostic value of ultrasonography for the median nerve, the state of life style activities and the pain degree of upper extremities in paraplegics with carpal tunnel syndrome (CTS). **Method:** Seventeen wheelchair ambulators with spinal cord injury that had neurological level below T2 were studied. Patients without peripheral or central neuropathies were included. Patients were assigned to either the electrodiagnostic CTS (group CTS, 7) or electrodiagnostically negative (group non-CTS, 11), and healthy volunteer (15) were classified control group. The cross sectional area of the median nerve (MN-CSA) at carpal pisiform level was ultrasonographically measured. The degree of painful restriction to execute ADL by hands using (TR-ADL), the pain grade (Visual Analog Scale, VAS) of upper extremities and revised version of Korean spinal cord independence measure (KSCIM-R) for functional level were measured and analyzed. **Results:** Nine hands (14.3%) of 7 patients out of 34 hands had CTS in electrodiagnostic study. There were significant difference among groups in TR-ADL hours (CTS group; 5.0 vs non-CTS group; 10.2, $p < 0.05$), VAS (4.1 vs 2.0, respectively, $p < 0.05$), and no statistical difference in KSCIM-R (68.4 vs 52.1, $p > 0.05$), MN-CSA (12.3 mm² vs 7.9 mm² vs control group; 8.0 mm², < 0.05). Using the ROC curve, the cut-off value of MN-CSA produced 8.5 mm² that provided a diagnostic sensitivity of 77.8% and specificity of 59.6%. **Conclusion:** The ultrasonographic measurement of the median nerve may be a useful non-invasive screening test for the diagnosis of CTS in paraplegic patients with wrist pain.

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WALKING PERFORMANCE IN STROKE PATIENTS

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Introduction: Walking after stroke is characterized by slow gait speed, poor endurance and reduced ability to adapt to the task and the environmental constraints. Many factors such as weakness, balance impairment and spasticity could potentially influence the distance walked. **Aims:** To evaluate the hemiplegic performance of the patients to carry out the test of 10-m walk and to seek correlations with the other clinical parameters. **Patients and Methods:** Fifty right-handed patients were included, and examined at 3 months follow-up stroke using the Demeurisse Index, Ashworth scale, FIM (Functional Independence Measure), NFAC (New Functional Ambulation Categories), PASS (Postural Assessment Scale for Stroke), MMSE (mini mental status Examination) and RNLI (Reintegration to Normal Living Index). Walking speed (10-m walk test) was measured for all subjects. **Results:** Subjects

follow up stroke had significant reduction in 10-m walking speed. The highest correlation was found with the gait performance (10-m speed and NFAC), PASS, FIM in the locomotion domain and RNLI in the daily domain activity. The results show also a significant relationship between a number of falls, the MMSE score and walking speed measurements. **Conclusion:** Gait speed is a quick and easy measure of walking disability that has been recommended as an outcome measure in stroke rehabilitation. This study used 10-m walk test suggest that improvement in walking speed reflect a veritable improvement in mobility, even if other mostly categoric measures fail to detect.

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MEASURING DISABILITY AFTER STROKE BEFORE AND AFTER INPATIENT REHABILITATION

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Introduction: It is very important to evaluate disability using outcome measures. The Functional Independence Measure (FIM) and Barthel Index (BI) are most frequently used in patients with ischemic stroke and intracerebral hemorrhage. FIM has been shown to be reliable and valid, but BI is more responsive and easier to use. **Aim:** In this study we used functional disability measures to evaluate level of disability and motor impairment before and after inpatient rehabilitation; and also to establish their relation to age, sex and lesion location. **Patients and Methods:** Prospective study was conducted in Clinic of Physical Medicine and Rehabilitation (Nis, Serbia). 49 patients with stroke (ischemic: $n=30$, intracerebral hemorrhage: $n=19$) undergoing inpatient neurorehabilitation, were studied. Group included 28 males and 22 females, age 33–80; 22 of them had left and 27 right side hemiparesis/hemiplegia. In order to measure disability we used FIM and BI, and also Rivermead Motor Score (RMA) for motor impairment. The patients were evaluated twice, at the admission and discharge. Hospital rehabilitation lasted approximately 3 weeks. **Results:** FIM, BI and RMA correlated with each other. Almost all patients showed statistically significant improvement in disability and motor impairment scores ($p < 0.05$). Younger patients, without prior ischemic or hemorrhagic episode, and patients with intracerebral hemorrhage had better results than older patients and those with repeated ischemic stroke. Lesion location had no statistically significant effect on this scores ($p > 0.05$). Study also demonstrated that more than 90% of patients had one or more correlated diseases with significant influence on recovery, such as diabetes, hypertension or some hearth disease. Evaluation of patients with ischemic stroke and intracerebral hemorrhage using outcome measures is important on many levels, including assessment and prediction of therapy effectiveness, duration and outcome of inpatient rehabilitation.

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FACIAL PALSY: THE EFFECT OF BOTULINUM TOXIN AND PHYSIOTHERAPY IN TWO DIFFERENT EVOLUTIVE CASES

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Introduction: Neuromuscular retraining for Facial palsy is a growing field of practice in Rehabilitation. Based on last publications, we present two cases, different in etiology and stage evolution, which have taken benefit of two different associated techniques: the neuromuscular retraining program and the botulinum toxin infiltration. **Aim:** To demonstrate the efficacy of the physical therapy but also of the Botulinum toxin as a coadjuvant treatment. **Patients and Methods:** Patient A, affected by facial palsy after resection of an acoustic neurinoma, in hypotonic stage. Patient B, affected by an idiopathic facial palsy in severe-synkinetic orbicular oris-orbicular oculi stage. Both patients were evaluated with The Sunnybrook Facial Grading System, the Facial Disability System, photos were taken in order to compare the effectivity of the treatment. Both realised 8 sessions in daily individualized neuromuscular retraining program and went under botulinum toxin infiltration. **Results:** Both patient referred a better sensation of disability after first neuromuscular retraining program and practice the exercise at home. FGS improved the score. After botulinum toxin and review physical therapy, we took photos which demonstrate a minor facial asymmetry. **Discussion:** Its obvious that two single cases are not enough to establish definitive lines of evaluation and treatment, but it indicates widely possibilities of treatment if different techniques are associated. **Conclusion:** Neuromuscular retraining programs and toxinum botulinum infiltration are two useful skills in facial palsy, we should individualised the program depending on clinical findings.

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VIBRATORY ORTHOSIS EFFECT ON PARKINSONIAN WALKING VELOCITY

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Introduction: The orthotic management of Parkinson's disease (PD) focuses greatly on improvement of gait pattern. Several studies showed that application of the biofeedback could enhance the characteristics of gait in these patients. Previous studies showed that PD patients had impaired proprioception and impaired movement perception. We hypothesized that step-synchronized vibration stimulation can increase the walking velocity in PD patients. **Method:** Fourteen patients (12 men and 2 women) with clinical diagnosis of idiopathic Parkinson's disease participated in this study. In this experimental study, we test the effect of a new designed vibratory orthosis on walking velocity. a simple valid clinical test, 10-m-walk test, was chosen to conduct this study. an average of two trials for the test was used in results. two different situations are examined, at first we asked the pd patients to walk along the 10-m path while they do not use vibratory orthosis and in the second situation, they walked while donning the vibratory orthosis with motors on. tests were performed under on-drug state and nearly two hours after the anti-Parkinson's medication intake. paired t-test was used to compare the mean times of walking in both test situations. **Results:** There is a significant difference between the time required for walking the 10-m-walk test in motor On state and without using Vibratory Orthosis ($p=0.001$). **Discussion:** In one hand, it seems that vibratory orthosis by creating a rhythmic vibration stimulus on each side of the lumbar in accordance with steps, cause a reeducation of the muscles and help reeducation of gait in pd patients. on the other hand, the high frequency vibration is a stimulus for proprioceptional receptors and makes a biofeedback for brain in choosing the best activation pattern for muscles contributed in walking. **Conclusion:** A new orthosis in rehabilitation of the pd patients is introduced that can create

new ideas for rehabilitation of similar neurological diseases. This orthosis increases significantly PD patients' velocity through 10-m-walk test.

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EFFECT OF THE MOTOR CONTROL OF AFFECTED LOWER EXTREMITY ON BALANCE AND GAIT IN HEMIPARETIC PATIENTS

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Objective: To investigate the effects of motor control of affected lower extremity on berg balance scale and gait in hemiparetic patients, using the newly developed motor control trainer of lower extremity. **Method:** Thirty five hemiparetic patients who can stand and ambulate more than 10 m without assist on even surface were included in this study. The motor control trainer of lower extremity was designed to measure the degree of weight shift and knee flexion angle of hemiparetic side and to play a game named 'Board cleaner' which use these data, so considering the vertical movement of the center of gravity. We measured above three parameters, and also evaluated with clinical tests including berg balance scale (BBS). We evaluated correlations between parameters on the motor control trainer of lower extremity and clinical parameters. **Results:** 1) Degrees of weight shifting to affected side had statistically significant correlation only with BBS. 2) Degrees of affected knee flexion had statistically significant correlations with all clinical tests examined, especially 10 m walking time (10mWT), timed up and go test (TUG), and BBS. 3) Scores earned from board cleaner game also had statistically significant correlations with all clinical tests examined, especially 10mWT, TUG, and BBS. **Conclusion:** Correlation exists between the ability to control the affected knee measured by motor control trainer of lower extremity and clinical parameters including 10mWT, TUG, and BBS, so we think the motor control trainer can be a useful tool for the evaluation in hemiparetic patients.

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IMPORTANCE OF REHABILITATION IN PATIENTS WITH TRAUMATIC LESION OF NERVUS PERONEUS – A CASE REPORT

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Introduction: Foot drop can be defined as a significant weakness of ankle and toe dorsiflexion. Weakness in this group of muscles results in an equinovarus deformity, and steppage gait. **Aim:** Our goal is to call attention to the need of rehabilitation starting from the first day after peroneal nerve injury, not only for preventing complications, but also for ensuring the best possible status for a potential surgical act which might follow. **Patients and Methods:** We want to present the case of a 18-year-old female patient with a drop foot, which was the result of a fibula head fracture acquired in a car accident. After 6 weeks of immobilization the patient still had clinical signs of drop foot, while electrodiagnostic studies revealed a complete conduction block. Four months later nerve plastic with n.suralis as a graft was performed. Fourteen months later no clinical, nor electrodiagnostic signs of recovery were observed. An indication for tendon transposition was set. Preoperative rehabilitation goals were to attain sufficient passive range of motion, with at least 90 degrees of dorsiflexion, as well as strengthening of the donor muscle.

Circumtibial transfer of the n.tibialis posterior tendon with insertion into the second cuneiform bone was performed. Postoperatively a lower leg splint was placed, and weight bearing was forbidden for 6 weeks. After the splint was discontinued the rehabilitation goals were to establish functional range of motion in the ankle joint, proper gait pattern and functional use of foot. *Results:* Two months after immobilization was discontinued the patient achieved full range of motion in the ankle joint, a proper gait pattern, and had no measurable hypotrophy of the lower leg, and after two more months the patient was able to return to her full preoperative activity level. *Conclusion:* Rehabilitation starting from the first day after injury, is of ultimate importance not only for preventing complications, but also for ensuring the best possible status for a potential surgical act. Additionally, if surgery turns out to be necessary an early started, and good conducted rehabilitation programme is crucial for optimal functional recovery of the foot.

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INFLUENCE OF NEURO-MUSCULAR ELECTRICAL STIMULATION ON POST-STROKE SPASTICITY AND ITS ROLE IN OVERALL MOTOR FUNCTION IMPROVEMENT

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Spasticity after stroke develops gradually and reaches its maximum after 1 to 3 months (1). Nowadays it is recognized that post-stroke hemiparesis may exist without spasticity and functional deficiency may be conditioned by 'negative factors' – muscle weakness and loss of dexterity (2). We decided to define the role of neuro-muscular electrical stimulation (NMES) in the treatment of spasticity and in overall improvement of motor function on acute stage of stroke. We investigated 200 patients randomized in two groups: 1) Stimulation Group (SG); 104 patients underwent NMES, physical therapy (positioning, massage, exercise) and drug therapy. 2) Control Group (CG); 96 patients underwent only standard physical and drug therapy. Muscle tone was assessed by Modified Ashworth Scale (MAS) at inclusion and after 3 weeks. At the initial assessment spasticity was found in 52 patients: 22 patients in the CG (mean MAS score 1.5) and 30 patients in the SG (mean score 1.7). At the follow-up 20 patients were found spastic in CG. The mean score has risen slightly and reached 1.6 points. In SG 24 patients remained spastic. The mean MAS score has decreased to 1.2. Slight increase of spasticity in CG and decrease in SG reflect an effect of NMES – prevention of spasticity. Although, the effect is limited at the acute stage because of relatively small proportion of spastic patients. In our opinion, above-described trend can not be the determinant of overall improvement of motor function, because of its relatively limited effect. We conclude, that electrical stimulation facilitates reduction of spasticity but this mechanism is not predominant in regards with restoration of motor function at the acute stage of stroke.

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THE INFLUENCE OF REHABILITATION ON POST-STROKE DEPRESSION

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Introduction: The aim of this study was assessment of relationship between intensity of post-stroke depression and factors of

socio-demographic nature, neurological state, speed of walk, functional state and quality of life. *Patients and Methods:* A sample of 64 first-ever ischaemic stroke survivors with light or moderate depression. Intervention: complex 28-days programme of rehabilitation. Investigative tools: Beck's Depression Inventory (BDI), Brunnstrom Scale, Speed of 10-m walk, Functional Index 'REPTY' (FIR), Stroke-Adapted 30-item Version of the Sickness Impact Profile (SA-SIP 30). Other factors: hemisphere's localization of stroke, coexistence of aphasia, concurrent diseases, sex, place of residence, level of education, family situation, housing conditions. *Results:* Significant decrease of depression (in BDI). After treatment, 23% patients didn't have depressive symptoms. Positive correlations between intensity of post-stroke depression and: neurological state in Brunnstrom scale, activity of daily living (in FIR), quality of life (in SA-SIP 30) and mean walk's speed. No significant relationships with: level of education, place of residence, age, localization of stroke, concurrent diseases (obesity, lipid disturbances). Significant relationships with: family-situation (before and after treatment), housing conditions (before and after treatment), coexistence of aphasia (after treatment), concurrent diseases: heart disease (before treatment), diabetes (before and after treatment). *Conclusions:* Complex rehabilitation decreased the intensity of post-stroke depression in correlation with: neurological state, speed of walk, activity of daily living and quality of life. Deeper depressive symptoms were connected with: lonely living, bad housing conditions, concurrent diseases (heart diseases, diabetes). Unfavourably on course of post-stroke depression influenced: lonely living, bad housing conditions, presence of aphasia and coexisting diabetes. Level of education, place of residence, age, localization of stroke, concurrent diseases (obesity, lipid disturbances) did not have influence on occurrence and further course of post-stroke depression.

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A PROSPECTIVE RANDOMISED STUDY REGARDING THE EFFICIENCY OF THE POSTURAL THERAPY AS PART OF THE REHABILITATION PROGRAM FOR THE PATIENTS POST-STROKE

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Introduction: A prominent part among the recovery medical services come to prevention, correction and rehabilitation of the functional deficits that appears in the patients post stroke. These deficits affect the capacity to self-care of the patients and leads to installation of a forms of severe disability. *Purpose:* Achievement of a prospective, randomized study regarding efficiency of the physical-kinetics recovery program with emphasis on postural therapy in two groups of patients post stroke. *Materials and Methods:* The groups (1-study; 2-control) included each 50 patients post stroke of both sexes and different age. Distinction between the two groups achieved after a methodology of recovery therapy-group 1 received a postural therapy as part of the physical-kinetics program. We assessed: pain, sensitivity disorders, physical dysfunctions, cognitive dysfunctions-depression, disabilities, self assessment of health status, drugs consumption, QOL, general score. *Results:* After the rehabilitation program, the scores for clinical-functional parameters recorded improved as follows: the pain improved with 30.12% (group 1) vs. 21.26% (group 2); sensitivity disorders improved with 20,23% (group 1) vs. 14.77% (group 2); physical dysfunctions improved

with 20.17% (group 1) in comparison with 13.24% (group 2); depression improved with 26.47% (group 1) vs. 18.57% (group 2); disabilities recorded improvements of 41.40% (group 1) vs. 31.25% (group 2); self perception of the health status improved with 20.71% (group 1) vs. 13.38% (group 2); drugs consumption reduced with 11.79% (group 1) vs. 6.77% (group 2). *Conclusion:* The great results obtained by the patients post stroke who followed one recovery program based on the postural therapy (patients included in group 1 – research group) proved the efficiency of this therapy as part of the physical-kinetics program.

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MODULATED MIDFREQUENCY ELECTROTHERAPY (MET) REDUCES PATHOLOGICAL ELEVATED MUSCLE TONUS IN GASTROCNEMIUS MUSCLE AFTER STROKE: A CASE REPORT

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Hemiparesis and spasticity are mayor complications for patients after stroke leading to movement disorders like gait problems. A dysfunction of the gastrocnemius muscle can be a source of trouble in those patients. A 37-year-old female patient suffered an Infarction of the right sided arteria media 6 years ago. After restoring her health sufficiently well after an intensive rehabilitation program she still has to put up with some concentration problems and struggle with her gait due to elevated muscle tonus of the left gastrocnemius muscle. She evaluated the tightness of the muscle with a 9 on a Visual Analogue Scale (VAS). The superficial electromyography (EMG) showed a value of 1.1 microvolt on right and 11.6 microvolt on the left side. We made a treatment with modulated midfrequency electrotherapy (MET) for 20 min leading immediately after treatment to an evaluation of 5 on VAS and a reduction of muscle tone on 8.0. After 3 weeks of therapy two times a week the impairment showed a 1 on VAS and a comparable muscle tone to the healthy side of 3.7. Due to these observations a pilot study should be initiated with 20 patients suffering from spasticity of the lower limb getting treatment by MET.

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AN UNSUAL CAUSE OF TRAUMATIC BRAIN INJURY?

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Background and Specific Issues: We present a case of a patient with Traumatic brain injury (TBI) due to road traffic accident (RTA) for which an undiagnosed neuromuscular condition contributed. Delayed diagnosis led to respiratory complication following anaesthesia. *Clinical Details:* A 19-year-old man sustained a significant brain injury in a RTA (head-on collision where his car veered to the right and collided with an on-coming vehicle at 11 am). This left him with right hemiparesis and impaired cognitive function. He developed dyspnoea during rehabilitation, had thoraco-lumbar scoliosis on examination with normal ECG and CXR and narrowing of bronchi on CT thorax. Following correction of scoliosis, he developed respiratory failure needing ventilatory support and right brachial plexus injury from lying on bolsters for 10 h during operation. *Management:* While in our ward, he was noticed to have difficulty in relaxing his left hand grip with percussion myotonia,

poorly developed sternomastoids, pectorals and daytime sleepiness. Electromyography revealed characteristic myotonic abnormalities. Genetic testing showed CTG trinucleotide expansion at the dystrophin gene. Subsequently, his father was found to have the same genetic abnormality without clinical or EMG evidence. In retrospect, we suspect that the RTA was contributed to by hypersomnia related to myotonia. Respiratory difficulties following surgery could have been better managed if the observation that he had a thoraco-lumbar scoliosis and poorly developed muscles had led to a clinical suspicion of an underlying hereditary neuro-muscular disorder. *Implications:* Somnolence in myotonia can contribute to RTA. Early diagnosis of myotonia can prevent complications. Brachial plexus lesions are recognised as a rare complication of surgery for scoliosis.

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BRACHIAL PLEXUS PARALYSIS AND OPENED CLAVICULAR FRACTURE FOLLOWING WORK-AVULSIONAL TRAUMA – CASE REPORT

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Introduction: The most frequent cause of brachial plexopathy is the traumatic traction mechanism by avulsion of superior limb, with plexus elongation or even rupture of C5–C8 anterior roots and T1 root (in which brachial plexus consists of). The occupational accidents with catching and avulsion of superior limb are quite often; these events represent not only a major individual trauma, but also a social problem for young working people. *Aim:* The poster shows the clinical and functional evaluation using specific scales (articular mobility and muscular strength measurements, FIM) evoking the severe dysfunction for self-caring and ADL performing. It presents, also, the importance of rehabilitation programme as an essential therapeutical sequence after plastic surgery for severe dysfunctional sequelae post-avulsion injury of brachial plexus. *Material and Methods:* We present the case of a 27-year-old patient who suffered an accident at his working place (in dec.2005) with traumatic avulsion of right thoracic limb, with emergency surgical intervention at Emergency Hospital in Bucharest (neuroraphy of brachial plexus, venoraphy, myoraphy of pectoral muscles, cutaneous grafts, reduction and osteosynthesis for clavicular fracture), followed by immobilization of the right limb in elevated position for 21 days. Rehabilitation program had begun early and had been done continuously since than, with periodical evaluation and adaptation of therapeutic goals. *Objectives and Results:* With specific rehabilitation methods (medication, electrotherapy, thermotherapy, kinesitherapy, ergotherapy) and a sustained PRM treatment following orthopedic and plastic surgery interventions, the patient managed to increase the functional status for every day activities and the quality of life. The goals of the complex rehabilitation program must be realistic and permanently adapted to the functional status of the patient; at his last hospitalization period in our clinic, the objectives were: prevention of vicious dysfunctional attitudes; muscular electrostimulation and reeducation progressively through reinnervation; increasing functionality and ability for major ADL performing with the right limb and education of left limb to compensate the major activities that are difficult to do; social and professional reinsertion. *Conclusions:* 1) In brachial plexus neurotmesis with correct surgical intervention, the reinnervation process has a speed of 1–2 mm/day (so 30 months from site of rupture towards peripheral); nevertheless, the functional

recovery depends upon the precocity and continuity of the rehabilitation program; 2) After two years of complex treatment, the patient improves the general status, increases the functional independence and the quality of life, with socio-professional reinsertion; 3) The importance of team-work is major (family, plastic surgeon, PRM specialist, kinesiologist, ergotherapist, psychotherapist).

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THE ROLE OF REHABILITATION MEDICINE IN AN ANTIPHOSPHOLIPID SYNDROME CASE WITH VERTEBROBASILAR ISCHEMIC STROKE – CASE REPORT

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Introduction: Antiphospholipid syndrome (APS) or Hughes syndrome is an autoimmune disorder characterized by recurrent venous or arterial thrombosis and/or fetal losses associated with characteristic laboratory abnormalities, such as persistently elevated levels of antibodies directed against membrane anionic phospholipids (ie, anticardiolipin [aCL] antibody, antiphosphatidylserine) or their associated plasma proteins, predominantly beta-2 glycoprotein I (apolipoprotein H), or evidence of a circulating anticoagulant. APS is sometimes called 'sticky blood syndrome', because of the increased tendency to form blood clots in the veins and arteries. It may evolve as an unique disease (primary syndrome) or associated with other autoimmune or pathological situations (secondary syndrome). **Aim:** The oral communication has three main purposes: – to present some major facts about the antiphospholipid syndrome – revised diagnostic criteria (international consensus statement in 2006), differential diagnostic, multiple possible clinical features, prognostic; – to present the multidisciplinary team involved in the diagnostic and treatment of this disease; – the importance of rehabilitation program in recovery and prognostic. **Method:** We present the case of a 28-year-old male patient, who suffered an ataxic tetraparesis caused by an ischemic vertebro-basilar stroke with great dysfunctionality and after multidisciplinary medical evaluation he was diagnosed with antiphospholipidic syndrome. In the first year after the stroke the patient has begun a very complex rehabilitation program (drugs and physio-kinesitherapy) in our clinic and adjusted by the monthly functional reevaluation. The objectives of the recovery treatment were: vital function preservation; functional improvement for lower extremities (gait) and for upper extremities (ADL performance); prevention of other manifestations of the disease or of possible complications; improving communication and socio-professional reintegration. **Results:** After several months of recovery, the improvement of quality of life and of self-care possibilities, gait control, ADL performing and communication were significant. **Conclusions:** 1) Impressive medical case because of its complex clinical manifestations and with major functional impact upon the patient (severe dysfunction for ADL and for socio-professional life at a young male subject); 2) The necessity of multidisciplinary medical team-work for diagnostic, treatment and recovery for this autoimmune disease with vital risk; 3. The importance of rehabilitation programme necessary for the global therapeutic success, for increasing the quality of life and functional status of a young patient.

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THERAPEUTICAL PROBLEMS IN PLURIPATHOLOGICAL PATIENTS – ANKYLOSING SPONDYLITIS AND POSTHEMORRHAGIC STROKE STATUS – CASE REPORT

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Introduction: Within the demographic phenomenon regarding population growing old, modern medicine acquisitions for diagnostic and treatment and the development and the application of different programs in Medical Rehabilitation, we often have to confront to multipathological aspects in patients and that fact opens a new phase in therapeutically and medical rehabilitation area. **Aim:** This case difficulty was represented by the fact that a cardio-vascular patient with left hemi paresis status post-recent (4 months) putaminal hemorrhagia associates an inflammatory acute process in context of ankylosing spondylitis. The clinician must be able to blend the treatment for two pathologies whose principles of treatment mutual except: ankylosing spondylitis' drug therapy is not accepted in post-intracerebral hemorrhagic status and the locomotors and cardio-vascular functional program for hemi paresis is limited by the ankylosing spondylitis' acute inflammatory process and by the cardio-vascular status. **Material and Method:** We present a case report of a 53-year-old patient diagnosed and NSAID treated for ankylosing spondylitis for 30 years, who had developed a severe spinal and coxo-femoral articulations determination with spinal ankylosis; he also associates bilateral hip osteoarthritis, which needed a left coxo-femoral arthroplasty 5 years ago. This patient associates severe cardiovascular problems: neglected arterial high blood tension and a putaminal hemorrhagic stroke with left hemiplegia and severe functional impairment for gait, ADL, speech. This pluripathological case needs a multidisciplinary medical approach and team-work between rehabilitation medicine, cardiology, rheumatology, neurology, speech-therapy. The objectives were: maintaining biological and cardio-vascular parameters in safety limits; pain and articular/periarticular inflammatory process control; increasing functional independence level (gait, ADL, speech) and improvement of the quality of life. **Results:** The patient followed a complex therapeutic program: educational therapy, drug therapy, medical rehabilitation plan (electrotherapy, therapeutic massage, ergotherapy, kinesitherapy). We managed the cardiovascular and respiratory problems, ameliorated the chronic pain and improved the functional status for ambulation, ADL. **Conclusions:** 1) Polipathological case because of its complex severe determinations (neurological, chronic inflammatory disease, cardiovascular problems, orthopaedic implant) and with major functional impact upon the patient (high morbidity and mortality risk, severe dysfunction for ambulation, ADL, speech and for socio-professional life); 2) The necessity of multidisciplinary medical team-work for diagnostic, treatment and rehabilitation; 3) The ability of the clinician to combine therapies that may be indicated for a disease but is not allowed for another; periodical reevaluation and reconsidering the treatment principles depending on the functional status is required; 4) The importance of rehabilitation programme necessary for the global therapeutic success, for increasing the quality of life and functional status of the patient.

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CHANGES IN CEREBRAL CURRENT SOURCE DISTRIBUTION BY ELECTRICAL WRIST STIMULATION IN PATIENT WITH RIGHT HEMIPARESIS

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Aim: To investigate the changes of brain current source distribution by electrical wrist stimulation in patients with right hemiparesis. **Patients and Method:** Ten patients with left MCA territory infarction (time from onset: 6–134 months) were enrolled in this study. Functional electrical stimulation (FES) was applied to the right extensor carpi radialis muscle of each patient. The segments were used to obtain cross-spectral LORETA (low resolution brain electromagnetic tomography) images. The frequency spectrums are set as delta (1–3 Hz), theta (4–7 Hz), alpha (8–12 Hz), beta-1 (13–18 Hz), beta-2 (19–21 Hz) and beta-3

band (22–30 Hz). Statistical nonparametric maps (SnPM) were obtained to detect the changes of current density between the sessions. *Results:* The current source densities of the theta band induced by the electrical stimulation decreased significantly in the ipsilateral superior and middle temporal gyrus ($p < 0.01$). The current source densities of the beta 2 and 3 band induced by the electrical stimulation increased significantly in the contralateral superior, middle, and inferior frontal gyrus, superior and the middle temporal gyrus, the anterior cingulate, and extranuclear ($p < 0.01$). *Conclusion:* Reorganization of motor control takes place after stroke and may involve the ipsilateral or contralateral cortex, depending on the site and size of the brain lesion and theoretically, the somatotopic organization of the residual pyramidal tracts. EEG changes observed after FES applied to a paretic limb supports the proposal that electrical stimulation may enhance the benefit of customary neurorehabilitative treatments and possibly motor learning.

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THE EVALUATION OF SYMPATHETIC SKIN RESPONSE, F WAVE AND H REFLEX IN PATIENTS WITH STROKE

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Introduction: Post-stroke autonomic dysfunction is mostly associated with hemiplegic or hemiparetic patients after a cerebrovascular accident (CVA) (1). *Aim:* In this study we aimed to assess the autonomic nervous system in terms of the sympathetic skin response (SSR) and to evaluate the peripheral nerve system in post-stroke patients. *Patients and Methods:* Thirty-four post-stroke hemiplegic or hemiparetic patients (13 acute, 21 chronic) and 33 age and sex matched healthy controls enrolled in this study. After clinical examination all patients were investigated in an electroneuromyography laboratory by means of SSR, F wave and H reflex studies. SSR was measured from both median nerve and tibial nerves. F wave was examined in both median and ulnar nerves in upper extremity and from tibial nerves in lower extremity. H reflex was measured from tibial nerves. Measurements were assessed bilaterally. Assessment parameters included the ratio of Hmax/Mmax amplitude, the mean value of F wave distal latency and amplitude and the distal latency and amplitude values of SSR. *Results:* The mean age of the patients and the control group was 57 ± 11.5 (40–76) (30 female and 38 male). There was a statistically significant decrease in SSR amplitude values in hemiplegic/hemiparetic upper extremities compared to control group ($p = 0.17$). The ratio of Hmax/Mmax was found to be statistically increased in the affected side in patients group ($p = 0.28$). No statistically significant differences were obtained in the other assessment parameters ($p > 0.05$). *Conclusion:* Our results support the autonomic dysfunction in post-stroke patients with an impaired sympathetic activation (2). In addition the increase in the ratio of Hmax/Mmax determines an increased motor neuron excitability in patients after CVA.

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CERVICAL ROOT INJURY FOLLOWING LOW VELOCITY TRAUMA

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Study Design: A case report detailing cervical root injury following low velocity trauma. *Aim:* To describe a unique presentation of abrupt spinal root injury in this condition. *Summary of Background Data:* The most common mechanism of injury to upper cervical roots involves stretching of the nerve. These injuries can occur due to low-velocity trauma secondary to cervical dystocia or clavicle fracture but mainly in childhood. When it occurs in adulthood, it is mostly associated with high velocity trauma like MVA. *Methods:* A 36-year-old right-handed female patient was presented with upper back and neck pain on right side with numbness in right thumb area. About 9 months ago, while coming down the stairs, her neck went into hyperextension while grabbing a bar to prevent a fall from steps. *Results:* Physical examination showed overall 5/5 muscle strength with no sensation on right thumb area. MRI of cervical spine showed extradural defect at C4–5, C5–6 levels with patent neuroforamina. NCS showed normal study of right radial, ulnar and median nerves. Needle EMG showed abnormal activities like PSW in upper cervical paraspinal and bicep brachii muscles otherwise the test was normal. *Conclusion:* Traumatic cervical root injury can be a part of differential diagnosis even after low velocity trauma and when MRI shows no root pathology.

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COMPARISON OF FUNCTIONAL GAIN AND INCIDENCE OF COMPLICATIONS IN YOUNG AND ADULT STROKE PATIENTS AFTER REHABILITATION

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Aim: The study aimed to compare functional gain and incidence of complications after rehabilitation in young and adult stroke patients. *Patients and Methods:* The study involved 150 young and 150 adult stroke patients (total=300) who were hospitalized and rehabilitated between April 2004 and May 2007 at Ankara Physical Medicine & Rehabilitation Education and Research Hospital. Stroke type, duration of illness, hospitalization time, accompanying disorders, and complications were recorded. The motor functions of the patients for the upper extremity, hand, and lower extremity were evaluated with Brunnstrom Motor Recovery Staging and their level of independence in daily life activities, with Functional Independence Measure (FIM) upon hospitalization and discharge after rehabilitation. *Results:* No differences were detected between the young and adult patients for stroke type ($p = 0.403$, Chi-square=0.69). The type of stroke was ischemic in 76% of the young patients and in 80% of the adult patients, and hemorrhagic in 24% of the young patients and in 20% of the adult patients. Hospitalization time was statistically significantly longer in adult stroke patients ($p = 0.000$ $T = -11.181$). The incidence of hypertension, hyperlipidemia, hypercholesterolemia and atrial fibrillation was significantly higher in adult stroke patients. No differences were found between the young and adult stroke patients for FIM scores at the time of hospitalization, while the mean FIM scores of the young stroke patients on discharge was higher. FIM gain scores of the

young patients were statistically significantly higher. The need for orthosis and support was statistically significantly higher in adult stroke patients. Comparisons of the complications showed that the incidence rates of shoulder subluxation and spasticity were higher in the young stroke patients and the incidence rates of use of shoulder brace, aphasia, neglect, urinary and bowel incontinence and deep vein thrombosis were higher in the adult stroke patients. *Conclusion:* Although FIM scores of both groups were similar upon hospitalization, functional gain of young stroke patients was higher on discharge. The lower rate of gain in adult stroke patients may be accounted for by higher incidence of co-morbid conditions and complications such as, aphasia, and neglect.

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DROP FOOT AFTER CAESAREAN SECTION UNDER SPINAL ANAESTHESIA: A CASE REPORT

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Introduction: Peripheral nerve injury after labor or caesarean delivery anaesthesia is uncommon, but disturbing. *Aim:* we present a case report with spinal root lesion caused by spinal anaesthesia for caesarean delivery. *Case:* We described a case of drop foot in the left lower extremity after spinal anaesthesia for caesarean section. Spinal anaesthesia was performed with a 25 – gauge spinal needle and 12.5 mg of 5% bupivacaine at the level of L4–5. After the caesarean section she noticed that left leg paraesthesia and unable dorsiflexion of her left foot. Paraesthesia of her left leg is never disappear after spinal anaesthesia. The patient was consulted to us one month after operation with left foot drop and numbness in her left leg. The patient had 0/5 strength of the left dorsiflexors, toe extensors, and evertors, as well as 4/5 strength of the plantar flexors. In addition, she had hypoaesthesia in L5 and S1 dermatomes. The patient was prescribed prednisolone 32 mg/day and also received physical therapy and strengthening exercise therapy. Twenty days after the treatment, the muscles reached 3/5 motor power. At the 8th week of the treatment, the patient's muscles reached 5/5 motor power. *Conclusion:* The possibility of occurring major neuropathies such as drop foot result from sciatic neuropathies and minor, transient neuropathy after subarachnoid anaesthesia should not be underestimated.

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POSTSTROKE SHOULDER PAIN: RELATIONSHIP WITH CLINICAL FACTORS AND FUNCTIONAL OUTCOMES

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Introduction: Shoulder pain is a common problem after stroke. A number of disorders have been proposed in the literature as being major causes of hemiplegic shoulder pain (HSP) (1). *Aim:* To assess the possible causes of shoulder pain in patients with stroke, to examine the relationship of shoulder pain with clinical factors and functional outcomes. *Patients and Methods:* A total of 187 patients with stroke were included in this study. All patients were evaluated for the presence of hemiplegic shoulder pain (HSP) and for the possible causes. Upper limb motor function was assessed by Brunnstrom recovery stages, spasticity was evaluated on a five-point Ashworth Scale. The presence of glenohumeral joint subluxation was assessed from anterior-posterior radiographs. Daily living activities were

assessed using Functional Independence Measure (FIM™) at admission and at discharge. *Results:* HSP was present in 114 (61%) patients. Of the 114 patients with HSP, 71 patients showed various grades of glenohumeral joint subluxation, 70 patients had Complex Regional Pain Syndrome-Type 1 (CRPS-1), 70 patients had impingement syndrome, 68 patients had spasticity, 49 patients had adhesive capsulitis, 10 patients had thalamic pain. There were no correlations with shoulder pain and clinical factors such as age, sex, side of involvement, etiology of lesion, duration of disease (day) and comorbidities. There was a highly significant association between shoulder pain and CRPS-1 and adhesive capsulitis ($p=0.001$). There were also correlations between HSP and shoulder range of motion, especially external rotation and flexion ($p=0.001$). The group without HSP showed significantly more improvement than the group with HSP in FIM gain scores ($p=0.01$) and the hospitalization period in patients with HSP was significantly longer than patients without HSP ($p=0.031$). *Conclusion:* These results indicate that shoulder pain is a frequent complication after stroke and it is often difficult to isolate a specific cause. Therefore, prevention and appropriate treatment of HSP should be included in rehabilitation of stroke patients as it prolongs the hospitalization period and reduces the functional outcomes.

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COMPLEX REHABILITATION IN PATIENTS WITH CLINICAL PATTERNS OF THE CONTINUUM METABOLIC SYNDROME → DIABETES MELLITUS → DIABETIC POLYNEUROPATHY → DIABETIC FOOT

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This paper reveals capacities of physical modalities for prevention and rehabilitation in patients with clinical patterns of the continuum: metabolic syndrome – non-insulino-dependent diabetes mellitus – diabetic polyneuropathy – diabetic foot. we accentuate on the mechanisms and effects of some methods (with clinical and instrumental verification by electroneurography, electromyography, laserdopplerflowmetry), like: analytic exercises, mobilizations, massages, stretching-techniques, post-isometric relaxation (pir); transcutaneous electro-neuro-stimulations (tens), nivalin-iontophoresis, electrostimulations; laser therapy, ultraviolet light; peloids. the declared opinions and conclusions of the author are based on the traditions of Bulgarian rehabilitation school, of the analysis of scientific rehabilitation literature (including electronic media), on our modest 20 years experience – clinical observations, scientific and applied investigations; and on the results of systematic interviews with over 500 patients with diabetes mellitus, diabetic polyneuropathy and diabetic foot of charcot type, treated by a complex physical therapy and rehabilitation in the national physical therapy and rehabilitation hospital (Sofia) and in the department of physical and rehabilitation medicine of the university hospital – Pleven (Bulgaria). we comment the possibilities of the physical factors for improvement of diabetic patient's quality of life – reeducation (functional and ergotherapeutic), professional orientation and resocialization of invalidated diabetic persons. our proposition includes some complex programs for ameliorating the quality of life of the diabetic patient – algorithms for treatment of these socially important alterations and for their physical prevention.

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CLINICAL EVOLUTION OF 12 CASES OF DISC HERNIA WITH MOTOR INVOLVEMENT WHO REFUSED SURGICAL INTERVENTION

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Objective: To follow the evolution of some particular cases of lumbar disc hernia with recent peripheral motoneuron involvement to whom the surgical approach was not possible. **Material and Method:** We followed 12 patients (9 females, 3 males) with lumbar disc hernia with recent radicular motor involvement and surgical indication who refused surgery. Follow-up period was 3 months. Treatment consisted in systemic corticotherapy, analgesia and rehabilitation procedures (antialgic electrostimulation, muscular electrostimulation, massage, kinetotherapy). Evaluation was done with: clinical examination, pain scale (VAS), Activity of Daily Living (ADL). **Results:** After 3 months of treatment (the first 3 weeks daily and the next 9 weeks 3 times a week) 8 patients had the same motor deficit, with less pain (43% improvement on VAS) and performed ADL easier (33% improvement). 1 patient had motor remission, with almost normal ADL performing and minimal VAS pain. 3 patients reported aggravation of motor involvement, persisting pain and ADL performing.

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SUPPORTING FAMILIES OF BRAIN INJURED PATIENTS: AN EARLY PSYCHOLOGICAL APPROACH PROGRAM AND ITS INFLUENCE ON REHABILITATION NURSES' WELL-BEING

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Introduction: Family stress following severe brain injuries is well documented, but high levels of stress are sustained also by professionals who take care of these patients, from ICU to rehabilitation, in particular nurses and nurse assistants (NA). Several studies indicate the need of early psychological support to families; well known are also the difficulties and conflicts that arise between families and healthcare staff and the need of improving this relationship to reduce the risk of burnout syndrome and its negative impact on patient care. **Aim:** Verify feasibility of a psychological support program for families of brain injured patients beginning in ICU and continuing in rehabilitation and evaluate family stress. Verify nurses and NA's burden of stress in a rehabilitation ward. Verify if the family support program could indirectly improve relationship between families and staff re-evaluating professionals' stress level after 5 months and one year. **Materials and Methods:** Family psychological support is realized through weekly group meetings with a dedicated Psychologist, enrolling relatives in ICU and continuing meetings during rehabilitation phase (start: January 2008). Relatives' stress is evaluated by: Symptom questionnaire, POMS (profile mood states), BDI (Beck depression inventory), STAI (State Trait Anxiety Inventory) at the beginning of the program. Nurses and NA are a sample of 22 persons working in a rehabilitation ward that routinely accepts severely brain injured patients from ICU in an early phase of recovery. Their stress level is observed evaluating their symptoms with Symptom questionnaire (SQ) and their behavioural responses to stress with Pisa stress questionnaire (PSQ) at three steps: before starting family program, after 5 months and after one year. **Results and Conclusions:** Baseline level of stress in nurses and NA has been evaluated showing a medium-low level of stress symptoms with particular importance

of somatization and low scores of hostility; their coping strategies show a tendency to an increased sense of responsibility and hyperactivity and low levels of vigour. Results of the next evaluation in May 2008 and evaluation of relatives' stress will be shown and possible relationship between the family support program and the team stress will be discussed.

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HEALTH SITUATION IN PATIENTS WITH CEREBRAL PALSY

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Introduction: Cerebral palsy (CP) is an umbrella term encompassing a group of non-progressive, non-contagious diseases that cause physical disability in human development. **Aim:** To evaluate the problems and health-related factors in patients with cerebral palsy. **Patients and Methods:** 57 patients with cerebral palsy from Special Education Centres, Integration Schools and Cerebral Palsy Association. Patients and families were requested to answer a questionnaire including age, sex, disability level, clinical type of cerebral palsy, lifestyle, self-help skills, resource management, communication skills, sensory and motor skills, basic daily life activities, respiratory, digestive and musculoskeletal pathology, sphincter function and epilepsy. **Results:** Ages between 3 and 36 years, average 12.3 years. 30 male and 27 were female. Disability percentage between 44% and 95%. The most frequent types of cerebral palsy were spastic (47.3%) and mixed (39%). 96% of patients lived at home with their families. The analysis showed that 71% needed wheelchair for their mobility, 66.7% could not manage self-care resources and 7% were independent in bathing, cleaning and eating. Almost 80% had osteomuscular pathology (pain and scoliosis), more than 50% presented double sphincter incontinence, more than 33% suffered repetitive pneumonias and 56% had digestive problems like difficulty swallowing, gastroesophageal reflux or constipation. **Conclusion:** The evaluated data suggested that the most frequent clinical type of cerebral palsy is spastic one, more than 65% presented a high level of disability, 71% needed a wheelchair, more than 55% had severe communication and resource management difficulties, 80% suffered osteomuscular pathology and 57% from digestive problems.

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ASSOCIATION OF T-CELL POPULATION SHIFT AND BONE MINERAL DENSITY CHANGE IN PATIENTS WITH TRAUMATIC DISEASE OF SPINAL MEDULLA TREATED WITH APPLICATOR LYAPKO

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Introduction: Applicator Lyapko is a polimetal (Ag, Au, Cu, Ni, Fe) needle applicator what can induce changes of immunological functions and tissue metabolism. Well known what disturbances of tissue metabolism (for example osteopenia) very often observed in patients with Traumatically Disease of Spinal Medulla. **Aim:** The influence of Lyapko Applicator in patients

with Traumatologically Disease of Spinal Medulla on bone mineral density was studied to investigate the relationship between antiosteopenic effects of Course Application and their effects on T-cell populations. *Patients and Methods:* 54 patients with Traumatologically Disease of Spinal Medulla was treated by course (everyday, $n=10$) of Applications during rehabilitation period. Lymphocytes were studied using indirect immunofluorescence methods employing monoclonal antibodies to CD-markers CD3, CD4, CD8, CD16, CD20. Bone and calcium metabolism were assessed by bone mineral density and serum calcium and phosphorus determinations. *Results:* Applicator Lyapko induce increase in T-suppressor cells and reduction in T-helper cell. Treated patients demonstrated expression of CD95, (range 7.92 to 8.16), an important marker of FAS-dependent apoptosis, associated with an increase in CD25 (range 17.89 to 19.14) consistent with lymphocyte activation. In addition, CD4/CD8 ratio reduced (range 1.33 to 1.26) with absolute CD8 and CD16 population increasing. The change (increasing on 12%) in bone mineral density had a 0.8 coefficient of correlation with the change in CD8/CD4 ratio, and a 0.76 coefficient with changes in CD16 cell population. In addition, serum calcium level increase (12%) and highly correlated to differences in CD4/CD8 changes (0.71) and CD16 (0.69) expression. *Conclusion:* Osteopenia associated with hypocalcaemia and decrease in bone mineral density develops in observed patients as a complication of Traumatologically Disease of Spinal medulla. Application Course by Lyapko Applicator induce positive changes in T-helper cell and T-suppressor cell populations what correlate to activation of bone tissue metabolism.

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BILATERAL SCHWANNOMA OF THE NERVUS TIBIALIS AT THE TARSAL TUNNEL: A CASE REPORT

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Introduction: A 46-year-old man presented with bilateral swelling at the medial malleolus present for more than 10 years. First symptoms were pain at contact and electric shocks were felt in the medial part of the feet. Initially, they were especially present at night and more severe after long standing or walking, more recently there had been also spontaneous pain. All complaints were most pronounced at the left side. *Aim:* This case documents for the first time a bilateral schwannoma of the nervus tibialis at the tarsal tunnel. *Patients and Methods:* There was a clearly palpable swelling bilateral over the tarsal tunnel with a positive Tinel sign. Ultrasonography and MRI revealed a $12 \times 11 \times 20$ mm mass at the left side and a $13 \times 10 \times 20$ mm mass at the right side, consistent with a schwannoma. Needle-electromyography of the intrinsic foot muscles and nerve conduction studies across the tarsal tunnel were normal. Resection of the schwannomas was done in a single operation. Post-operatively, pain disappeared, but there was some remaining loss of sensibility. *Results:* Microscopic examination confirmed the diagnosis of schwannoma and complete removal. Because of loss of 1 of 2 chromosomes 22 in each of the schwannomas, further genetic testing is ongoing. Possibly, neurofibromatosis type 2 mosaicism is present. *Conclusion:* Tarsal tunnel syndrome is defined as a compressive neuropathy of the posterior tibial nerve in the tarsal canal. A schwannoma is an uncommon cause of tarsal tunnel syndrome and is a benign, encapsulated neoplasm derived from Schwann cells. It is rarely seen in the lower extremities. A schwannoma of the nervus tibialis at the tarsal tunnel is described in some case reports, however this is the first report of a bilateral case of schwannoma of the nervus tibialis.

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CHURG-STRAUSS SYNDROME WITH NEUROLOGICAL MANIFESTATIONS: THE ROLE OF REHABILITATION

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Introduction: The Churg-Strauss Syndrome (CSS) is a rare disorder characterized by hypereosinophilia and systemic vasculitis that commonly affects the skin, lungs and peripheral nervous system. The neurological manifestations have a particular interest for rehabilitation. *Aim:* To present two clinical cases of CSS with peripheral nervous system involvement. *Cases:* Case 1 is a 51-year-old woman admitted with cough, a 10-kg weight loss in few months, peripheral eosinophilia, weakness of the left hand and bilateral foot drop with walking incapacity and a skin eruption on the right arm and foot. She had a history of recurrent sinusitis, nasal polyposis and lower respiratory track infections. A diagnosis of CSS was made and she started oral corticosteroids and cyclophosphamide with moderate improvement. The electromyographic study was consistent with mononeuritis multiplex with severe involvement of right femoral nerve and sciatic nerve bilaterally. She started a rehabilitation program. Gait was possible with a walker and bilateral ankle-foot orthoses (AFO) which improved to independent ambulation with a left AFO and forearm crutches in 6 months. Case 2 is a 60-year-old woman with a history of bronchial asthma and sinusitis admitted with fever, peripheral eosinophilia, dysesthesia in her distal upper extremities and right arm paresis with hand drop. She was dependent for activities of daily life. With a diagnosis of CSS, she started oral corticotherapy. The electromyographic study showed mononeuritis multiplex with severe involvement of right radial nerve and median nerve bilaterally. She began activities of daily living training and a wrist-hand orthosis was prescribed with functional improvement. *Conclusion:* These cases reveal the disabilities that these patients present. The medications are not always effective. The response to treatment may not be immediate and improvement may be gradual. Organ involvement must be considered in order to establish an adequate rehabilitation program and a correct prescription of technical aids.

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STATE OF CONFUSION IN HEMIPLEGIC PATIENTS ON REHABILITATION

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Intention of the author of this study was to draw attention to occurrence of state of confusion in patients on rehabilitation after cerebrovascular insult, which is not related to the basic pathological process in central nerve system. This occurrence was noted in hemiplegics with heart and kidney disease, in diabetics, and generally in patients with stress conditions. In the sample of 142 hemiplegics, 15 patients showed signs of confusion or delirium manifested as disorientation, mainly in space. In the attempt to discover cause of such disorders, detailed records from patients' medical history were analyzed, as well as their actual life circumstances, and frequent check-ups were done, if needed, of blood pressure, glycemia, urea, creatinine, electrolytes, ECG, etc. State of confusion/delirium was noted in 11 out of 15 patients, as a result of metabolic disorders, due to high blood pressure or

hyperglycemia, or as side-effect of other diseases. In 4 patients, the state of confusion was caused by emotional stress related to new, degraded social position, or by stress of other origin. This state lasted averagely shorter time and was eliminated by medicamentous therapy, accompanied by closer attention, to prevent traumas. Physical treatment was performed regularly in modified form. Increase of the existing neurological deficit was not noted. Control group consisted of the remaining patients in the sample. Discovering a cause of state of confusion and right-time application of adequate therapy is an important condition for continuing rehabilitation of hemiplegics.

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IMPORTANT ROLE OF FAMILY IN REHABILITATION OF OLDER HEMIPLEGICS

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In the attempt to achieve better rehabilitation effect in older hemiplegic patients, and having in mind changes caused by age and their bad influence to acceptance of therapeutic procedures in the process of rehabilitation, the authors turned to family as a possible source of positive therapeutic effects. The study involved 70 families of hemiplegic patients aged over 60, who were hospitalized in our Clinic. Individual education of family was performed by the members of rehabilitation team. Publications, posters and film about cerebrovascular diseases were used in this education. Active work with the family started on the average 10 days after beginning of rehabilitation and lasted for 30 days; after that, the treatment was performed in usual conditions. Instead of control group, medical history of patients with equal disabilities was used. The parameters screened for comparison were: time of involving patients in the rehabilitation, their interest for daily rehabilitation procedures, time of occurrence of the first signs of motor recovery, patients' intellectual activities, and others. In our research group time for beginning of rehabilitation was shorter 10 days on the average, with greater interest for rehabilitation by the patients. Their performance of motor activities was better, and their passive dependence were reduced or non-existent. They showed earlier interest in the activities around them. Giving the family active role in patients' rehabilitation after cerebrovascular insult resulted in reduction of patients' resistance, usually occurring in the process if recovery and shortening of time necessary of hospitalized older hemiplegics.

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EFFECTS OF VISUAL FEEDBACK BALANCE TRAINING BY NEUROCOM SYSTEM USING COMPUTERISED DYNAMIC POSTUROGRAPHY IN PATIENTS WITH MULTIPLE SCLEROSIS

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Introduction: Multiple Sclerosis is believed to be autoimmune in nature. People with MS often experience difficulty with mobility. NeuroCom International dynamic posturography system provides information about balance. *Aim:* To study effects of complex treatment of both conventional physical therapy & visual feedback balance training by neurocom system using computerised dynamic posturography (CDP) in patients with multiple sclerosis (MS). *Patients and Methods:* A total of 23 female Kuwaiti patients with MS were recruited and selected from out-patient clinic in physical medicine and rehabilitation hospital, Kuwait. All patients received complex treatment course for 3 months including visual feedback

training (once/weekly) by using computerised dynamic posturography & conventional physical therapy (three times/weekly). All patients & healthy individuals were evaluated by both the Berg Balance Scale score and the sensory organization test by neurocom system using computerised dynamic posturography before & 3 months after rehabilitation training program. The Sensory Organization Test (SOT) consists of six conditions including SOT 1, SOT 2, and SOT 3, SOT 4, SOT 5, SOT 6. Composite Equilibrium Score (%) was calculated that describes the overall level of performance during all the SOT trials. *Results:* Before training, all patients had a reduction of Berg Balance Scale score and parameters of the sensory organization test. After training, a significant increase of Berg Balance Scale score ($p < 0.05$), all parameters of the sensory organization test (SOT 1, SOT 2, SOT 3, SOT 4, SOT 5, SOT 6) ($p < 0.05$) and composite equilibrium score ($p < 0.001$) were observed. *Conclusion:* The computerised dynamic posturography is a valuable training tool in assessment of improvement of the equilibrium performance. Our data suggest that improvement all parameters of the sensory organization test after training program could be explained by some detectable change in the structure of the posture control system in patients with MS.

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COLOR-IMPULSIVE OPHTHALMOTHERAPY WITH ASIR APPARATUS IN COMPLEX TREATMENT OF CHRONIC FATIGUE SYNDROME (CFS)

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A current quickly changeable world is full of tension and stresses. An excessive stream of information, operation with use of PC, a high level of responsibility, hypodynamia, all they result in a Chronic Fatigue Syndrome (CFS). Two groups of patients each includes per 50 persons which were compared by gender, age, availability of accompanying diseases participate in the study carried out for assessment of effectiveness of this syndrome treatment. All they are designers at SE IVCHENKO-PROGRESS and in the same degree are subjected to the above mentioned risk factors. The treatment complex comprises: a phytotherapy, massage of a neck-collar zone and a head d'arsonvallization procedure. The experimental group additionally was subjected to a color-impulsive therapy by using the ASIR apparatus. This apparatus is intended to perform a rhythmic photoreflexotherapy in the band of visible light for the purpose of prophylaxis and treatment of conditions caused by insufficient intensity of light, artificial illumination in offices, decompensated deficit or excess of one or more colors. A color of light varied by using color filters fixed in the optical system. The colored light makes a different influence on a patient's emotional state and depends on a color applied. We preferred a green color, because it is a color ensuring a comfort for majority of people, and causes a state of rest and relaxation. The effect of color can be increased while applying it in a 'SMOOTH' mode in a comfort rhythm. A treatment course included 15 procedures per 15 minutes each. Before a treatment and after it the patients were subjected to a clinical interview, visual inspection, monitoring of arterial pressure, frequency of cardiac contractions, rehovasogram of cardiac vascula, an integral rehovasogram. A fit for work was evaluated by the patients themselves by using a 5-score system. Changes in mood, sleep quality, frequency of headaches occurred, fatigue, symptoms of visual organ strain were taken into account during the evaluation. Before the treatment the all patients had a lability of arterial pressure, frequency of cardiac contractions. The rehoencephalogram showed the symptoms of increased tonicity of large-, medium- and small - size vascula, their degraded elasticity, initial symptoms of disorder in a vain efflux. The integral rehovasogram for 32% and 25% of the patients, which participated in the study, corresponded to a hyperkinetic and hypokinetic types of

blood circulation, accordingly. A fit for work before the treatment was evaluated by the patients as score of 2 to 3. As a result of a course of performed treatment, both groups of patients felt significantly better, their fit for work recovered (score was of up to 4 to 5). A clear tendency to a normalization of emotional state (score was of up to 5) and a complete elimination of symptoms of visual organ strain were traced with the experimental group of patients. The arterial pressure, frequency of cardiac contractions have been stabilized. The rehoencephalogram did not show any symptoms of increased tonicity of medium- and small- size vascula. Other studied symptoms such as: frequency of headaches, sleep quality, rehoivasogram data (tonicity of large-size vascula and vein efflux), integral rehoivasogram have been reliably improved for both groups of patients involved in the study. So, the carried out study confirmed a high effectiveness of a complex treatment performed with applying such free of medicine methods as: phytotherapy, massage, d'arsonvallization procedure, a color-impulsive therapy by using the ASIR apparatus. The ASIR apparatus produces a general corrective effect on an organism with a local effect on a visual organ which result in additional priorities of this complex of treatment. The paper presents the study results of rehabilitation of patients with CFS.

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PREVALENCE OF ANAEMIA IN THE POSTACUTE STAGE FOLLOWING BRAIN INJURY

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Introduction: Severe anaemia is associated with cognitive dysfunction, impaired cerebral vasoregulation, neurological injury and increased mortality. This suggests that brain is vulnerable to anaemia-induced injury. Therefore, the presence of anaemia as co-morbidity may affect outcome of brain injury. No clear relationship is established between brain injury and anaemia; however few reports suggested such relationship. **Aim:** To identify the prevalence of anaemia in patients with acquired brain injury and subarachnoid hemorrhage. Establish co-relation between anaemia and length of stay. **Patient and Methods:** Retrospective data collection of 100 patients admitted to a regional neurorehabilitation unit. Ethics committee approved protocol. Patients were divided in three categories: 1) Subarachnoid hemorrhages treated with coiling and not needing ICU stay (SAH); 2) Mild Traumatic brain injury: requiring observation only (MABI); 3) Complicated SAH, ABI requiring Neuro-surgical intervention. (SABI) Demographic data, type of brain injury, admission Hemoglobin (Hb), lowest Hb, pre-discharge Hb, percentage drop from admission to lowest Hb and average Hb. Change from admission to discharge Hb were documented. **Results:** Of the 100 subjects: 72 males, 28 females, SAH (27%), MABI (33%), SABI (40%). Using T test: admission Hb shows significant differences with SAH having higher level ($p=0.01$). Both lowest and average Hb show higher level in SAH ($p=0.06$, $p=0.07$). Hb change between SAH and MABI: T tests show significant difference ($p=0.01$). SAH having 10% drop. Both groups SAH, MABI showed significant drop 21.8% (17–26%) from admission to lowest Hb. MABI had longer length of stay compared to SAH ($p=0.032$) (Mann-Whitney *U* tests). **Conclusion:** Haemoglobin drops significantly following MABI and SAH. Despite Hb drop being statistically significant, length of stay was shorter in SAH. As Hb does improve over time, patients need not be subjected to unnecessary investigations. However low Hb can lead further cerebral damage and delayed healing and rehabilitation outcome. Larger study is planned to validate our results and identify the exact mechanism of this pathophysiology.

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P426

PATIENTS' AND CAREGIVERS' SATISFACTION WITH REHABILITATION SERVICES AFTER STROKE

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Introduction: Patient's and caregiver satisfaction has been considered as a medical care quality indicator and it should be included as one of the objectives in the rehabilitation program after a stroke. The purpose of this study was to evaluate the satisfaction level related to the rehabilitation services in patients with stroke and their caregivers. **Patients and Methods:** 140 patients admitted to our inpatient rehabilitation unit after a first-ever stroke from 06–2005 to 06–2006 (67.1% men, age 66.7 ± 12.7 years, discharge FIM 91.1 ± 27.7 , I. Discharge Barthel 65.2 ± 28.9 , 13.6 ± 3.1 months postictus). By means of a telephonic questionnaire we evaluated patients and caregiver satisfaction with in-patient rehabilitation care and the social support services at discharge. Of the 107 patients with identified caregiver, the 71% were closely related and the 80.9% were women. **Results:** 52.9% of patients completed the satisfaction questionnaire: 21.6% of patients were unsatisfied with some aspect related to in-patient treat and information. As to the treatment, the 47.3% were not satisfied to a greater or lesser degree. The quantity of therapy presented the lower rates of satisfaction. Higher dissatisfaction rates were found in social support services at hospital discharge (75.3%). 85 (83.1%) identified caregivers completed the questionnaire: 25.9% referred dissatisfaction in the information given, 36.5% in the training of patients' needs and 57.6% in social support services at hospital discharge. Only depression and the longer time after de stroke were significantly related with higher dissatisfaction rate ($p < 0.05$). **Conclusion:** Systematic information and training programs for patients and their caregivers should be included in stroke rehabilitation services, considering social support services at discharge, whereas higher rates of patient's and caregiver's dissatisfaction.

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MOVEMENT PATTERNS OF HYOID BONE AND EPIGLOTTIS DURING SWALLOWING IN STROKE PATIENTS

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Objectives: Dysphagia is a common problem in stroke patients. The hyoid bone and epiglottis movements are known as an important protective mechanism from aspiration. The purpose of the study is to classify the movement patterns of the hyoid bone and the epiglottis during stroke in stroke patients by kinematic analysis, and to investigate the relation between these movement patterns and the incidence of aspiration and penetration. **Material and Methods:** A total of 106 stroke patients were enrolled in this study. The authors performed two-dimensional motion analysis on hyoid bone and epiglottis movements using videofluoroscopic images of these patients. As compared with normal data from our previous study (N=69), hyoid bone and epiglottis movements were classified to four different patterns. The movement patterns of epiglottis were 1) normal, 2) normal-delayed 3) incomplete rotation and 4) no rotation pattern. The movement patterns of hyoid bone were 1) normal, 2) normal-delayed 3) decreased amplitude and 4) decreased and delayed pattern. The incidence of subglottic aspiration and supraglottic penetration of each movement pattern was compared. **Results:** In 106 patients, aspiration was noted with 16.0%, penetration with 27.4%. The incidence of aspiration and penetration was significantly different between the movement patterns of the epiglottis ($p < 0.001$, by Fisher's exact test). By comparison between each group, normal pattern (aspiration 7.1%, penetration 24.3%, $n=75$)

($p=0.001$) showed a significant difference from no rotation pattern (aspiration 71.4%, penetration 28.6%, $n=7$), and a borderline significant difference from normal-delayed pattern (aspiration 21.1%, penetration 36.8%, $n=19$) ($p=0.054$) and incomplete rotation pattern (aspiration 30.0%, penetration 30.0%, $n=10$) ($p=0.055$). There was no difference between the movement patterns of hyoid bone ($p=0.618$). The incidence of aspiration and penetration in normal group (the movement patterns of both hyoid bone and epiglottis were normal, aspiration 4.3%, penetration 17.0%, $n=47$) was significantly lower than one abnormality group (the movement pattern of either hyoid bone or epiglottis was abnormal, aspiration 23.1%, penetration 41.0%, $n=39$) ($p<0.001$) or two abnormality group (the movement patterns of both hyoid bone and epiglottis were abnormal, aspiration 30.0%, penetration 25.0%, $n=20$) ($p=0.006$), and there was no difference between 1 and 2 abnormality groups ($p=0.479$). **Conclusion:** There was significant relation between the movement patterns of the epiglottis and the incidence of aspiration and penetration. This study confirm the importance of the hyoid bone and epiglottis movements for the protection from aspiration, especially the rotation of the epiglottis.

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HETEROTOPIC OSSIFICATION FOLLOWING A HAEMORRHAGIC STROKE: A CASE REPORT

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Introduction: Heterotopic Ossification (HO) is characterized by the formation of mature lamellar bone in soft tissue surrounding peripheral joints, mostly reported following trauma to the central nervous system and, less frequently, following severe neurological disorders (called Neurogenic Heterotopic Ossification (NHO)), or muscular and skeletal trauma (also called miositis ossificans). It is thought that trauma is the most important initiating factor, leading to soft tissue ischemic degeneration and inflammatory response that induces tissue expression of bone morphogenetic proteins. In NHO vascular and metabolic changes, resulting from autonomic nervous system dysfunction, may play a role in the aetiology of heterotopic ossification. **Aim:** To report an unusual presentation of an elbow heterotopic ossification following a cerebral haemorrhage. **Patients and Methods:** A 34-year-old woman presents a long standing right elbow pain, without functional impairment in the upper limb. At clinical examination a palpable solid mass was felt at elbow ventral aspect, with extension limitation. There was no history of muscular or skeletal trauma. She suffered a cerebral haemorrhage, due to a vascular malformation at age of 18-years-old, staying in coma during a month. Neurological impairment was a double-hemiplegia with a right predominance. Nowadays she presents a spastic paraplegia, without upper limb impaired function. An elbow X-ray and a 3-phase bone scan scintigraphy were made. **Results:** At X-ray was evident an unusual heterotopic ossification with a diaphyseal segment bonny shape. Scintigraphy showed a slightly increased activity at the elbow HO; other heterotopic ossifications were excluded on the whole body. **Conclusion:** A history of cerebral haemorrhage, without muscle and skeletal trauma known, led us to conclude that it is an elbow neurogenic heterotopic ossification. The initial long standing coma, with lack of awareness and absence of pain, associated with the multiple post-stroke impairments, may have delayed the early diagnosis of NHO. At this stage, the best therapeutic approach includes surgical excision of the elbow NHO.

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COMORBIDITIES INFLUENCING STROKE REHABILITATION

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Introduction: Many studies have been published investigating factors influencing the rehabilitation process of stroke patients. **Aim:** To investigate the influence of the Stroke Risk Factors to the functional outcome of the stroke patients. **Patients and Method:** Three hundred and fifty three persons with stroke, admitted in our inpatient rehabilitation unit during the last 10 years took part in the study. Measures for outcome was the Barthel Index (BI). Stroke Risk Factors (Comorbidities) investigated in this study were hypertension, diabetes mellitus, heart disease, previous transient ischaemic attack, previous stroke, anticoagulant treatment. Data were analysed with the *t*-test. **Results:** Hemiplegics with hypertension were discharged with Barthel Index Score of 51.6 ± 23 , whereas hemiplegics without hypertension were discharged with Barthel Index Score 53 ± 27 ($p=0.6$). Hemiplegics with diabetes mellitus had discharge score of 48.9 ± 28 , whereas those without had 53 ± 24.4 ($p=0.2$). With transient ischemic attack were discharged with score of 54.1 ± 22 , whereas those without were discharge with 51.5 ± 26 ($p=0.4$). Hemiplegics with previous stroke discharged with 54 ± 25 , whereas hemiplegics without previous stroke with 51.6 ± 25 ($p=0.5$). Patients with heart disease with 47.9 ± 25 , and without 54 ± 25.3 ($p=0.01$). Treated with anticoagulant discharged with 61.1 ± 14.3 , whereas patients without 51.6 ± 25.7 ($p=0.1$). Hemiplegics who had undergone brain surgery discharged with 42 ± 24 score, whereas those who did not with 52.7 ± 25.3 ($p=0.05$). Patients with Diabetes Mellitus improved their Barthel score by 20.5 ± 18 , and patients without by 27.5 ± 18 ($p=0.003$). **Conclusion:** Hemiplegics with heart disease and with brain operation show less functional improvement in rehabilitation center than those who had not. Diabetes mellitus influences negatively the functional improvement.

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WALKING AND DIABETIC POLYNEUROPATHY

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Aim: To study the effect of walking in diabetic polyneuropathy. **Patients and Method:** 42 patients with symmetrical diabetic polyneuropathy that were examined electrodiagnostically in our department. They were randomly separated into 2 groups. The first group was briefed on the purpose of the program and received a calendar form for registering their daily walking time. Electrophysiology tests were repeated on both groups every 3 months. H-reflex and F wave were used as a measure for comparison. **Results:** After 18 months, 37 patients are still on the program – 17 from the first group and 20 from the second. From the 17 of the first group, 5 were excluded for not practicing their walking program. All of the remaining 12 have described improvement in subjective symptoms, while there was no deterioration in the electrophysiological measurements recorded. Unlike the control group, where deterioration was clear in 12 out of the 20 patients. **Conclusion:** If the problem of non-compliance, which seems to be high (30%) among diabetic patients, can be overcome, walking seems to be positively correlated with the progress of polyneuropathy.

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PEDOBAROGRAPHIC FINDINGS IN PATIENTS WITH DIABETES MELLITEUS

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Aim: To evaluate pedobarographic findings in patients with burning sensation and callus formation in the plantar area of the foot. **Patients and Method:** A total of 35 patients with diabetes mellitus, burning sensation and callus formation in the

plantar area as well as 27 controls were included in this study. Pedobarographic measures were obtained from all patients and controls. Pain intensity of patients was measured using the Visual Analog Scale. The percentage of pressure on forefoot and rearfoot, the surfaces of contact and the points of maximum and medium load were measured using static pedobarography. The surfaces during walking, the maximum pressure and the existence of anterior or posterior instability were measured using dynamic pedobarography. The center-of-pressure sway as well as its variation was measured for evaluation of balance. *Results:* The percentage and the surface of pressure in the forefoot were positively correlated with the pain and burning sensation. The sway width in the patient group was higher than in the control group. The Visual Analog Scale score was negatively correlated with the existence of points of maximum load in the forefoot. Maximum pressure during walking was positively correlated with callus formation. The grade of maximum pressure in the forefoot was positively correlated with the sway length and sway width ($p < 0.05$). *Conclusion:* Pedobarography may become a useful technique to determine foot pressures, walking and balance problems in patients with diabetes mellitus.

P432

ACUTE BACK PAIN DUE TO THORACIC CARVERNOUS ANGIOMA RUPTURE AFTER THRUST MANIPULATION: A CASE REPORT

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Introduction: Acute back pain is a common problem in clinical practice. Many etiologies can result in this problem. We present a woman with acute back pain due to relative rare thoracic intramedullary cavernous angioma rupture. After successful operative removal of tumor and series of rehabilitation, patient got good recovery in motor, sensory and bladder function. *Aim:* The purpose of this case report is to remind physicians that many etiologies may cause acute back pain. Early surgical intervention and postoperative rehabilitation are very important for symptomatic spinal cavernous angioma and neurological function also can be preserved. *Patients and Methods:* A 50-year-old female patient suffered from sudden onset back pain with progressive sensory loss to light touch, pin prick and vibration of left lower leg after Chinese traditional thrust manipulation. She also exhibited unsteady gait and incomplete urinary voiding. During her two visits to emergency room She ever visit emergency room for two times, left sciatica and myofascial pain syndrome were diagnosed. Due to her persistent symptoms were progressed and poor response to analgesics, more advanced examinations were performed. Consequent spinal MRI showed an intramedullary lesion located within dorsal spinal cord of T3-4 and 0.6×0.3 cm in size with cord compression. The lesion was accompanied by diffuse swelling and high signal intensity change on T2WI consistent with subacute hemorrhage. Urodynamic study was arranged due to difficulty in voiding and revealed underactive detrusor contraction with detrusor external sphincter dyssynergia (DESD). Diagnostic conclusion was T3-4 intraspinal intramedullary tumor with hematoma. *Results:* Emergent operation with laminectomy of T3/4 for decompression and tumor excision was performed by neurosurgeon. Pathological report showed cavernous angioma of thoracic spinal cord. After surgical operation and comprehensive rehabilitation for 6 months, the patient recovered and her bladder function also recovered completely after medication treatment (Harnalidge and Baclofen). *Conclusion:* Acute back pain is a diagnostic challenge in clinical practice. Correct diagnosis and prompt management are very important. Satisfactory results can be achieve if patients receive proper treatment and comprehensive rehabilitation program.

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AN UNUSUAL CASE OF DELAYED VISUAL LOSS AND TINNITUS FOLLOWING TRAUMATIC BRAIN INJURY

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Introduction: Direct carotid-cavernous fistulas are high-flow shunts with a direct connection between the internal carotid artery and the cavernous sinus. This usually occurs at the time of injury and will be recognizable in the immediate phase after the injury by the classical clinical signs and symptoms (pulsating exophthalmos, bruit, and conjunctival chemosis). We had an unusual case which presented 4 months after the injury and identified on a routine rehabilitation outpatient clinic appointment. *Case Report:* A 28-year-old male patient was admitted with a diffuse traumatic brain injury and fracture of the base of skull on the left side. He recovered well with no physical neurological deficits but had problems with cognition and memory on discharge. He attended a routine neurorehabilitation clinic appointment 4 months later, was complaining of progressive deterioration of vision in the left eye and a troublesome tinnitus in the left ear. Clinical examination revealed a left sided ptosis, chemosis, left 3rd nerve palsy and a bruit over the left eye. Vision was reduced to finger counting in the left eye. Patient had investigations which confirmed the diagnosis and the fistula was occluded by endovascular means. *Discussion:* Carotid-cavernous fistula is a serious, though rare complication of traumatic brain injury. It has been reported to occur only in 0.17% of patients sustaining cranio-facial injuries. Although not life threatening, there is risk of visual loss and paralysis of cranial nerves in addition to the constant 'whooshing' noise in the ear which can be very troublesome. Most of the traumatic fistulas present in the acute phase, although very rarely can present delayed. *Conclusion:* Traumatic carotico-cavernous fistula is a rare entity. The possibility of delayed carotico-cavernous fistula should always be kept in mind while discussing differential diagnosis of patients with any of the symptoms mentioned above since prompt diagnosis and treatment can prevent the complications.

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P434

DIFFICULTIES AND CONTINUITY OF USING AIDS AND ORTHOSES AFTER STROKE

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Introduction: The literature is very poor about the difficulties and continuity of using some aids and orthoses prescribed to stroke patients. *Aim:* To investigate the most preferable aids and orthoses in stroke rehabilitation and the difficulties causing the stroke patients to quit using these devices. *Patients and Methods:* Ninety-six patients (mean age; 62.3 years) who were discharged after an inpatient stroke rehabilitation program were included in this study. A questionnaire that was prepared to get information from patients about using aids and orthoses was introduced to all patients at least 1 year after discharge. The results and patients' demographics were examined together. All statistics were done with SPSS program. *Results:* 49 of them have right hemiplegia and the others have left hemiplegia. Tripod walking cane (TWC) (57 patients), shoulder sling (SS) (31 patients), hand splint (HS) (20 patients) and ankle foot orthosis (AFO) (40 patients) were

the devices, which were preferred frequently. Thirty-two (56.1%) of the patients who were using TWC, had left hemiplegia. It was determined that 40.4% of the patients who were given TWC had quitted using it after 10.13 ± 13.52 months, and in this group only 28.8% had quitted using it safely with the control of rehabilitation team. 77% percent of the patients, who had given SS, had quitted using it due to the lack of information about using and wearing it. Seventy percent of the patients, who was using HS, had quitted using it due to discomfort. Thirty-two (50%) of the patients who were using AFO, had left hemiplegia. 50% of them had quitted using AFO after 11.4 ± 2.57 months, despite half of them had still circumduction gait due to spasticity. The most reason for quitting (85%) was discomfort and difficulty of wearing. *Conclusion:* Not to complicate the lives of the patients' with stroke more, training about using aids and orthoses, and feedbacks about the difficulties of using these devices are important for rehabilitation team.

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THE ROLE OF ELECTRO-STIMULATION IN THE PATIENT WITH ISCHEMIC STROKE

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Introduction: It is known that neurological disability appear after an ischemic stroke. This imposed a supplementary attention to find new techniques for an earlier rehabilitation. One of this is electro stimulation with rectangular electric current for flabby muscle. *Aim:* We proposed in this study to evidence the roll of electro stimulation to the flabby muscle at patient with recent ischemic stroke using rectangular electric current which is followed by an isotonic contraction with isometric end. *Material and Method:* There were taken into the study 63 patients with ischemic stroke that happened at most 3 weeks earlier. All the patients included in the study had a flabby hemiplegia. The patient were divided in two groups: group A (42 patients) that received electro stimulation for superior limb, using rectangular electrical current for five minutes three days, and then with five minutes more at three days until for 20 minutes, and the motion obtained is a correct one; and a group B (21 patients), where electro stimulation was not applied. Both groups received the rest of the rehabilitation techniques, including the passive kinetotherapy. The program lasted for 15 days for both groups. *Results:* It was observed that group A had an active motion of the superior limb at an average of 6.5 days from the beginning of the electro stimulation, while group B had an active motion at an average of 12.6 days from the beginning of the treatment. From the 42 patients in group A, 38 had an active motion, when group B only 5 patients. *Conclusions:* The electro stimulation has an important role in the earlier rehabilitation of the superior limb process, being one of the techniques that initiate the active move of the superior limb at the patients with ischemic stroke.

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THE EFFECT OF LIMITATIONS IN MUSCULOSKELETAL SYSTEM ON HEMIPLEGIC GAIT

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Introduction: Hemiplegic gait disturbance has been associated with limitations in musculoskeletal system, spasticity and balance problems. Our study was aimed to determine the effect of limitations in musculoskeletal system on the gait of hemiplegic

patients. *Patients and Methods:* Twenty three hemiplegic subjects with a mean age of 60.8 years were included. Data including age, sex, disease duration, etiology and involvement sides were obtained. The range of motion (ROM) of the lower extremity, peripheral joint spasticity assessed by Ashworth scale, superficial and deep sensation, balance and coordination, functional status assessed by Functional Independence Measure (FIM) and cognitive functions assessed by Mini-Mental Status Examination (MMSE) were determined. Visual gait analysis was performed and parameters including gait velocity, cadence, step length, step width were recorded. The correlation between clinical characteristics and gait parameters were determined. *Results:* Thirteen men and 10 women with a mean disease duration of 24.7 months were evaluated. Right side and left side were involved in 10 and 13 subjects respectively. The aetiology of cerebrovascular event was thromboembolism in 17 and haemorrhage in 6 patients. The mean scores of Ashworth scale, FIM and MMSE were 0.56, 90.65, 31.87 respectively. There was no relationship between the range of motion of hip, knee, ankle joints and the joint mobility of lower extremity during gait phases of patients. Brunnstrom stages and FIM were correlated significantly with the gait velocity and cadence ($p < 0.05$). There was significant difference in Romberg and sharpened Romberg tests for gait velocity and cadence ($p < 0.05$). MMSE scores were correlated significantly with the cadence in the patients with hemiplegia ($p < 0.05$). *Conclusion:* In conclusion our study indicates that limitations in musculoskeletal system has no effect on the gait patterns and velocity in the hemiplegic patients but functional disability and cognitive impairment have a negative influence on gait parameters in patients with hemiplegia.

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EXPERIENCE USING A MINIMAL PROTOCOL FOR THE EVALUATION OF STROKE PATIENTS IN TERRITORIAL PHASE IN EMILIA ROMAGNA REHABILITATION FACILITIES

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Aim: The target of the project is the definition of a minimal protocol for the evaluation of the stroke patient in the various phases of the rehabilitation path that could be used in all Italian structures. We have been using the 'minimal protocol' in some territorial rehabilitation structures of Emilia-Romagna, using the specified form. *Patients and Methods:* The protocol is referring to the ICF (1). It has been included three kind of indicator: process indicators, clinical indicators, outcome definition and measurement. *Results:* 63 patients have been evaluated (40 males and 23 females) with an average age of 66.04 for males and 66.39 for females. 42 patients had ischemic outcome (LACI 15; PACI 14; TACI 12; POCI 1) (2) and 21 haemorrhagic outcome (overtentorial 13, extended 6; undertentorial 2). 29 patients had right hemiplegia and 34 left. 13 patients had stroke relapse. The average difference between the stroke event and the territorial evaluation is 660.76 days with a SD of 953.21 days (0–4353). The average Rankin (3) prepathogenic is 0.375; the current average Rankin is 3.09. The destination after the hospital phase is home for 61 patients and hospital care for 1 patient. 68.25 % of patients can go outside home with an average Garrett (4) score of 1.70. *Conclusion:* The protocol is a useful tool to evaluate the outcome and the clinical paths for stroke patients.

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P438

A SURVEY OF MEMBERS OF BSRM COLLECTING DATA ON CARE PROVISION FOR PATIENTS IN VEGETATIVE AND MINIMALLY CONSCIOUS STATE

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Understanding the dilemmas faced in the care of vegetative and a minimally conscious state patient is vital for provision of services for this cohort. The first step in order to reach such an understanding is to identify the people involved in care provision and management of this group of patients. Secondly, it is equally important to define the present care pathway. The diagnosis of these conditions remains problematic due to high degree of variability. This study is the first step in gathering data forming a basis for further research and to highlight the fragmentation of services prevalent for this cohort. *Objectives:* To generate data regarding involvement of doctors in management and assessment methods for vegetative and minimally conscious state patients across the country. *Study Design:* Cross sectional postal survey with semi-structured questionnaires; 376 questionnaires were sent, to all the current members of British Society of Rehabilitation Medicine who are based in United Kingdom. SPSS-statistical programme for social sciences was used to perform statistical analysis, frequency, descriptive analysis and cross tabulation were used. *Results:* The results provide the answer for the aims of this survey. 69.8% (150) responses were from consultants. 28.8% (62) consultants are involved in care provision, however 26.5% (57) consultants use some kind of system to assess these patients. SMART 26 (12.6%) was more popular than WHIM 18 (8.4%). Overall 41.9% (90) doctors are involved in the provision of care for this cohort. *Conclusion:* The above findings indicate that the knowledge about this cohort is fragmented and no standard care pathway exist for patients in vegetative and minimally conscious state. A detailed survey is required for generation of data to assist in the formulation of a structured pathway for diagnosis and management for this cohort. This data would enable further research in multidisciplinary team settings, and will also improve the provision of care for patients in vegetative and minimally conscious state.

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MULTILEVEL CERVICAL SPINE OSTEOMYELITIS/DISKITIS AND GIBBUS DEFORMITY PRESENTING INITIALLY AS SHOULDER PAIN IN AN IMMUNOCOMPROMISED PATIENT

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Introduction: An atypical host immune response and lack of signs and symptoms of spinal infection in immunocompromised patients causes delayed diagnosis of disease, which may cause a patient to be in danger of severe complications at a later stage of development. *Aim:* We describe a patient with acquired immunodeficiency syndrome (AIDS), intravenous drug user, who developed Staphylococcus Aureus osteomyelitis/diskitis of the cervical spine. The case is unusual because of the initial indolent nature of the extensive destruction of infection. *Patients and Methods:* A 58-year-old female with AIDS (CD4 # 294, Viral Load 36000), subcutaneous/nasal heroin and cocaine user, presented with a right shoulder pain and numbness of her hands. She had crusted healed wounds from heroin "popping" on her both dorsal forearms. Her forearm X-rays were normal. She left the Emergency Department against medical advice. Two weeks later, she presented with quadriparesis, positive blood culture for Staphylococcus Aureus, Magnetic Resonance Imaging (MRI) revealed osteomyelitis/diskitis of her cervical vertebra (C) 4-6, and Computer Tomography (CT) revealed destruction of her

C4-7 vertebral bodies with gibbus deformity, retropulsion of C4-6 and spinal canal stenosis with chronic cord compression. *Results:* Patient was treated with steroids and antibiotics. Subsequently, she underwent microscopic anterior cervical C4-6 corpectomy with C3-7 anterior spinal fusion and C3-T1 posterior spinal fusion with local autograph and segmental instrumentation. Halo vest was placed. During a month of acute rehabilitative treatment, the patient made good progress and recovered most of her function. *Conclusion:* Recognizing infections of the spine in immunocompromised patients with multiple risk factors is extremely important. Spinal column osteomyelitis or abscess should be considered even when they present only with peripheral problems or bacteremia without an obvious extra-vertebral focus of infection. Early spinal imaging will facilitate diagnosing and therapy. Cervical vertebra destruction raises a concern about spine stability and risk of further cord injury.

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VON RECKLINGHAUSEN'S DISEASE AND RADIAL NERVE LESION

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Introduction: Neurofibromatosis type 1 (NF1), also known as Von Recklinghausen's disease, is an autosomal dominant disorder with half of the cases resulting from spontaneous mutations. It has an incidence of approximately 1 in 4000 live births. The predominant clinical hallmarks of NF1 are café-au-lait spots, neurofibromas, iris Lisch nodules and skin fold freckling. *Aim:* The authors report the case of a patient with Von Recklinghausen's disease and radial nerve lesion that resulted from the removal of a neurofibroma. *Patients and Methods:* PSR, 25-year-old, female, Caucasian, known with Von Recklinghausen's disease. Physical examination revealed multiple café-au-lait spots and a nodule in left axilla. *Results:* The MRI of the left axilla showed an irregular radial nerve with two fusiform images (8 and 10 mm) which suggested neurofibromas/schwannomas. The biopsy was inconclusive so the patient was submitted to removal of the neurofibromas. In the post-operative period a total radial nerve lesion was detected. She went through two more surgeries for tendon transfers. She began a rehabilitation program after the first surgery to maintain the muscle trophism and continue it after the other surgeries to improve strength and functional outcome. *Conclusion:* The neurofibromas arise from peripheral nerve branches or sheaths of peripheral nerve fibers and are derived from Schwann cells or pluripotent cells of neural crest origin. The authors present this case to illustrate the role of Physical and Rehabilitation Medicine in a case of a patient with NF1 and radial nerve lesion who underwent multiple surgeries.

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PROFILE OF THE POPULATION THAT UNDERWENT CHEMICAL NEUROLYSIS WITH BOTULIN TOXIN TYPE A IN A BRASILIAN PM&R UNIVERSITY CENTER BETWEEN 2002-2007

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Introduction: Spasticity is responsible for a significant drop in the quality of life of individuals with neurological disability. Chemical neurolysis allows local approach of the involved muscles, without decrease of the cognitive and muscle strength functions, as with systemic medication. SMFR-HUCFF facilities receives people with motor disabilities from around the state to comprehensive rehabilitation treatment including, chemical neurolysis. After 5 years from this procedure implementation, we are tracing the profile of the population attended. Goals-Known population characteristics underwent to chemical neurolysis in a physical medicine and rehabilitation facility, inside a university hospital. Tracking the disability evolution of in the population treated. **Material and Methods:** Reviewed data of 196 patients who underwent the procedure since its implantation. The population was assessed after international standards, using the Ashworth scale modified to spasticity graduation, at stat and final. It was considered successful the 2 degrees decrease in Ashworth scale of the target muscle. The sample was analysed and grouped for gender, age and diagnosis. There were no reports of severe complications, such as allergic reactions or worsening in spasticity. There aren't reports of total failure in action expected. The number of reapplications ranged from 1 to 6 replications with a minimum interval of 6 months and maximum of 1 year. **Results:** Our population is similar to other centres with our profile, enabling a comparison of results. The technique proved to be a useful and secure tool for the spasticity control. **Conclusions:** Chemical neurolysis with botulin toxin type A is an important tool in the management of neurological based disability and must be made within the rehabilitation program following secure clinical protocols.

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FAMILIAL SPASTIC PARAPARESIS – CASE STUDY

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Introduction: Familial spastic paraparesis (FSP) is not a single disease entity, but rather a group of clinically and genetically different disorders that share the primary feature of progressive severe lower extremity weakness and spasticity. FSP causes degeneration of the distal corticospinal tracts within the spinal cord. In uncomplicated FSP, symptoms are generally limited to gradual weakening in the legs, urinary bladder disturbance and, sometimes, impaired sensation in the feet. In complicated FSP, additional symptoms may include peripheral neuropathy, epilepsy, ataxia, optic neuropathy, retinopathy, dementia, ichthyosis, mental retardation, deafness, or disorders of speech, swallowing, or breathing. Complicated FSP is rare. FSP can be classified by genetic inheritance (X-linked, autosomal dominant, or autosomal recessive). Each type has several subtypes; these are based on the gene location. Genetics cannot be used to predict severity of the disorder because symptoms can vary greatly within each type. **Case Report:** The authors present a case report of a 41-year-old woman with FSP. Other diagnosis are osteoarthritis and osteoporosis. The patient walks with a spastic pattern, presents impaired balance, lower limb weakness and impaired postural sensitivity. The authors discuss the therapeutic options and the relevance of rehabilitation treatments in this case.

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SPINAL DURAL ARTERIOVENOUS FISTULAS – AN UNDERDIAGNOSED CONDITION CAUSING PROGRESSIVE RADICULOMYELOPATHY IN ELDERLY PEOPLE

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The authors present the case of a 74-year-old man with a 1 year history of progressive bilateral asymmetrical lower extremity weakness, lumbar pain, muscle atrophy and reduced deep tendon reflexes in lower limbs. No bowel or bladder difficulty and no fasciculations or fibrillations were evident. During this time the patient did physical therapy and the condition was attributed to radiculomyelopathy due to lumbar osteoarthritis. When he lost gait function, additional studies were performed: gadolinium-enhanced MRI of the thoracic and lumbar spine revealed hyperintensity in the spinal cord on T2-weighted images from D9 to the conus. A selective intercostal arteries D12 and lumbar arteries L1 and L4 angiogram demonstrated a dural arteriovenous fistula. Selective catheterization using a microcatheter and endovascular surgical obliteration was performed. It was not possible to perform a selective catheterization of the lumbar arteries L2 and L3. After embolization there was progression of neurological dysfunction with muscle weakness worsening, sensitivity to pin prick and light touch and proprioception sense loss and sacral involvement with urinary disturbance and constipation – a flaccid complete paraplegia with L1 sensory level. The patient is now following a rehabilitation program in a inpatient center and undergoing further investigation. **Conclusion:** Spinal dural arteriovenous fistulas are an underdiagnosed condition. They should be suspected in men aged 50 years and over who present a progressive paraparesis. They are the most common variety of spinal cord arteriovenous malformations, usually dorsolumbar in localization and are acquired lesions, being the mechanism obscure. Presentation is generally with radiculomyelopathy, followed by slow but progressive neurological deterioration. Total spine gadolinium-enhanced MRI and spinal angiography are the diagnostic studies of choice. There are two different treatment options: the embolization or direct surgical exposure. It is important to diagnose this disease early in order to obtain a better functional outcome after treatment.

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HOME-BASED REHABILITATION OF THE PATIENT WITH SPINAL CORD INJURY: A CASE REPORT

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Introduction: The annual incidence of the traumatic SCI in Russia in 1999 has been estimated at 65.4 per million population. The negative influence on SCI rehabilitation is concerned with underestimation of compensatory abilities of this group of patients and overestimation of complete injury incidence (1). **Aim:** The purpose of our presentation is to show that prolonged course of physical rehabilitation at home can be effective in SCI patients. **Patients and Methods:** Alexander B., 46 years old, architect. Etiology of SCI was a sport injury while skiing and crashing into a pole on March 18, 2006. The primary injury was a spinal

cord contusion (level L3–L4) with low paraplegia. The patient also sustained bilateral pneumothorax, multiple rib fractures, disruption of liver and hemoperitoneum. We started a course of home-based rehabilitation on July 4, 2006. Conventional rehabilitation consisted of overground mobility practice and massage (5 days a week, 2 h a day) and exercises on active cycle for lower limbs. We also used special ‘weights and hoists’ machine. Every 4 months we conducted 7–10 days long intensive courses with 2 physical therapy sessions a day. **Results:** The outcome measures were manual muscle testing, functional skills and neurological examination pre and post training (2). The course took 18 months (350 therapy sessions). We got changes in Barthel Index Score (7→19) and ASIA Impairment Scale (C→D). The patient is able to walk with a help of two sticks. **Conclusion:** This clinical case shows the power of intensive and not a time-limited home-based rehabilitation approach.

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EPIDEMIOLOGY, CLINICAL PRESENTATIONS AND MEDICAL COMPLICATIONS OF INDIVIDUALS WITH GUNSHOT SPINAL CORD INJURY

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Aim: Analyze the epidemiology and characteristics about Spinal Cord Injury (SCI) by gunshot in Catalonia, a region of Spain where are living seven million people. **Material and Methods:** A retrospective longitudinal study was done in Spinal Cord Injury on Vall d'Hebron Hospital. We studied the characteristics and epidemiology of the Spinal Cord Injury with firearm etiology during 1996–2007 and we compared this study with other made in the same Unit during 1973–1995. Bibliographic revision was done about firearm spinal cord injury of others countries. **Results:** During period 1973–1995, 20 patients with gunshot wound-induced SCI were attended and only 7 patients during 1996–2007 period. At the first period the highest incidence was in 1983 (7 patients) and at the second period was in 2006 (3 patients). All patients were men and younger (33.42 years). The principal etiology was armed robbery at the first period (1973–1995) and argument at the second period (1996–2007). Nineteen patients were paraplegic (70.37%) and 8 tetraplegic (29.63%). Firearms frequently resulted in hemopneumothorax (26%) and abdominal wound (22.22%). Common gunshot wound-related medical complications included infections (71.4%) and pain (85.7%). **Conclusion:** The SCI by gunshot is very slightly frequent in our population, although is the second cause in USA, with reduction of the incidence in the seven last years.

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BILATERAL ULNAR NERVE ENTRAPMENT BY THE M. ANCONEUS EPITROCHLEARIS.

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Introduction: Ulnar neuropathy at the elbow is the second most common entrapment neuropathy after carpal tunnel syndrome. There are several causes for ulnar nerve entrapment. A case report

is presented with bilateral presence of the M. Anconeus Epitrochlearis. This anomalous muscle, also known as the accessory anconeus, is reported to occur in 4% up to 34% in humans. **Aim:** This case illustrates the importance of this anomaly in the differential diagnosis of symptomatic ulnar neuropathy at the elbow. **Patients and Methods:** The patient contacted our department with chronic, diffuse bilateral elbow pain irradiating into both forearms. The patient experienced typical nocturnal paresthesias involving digit IV and V of both hands. Tinel's sign was present over the ulnar nerve, just proximal to the medial epicondyle. **Results:** After examination, a bilateral ulnar nerve entrapment was clinically suspected. An EMG investigation for confirmation of this entrapment revealed slowing in the ulnar nerve across the elbow. Because the symptoms didn't resolve with conservative measures, an ultrasound and MRI of both elbows was performed. These examinations revealed the presence of the anomalous muscle, called the M. Anconeus Epitrochlearis, at both sides. This structure was situated in the cubital tunnel. At both sides it replaced the retinaculum and compressed the underlying ulnar nerve. Treatment consisted of surgical excision of both muscles and retinacular release. In the postoperative phase physiotherapy was recommended. **Conclusion:** When ulnar nerve entrapment doesn't resolve with conservative measures, further investigation is necessary. One of the differential diagnoses is an anomaly, M. Anconeus Epitrochlearis. Depending on the symptoms and complaints, surgical excision of the muscle and cubital tunnel release is indicated.

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EVALUATION OF TREATMENTS IN PATIENTS WITH DIABETIC NEUROPATHY

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Aim: Aim of the study was to evaluate the degree of diabetic neuropathy (DN) analysing the subjective parameters (pain sensation) and objective parameters such are: motor functions, sensibility, muscular reflexes (biceps, patellae and Achil reflex) and electroneurographi (ENG) parameters. Also, the aim was to examine the role of low level laser therapy (LLLT) in the treatment patients with proven DN. **Method:** The study included 43 patients with diabetes mellitus type I and II who insulin dependent, with clinical and ENG signs of DN. The patients were divided into two groups: A group – 25 patients were treated with LLLT (γ 870nm, $p=150$ mW, Frequency 400Hz) for 4 months. The total dose per treatment was 36J, 2J per point (paravertebral points on cervical and lumbosacral spine, as well as points along plexus brachialis and n. ischiadicus). All patients (A group and B group – 18 patients) with DN who received vitamin therapy per os (Beviplex drag. 3×1) within the same period. According to the subjective parameters (intensity of the pain) and objective parameters (motoric, sensitive disorders, reflexes) we calculated the neuropathic total and individual score before the treatment and 4±0,4 months after their treatment. Prior to and after 4±0,4 months of treatment, the following parameters were determined using surface electrodes: motor (MCV) and sensory conduction velocities (SCV) values of n. peroneus and n. ulnaris. **Results:** At the end of the treatment in group A statistically significant reduction of pain was noticed ($p<0.01$). In group B reduction of pain was also achieved but not statistically significant. At the end of the treatment, the total neuropathic score was significantly reduced only in group A ($p<0.01$), and if compared with the control group ($p<0.05$). Motor conduction velocity was

not significantly improved in the all groups. *Conclusion:* By reducing pain and total neuropathic score LLLT has been proven to be effective in the treatment of patients with DN.

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STROKE: PAMPHLET FOR PATIENTS AND CAREGIVERS

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Introduction and Aim: Stroke is one of the leading causes of mortality and disability in the world. Family caregivers and friends play a critical role in the recovery from stroke, particularly as lengths of stay in hospitals and rehabilitation settings continue to decrease. Also important to note is that stress tends to increase over time if the patient and caregiver's needs are not met. We notice that some of those needs may include the need for better information about stroke. Faced with this fact, emerged the idea of a pamphlet of information and actuation for stroke victims and relatives, in order to respond to the concerns and questions that are raised more often by them. *Patients and Methods:* The authors present an educational pamphlet with information from a rehabilitation point of view that helps patients and their families to face and adjust life after stroke. Introductory it includes definition, etiology, clinical manifestations and risk factors of stroke. We also believe that is necessary to inform about the aims and the elements of a rehabilitation team. And very important we included practical tips about care of these patients and tips for adapting home, activities of daily living and communication. We had a particularly care of using a terminology and graphic material simple and understandable to the patient and their families. *Results and Conclusion:* Patient and family education about stroke and strategies to maximize functional independence is an important aim in the rehabilitation process. The communication with the patient and relatives needed for this education can be enhanced by delivering information pamphlets. It will reduce the anxiety of facing this new situation, help them solve practical problems and facilitate the autonomy of the patient and improve quality of life.

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ANTIMICROBIAL SUSCEPTIBILITY PATTERN OF NOSOCOMIAL URINARY TRACT INFECTIONS IN PATIENTS WITH SPINAL CORD INJURY IN A REHABILITATION SETTING

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Introduction: Patients with spinal cord injury (SCI) are at risk for developing urinary tract infections (UTIs), which may involve multiple organisms, irrespective of the type of bladder management used. Because of prolonged hospital stays, most SCI patients experience nosocomial UTIs. *Aim:* To investigate the antimicrobial susceptibility of nosocomial UTIs in SCI patients in our rehabilitation center. *Patients and Methods:* This study is a prospective study carried out by the Hospital Infection Control Committee from January 1st to December 31st of 2007. There were 230 SCI patients who were hospitalised during this period. Nosocomial infection was defined as an infection that was identified >72 h after admission to the hospital, in cases in which there was no evidence of incubating infection on admission. All patients were screened when they were

admitted to hospital to rule out incubating infections. *Results:* Fifty six nosocomial UTIs were detected. The detected pathogen was *E. coli* in 27 cases, *Pseudomonas* in 7, *Proteus* in 8, *Klebsiella* in 5, *Enterococcus* in 3, *Enterobacter* in 2, MRSA in 2, MSSA in 1 and *Citrobacter* in 1. Urinary drainage method was indwelling catheter (IC) in 12 patients and clean intermittent catheterisation (CIC) in 40 patients, whereas 4 of these patients did not have micturition problems. The most common microorganism detected was *E. coli* in SCI patients who use CIC as urinary drainage method (21 of 40 patients). The susceptible/resistant ratios of *E. coli* to Ampicillin, Ciprofloxacin, Trimethoprim/sulfamethoxazole and Nitrofurantoin were 18.5/81.5, 18.5/81.5, 25.9/74.1 and 66.7/29.6, respectively. The susceptible/resistant ratios of all pathogens to Ampicillin, Ciprofloxacin, Trimethoprim/sulfamethoxazole and Nitrofurantoin were 23.8/65.5, 37.9/58.6, 31.0/63.8 and 58.3/32.8, respectively. *Conclusion:* Nosocomial pathogens, especially *E. coli*, which cause UTIs in patients with SCI seem more resistant to antimicrobial agents than able-bodied patients.

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NEED FOR OUT-PATIENT COMPREHENSIVE REHABILITATION: EPIDEMIOLOGICAL DATA STUDY

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Purpose: The aim of the study was to analyse the population needs for out-patient comprehensive rehabilitation and to determine what part of all the patients, made the patients, suffering from back pain and to determine the influence of various factors, such as age, sex, educational level, social status on such type of pathology. *Study Material and Methods:* The retrospective data of 238 patients, who underwent out-patient comprehensive rehabilitation programme in our department during the period of 2006–2007 were analysed. *Results:* Our study revealed that 155 patients out of 238 suffered from neck or low back pain, that made up 65.13%. Age range of these patients, was from 24 to 81 year, the mean 51.02 years. 33.55% of them were male and 66.45% - female. We determined, that 72.9% were in age group under 60 years and 27.1% were over 60 years old, this finding let us predispose, that the majority of patients was working age. 129 (83.23%) patients claimed their educational level: 59 of them had university degree, that made up 38.06% and 13 of them had high school degree, that made up 8.39% The rest of patients had poor educational level – 36.77%. Analysing the social status of these patients we revealed, that on arrival 105 (67.74%) of them were working on daily basis; 25 (16.13%) were retired; 18 (11.62%) had some disability level, the rest of them: 7 patients (4.52%) had another social status (e.g. students, women on maternity leaf etc). The analysis of pathology type revealed that 19 patients had pathology of cervical part of spinal column (12.3%), 135 (87.1%) had low back pathology – lumbar or lumbosacral part of spinal column. *Conclusions:* The analysed data show that the highest demand for out-patient comprehensive rehabilitation is in patients with neurological disorders, especially low back pathology, that made up 87.1% of all back problems cases and made up to 56.72% of all in our department rehabilitated patients during mentioned period of time.

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FUNCTIONAL RECOVERY AND MOBILITY FOLLOWING REHABILITATION AFTER HEMORRHAGIC AND ISCHEMIC STROKE

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Objective: The aim of this study was to evaluate the impact of stroke types (hemorrhagic or ischemic) on mobility, function and motor

improvement. *Patients and Methods:* One hundred and seventy stroke patients rehabilitated in our clinic were evaluated in the study. Patients were divided into two groups according to their stroke types; 116 ischemic (Group I) and 54 hemorrhagic stroke patients (Group II). All the patients were evaluated with respect to age, gender, lesion location, length of hospitalization, disease duration. Rivermead Mobility Index (RMI), Barthel Index (BI), Brunnstrom evaluation were used for mobility, functional and motor status, respectively on admission and at discharge. T-test and chi-square tests were used as statistical methods. *Results:* There were 97 female (57%), 73 male (43%) patients with a mean age of 62.31 ± 11.58 years. there were no statistical difference with respect to gender, lesion location, disease duration. The mean age of the ischemic group was statistically older; also length of hospitalization was longer in this group. although improvements in rehabilitation parameters were statistically significant in each group, there was no significance when the two groups were compared with each other. *Conclusion:* The stroke patients had a significant functional improvement regardless of lesion type. We can assume that the financial burden of ischemic stroke patients is more than hemorrhagic stroke patients during rehabilitation period since the length of hospitalization is shorter for hemorrhagic patients in this study group.

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FUNCTIONAL IMPLICATIONS ON HEMIPARETIC PATIENTS SUFFERING A LOWER LIMB FRACTURE

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Introduction: Lower limb fractures are one of the most common and serious complications in hemiparetic patients. Fractures are usually consecutive to ordinary falls due to spasticity leading to balance and gait disturbances, together with the effects of sedative, antispastic, high blood pressure medication and the coexistence of osteopenia and osteoporosis. *Aims:* To follow-up the lower limb fractures prevalence in hemiparetic patients considering the affected region, moment of occurrence, causative factors and the implications of orthopaedic and surgical treatment upon the functional status and rehabilitation schedule. *Results:* In all patients the fracture was due to ordinary falls caused by transfers or while walking inside their house in the late stage of the stroke (after 6–12 month). All of the patients had fractures on the paretic side: 10 of them had femoral neck fractures, 3 pertrochanteric fractures and 4 tibial/peroneal maleola fractures. DEXA osteodensitometry assessment showed different stages of osteopenia or osteoporosis. The patients followed an individualised rehabilitation programme adapted to the previous orthopaedic treatment. Long lasting immobilised cases also implied the most severe functional rehabilitation problems, as well as the joint and muscle disorders, gait disorders and an increased spasticity. *Conclusions:* The importance of reducing the risk of falls and implicitly the fracture risk by the early assisted walking, the spasticity treatment using medication and physical therapy, orthopaedic conservative measures (bracing of a spastic varus equinus foot, orthopaedic shoes, hip protecting devices), surgery – tendon lengthening or isolated and combined tendon transplant, single or multiple level arthrodesis, osteoporosis prophylaxis are all paramount.

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EVALUATION OF SENSORIAL INFORMATION INTEGRATION FOR BALANCE AFTER STROKE

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Aim: To evaluate sensorial information integration for balance and its evolution in patients with hemiplegia after stroke in the acute period. *Patients and Methods:* Ten patients with hemiplegia after a single stroke (6 left lesioned and 4 right lesioned, mean age 55.3, mean Barthel 73), able to stand on a force platform without human assistance were included between the first and the 4.5th month (mean 2.4 months). Sensory integration for balance was assessed initially and on Day 30. Assessment of sensory integration was performed by evaluating CoP displacement on a platform during sensory perturbations. Sensory perturbations used were successively muscle vibrations (proprioceptive), optokinetic (visual), and galvanic (vestibular) perturbations. *Results:* Initially, the pattern of the response to the different sensory perturbations was varied: 6 patients were excessively sensitive to 2/3 sensory stimulations, 3 to only 1 and 1 was moderately sensitive to the 3 stimulations. Six patients were excessively sensitive to visual, 5 to proprioceptive and 4 to vestibular perturbations. However the patterns of the patients were not fixed since one month later, sensitivity to visual information decreased for 3 and increased for 2, sensitivity to vibrations increased for 4 and decreased for 2, sensitivity to galvanic perturbations increased for 4 and decreased for 4. *Conclusion:* In acute post-stroke patients, various patterns of response to sensory perturbations were observed but these patterns changed over time. Sensory profile must probably be taken into account to design individual rehabilitation programs.

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BRADYCARDIA RELATED TO ADMINISTRATION OF LOW DOSE INTRATHECAL BACLOFEN

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Introduction: The most common complications of intrathecal baclofen were muscle weakness, somnolence, catheter malfunction, and surgery complications. In the literature, there is limited knowledge about cardiac rhythm disorders due to ITB therapy. *Objective:* To present an unusual case with sinus bradycardia after intrathecal baclofen (ITB) therapy in a patient with tetraplegia ASIA-A. *Methods:* Review of relevant literature. *Results:* Our case with tetraplegia have been received inpatient rehabilitation services at many times and used oral high dose baclofen for spasticity without any heart rhythm disorder. Because sinus bradycardia was determined after lower doses of ITB administration (125–200 µg/day), the suspicion of overdosing or withdrawal syndrome which were the main risks of intrathecal baclofen infusion came out. *Conclusion:* Since the bradycardia does not exceed the benefits of baclofen for patients with spinal spasticity, the benefit/risk assessment is favourable. To achieve the optimum balance between reduction in spasticity and maintenance of normal heart rate values, the adjusting of the baclofen dose is necessary.

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LUMBAR PLEXUS RECUPERATION AFTER L4-L5 DISCECTOMY – A 3-YEAR FOLLOW-UP PROCESS

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Introduction: Peripheral nerve pathology presents a recovery time that is only approximate. The recovery probability and the velocity of nerve regeneration diminishes in relation to the time since the origin of the lesion. *Aim:* To describe the case of a patient suffering from severe sciatic neuropathy for more than 2 years who underwent surgery and developed delayed signs of neural regeneration following rehabilitation. Treatment and follow-up were conducted until relatively normal life activity was achieved. *Patients and Methods:* The case involves a 45-year-old male with a personal history of: Low back pain, hypoaesthesia in the S1 root

corresponding territory, and anterior tibial muscle dysfunction. L4–L5 discectomy was performed one year after symptomatology. MRI pre-surgery: Moderate parasagittal L4–L5 right disc hernia touching the L5 and S1 right nerve roots. EMG post-surgery: Severe chronic motor radiculopathy in L4–L5 right roots, sensitive radiculopathy in the S1 right root. Acute axonal lesion, anterior tibial muscle denervation. No reinnervation signs. Treatment: Active lower limb exercises, electrostimulation, vitamin B1 and a foot drop orthosis. *Results:* The clinical outcome was favourable at 13-month follow-up; low back pain disappeared, sensitivity was recovered and the patient was able to walk normally, although a mild steppage gait persisted. The patient required the orthosis only outside the house. *Conclusion:* Although probability of nerve regeneration decreases with time, rehabilitation therapies should be used to treat these pathologies for an extended period since the recovery could evolve slowly. In our case, it required more than 2 years to show an incipient recuperation.

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NEUROREHABILITATION OF THE UPPER LIMB USING ROBOTIC SYSTEMS

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Stroke is the third leading cause of death behind heart disease and cancer and the leading neurological cause of long-term disability in the world (1). The use of properly designed machines for robot-aided motor therapy resulted a powerful tool both for the application of novel clinical protocols for neuro-rehabilitation and for the investigation on human motor re-learning after stroke injuries (2, 3). Robotic machines allow the performing of a deep and long-lasting stimulation, through the execution of sensory-motor tasks, aimed at improving neuroplasticity. They also allow a quantitative assessment of the outcomes, a continuous monitoring of results and therapy personalization (4, 5). This work presents a programme for multicentric clinical trials with two robotic systems (InMotion² and InMotion³) for the upper limb rehabilitation, that is being carried on at the Physical Medicine and Rehabilitation unit and at the Biomedical Robotics and Biomicrosystems Lab at the University Campus Bio-Medico, in cooperation with the Burke Rehabilitation Hospital (NY, USA). The goal of this study is to determine what is the optimal sensory-motor activity that maximizes motor recovery, by testing the order-effect of distal versus proximal therapy. To this purpose patients have been trained in two different fashions: one group has been trained first with the MIT-Manus robot focusing on the shoulder and elbow (proximal) for eighteen sessions followed by another eighteen sessions only with the wrist robot (distal). The other group has been trained for the same duration but first in wrist robot (distal) followed by training with MIT-Manus focusing on the shoulder and elbow (proximal). This study presents the preliminary results of clinical trials on ten post-stroke chronic patients. The outcome of the therapy has been measured using standard clinical scales (Fugl-Meyer, Motor Power, Wolf Motor Function Test and Stroke Impact Scale) as well as quantitative evaluation indices of motor performance provided by the robots.

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THE EVALUATION OF COGNITIVE AND PSYCHOMOTOR DISORDERS CHANGES IN OCCUPATIONAL THERAPY OF PATIENTS WITH STROKE

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Aim: To evaluate cognitive and psychomotor disorders of patients with stroke and to assess the effectiveness of occupational therapy. The contingent of the examined patients consisted of 30 patients with stroke rehabilitated in the Department of Neurorehabilitation at Kaunas University of Medicine Hospital. The average age of rehabilitees was 65.33 ± 13.2 years. During the study we evaluated their cognitive functions (with MMSE and by NCSE), handgrip strength (with dynamometer), reaction time and frequency of movements (speed of finger tapping). *Results:* After the applied course of individualized occupational therapy, cognitive functions of the patients significantly improved. The increased in cognitive functions estimated with MMSE was 6.4 (±2.3) scores, and 13.3 (±10) assessed by NCSE. In early stage of rehabilitation, mostly affected cognitive functions were memory present in 83% of patients, constructional capabilities in 70% of patients, and orientation in 57% of patients. *Conclusion:* At the end of rehabilitation a significant improvement was assessed in all the studied cognitive functions. After rehabilitation a significant improvement was assessed in patients reaction time and movement frequency. The results of the research have shown, a moderate strong significant correlation between the mental state of the patients and reaction time after applied rehabilitation.

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EFFECTIVENESS OF NEW METHODOLOGY OF PHYSIOTHERAPY AFTER FIRST ISCHEMIC STROKE IN COMPARISON TO STANDARD PHYSIOTHERAPY IN CONTROL GROUP – PRESENTATION OF PROTOCOL

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Introduction: Effectiveness of treatment of main consequences of stroke including motor deficit are not satisfactory. Access to physiotherapy is limited which forces specialists to look for new methods which are more efficient ones. The goal of the Project is to describe and define more effective physiotherapy for stroke

patients. Author wishes to achieve this goal by comparing two therapeutic programs. Essence of experimental program is an intensive as well as functional engagement of motor potentialities of the patient's involved side of the body. *Objectives:* It will be 60 successive patient enrolled after first stroke, between 1st and 3rd month after the onset. Patients will be randomly allocated to two groups: experimental and control one. Total time of physiotherapy in both groups will be the same (two hours of individual therapy during 30 days). Main difference between two groups is conducting physiotherapy only in standing or sitting position and beginning treatment from exercises in close chain to open chain exercises in experimental group. Every exercise will be designed to engage at the same time muscles of the upper extremity, lower extremity and trunk muscle. After completing 30 days of therapy patients will continue physiotherapy for 30 days in ambulatory terms. Patients will be assessed (three times) by independent physiotherapist just before the therapy, after 30 days and after another 30 days (RMA Scale, Fugel-Mayer, Bartel Index, Rankin Scale, Quality of life and Berg Balance Test). In the hospital terms patients will be objectively measured in gait and movements of the upper extremities during completing five simple motor tasks. Measurement will consist of three-dimensional kinematic assessment (Vicon System 460), Ground reaction forces (Kistler platform) and electric activity of muscles (16 channel functional EMG) during gait and isolated movement of upper extremities. Trunk movements while walking and posture during quiet standing will be assessed. Stabilography of standing position will be measured too. *Results:* Main goal for statistical analysis will be to describe changes of all observed parameters, differences between groups and searching conditionals in between clinical and laboratory results. *Conclusions:* Conclusions will be concentrated around clinical applications of the results of this trial.

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THE ROLE OF ANKLE-FOOT ORTHOSIS FOR RETRAINING THE GAIT IN STROKE PATIENTS WITH HEMIPARESIS

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Introduction: Patients after stroke have abnormal movement patterns, which have negative influence on locomotion and gait. Retraining of stroke patients with hemiparesis to walk is a major goal for any of rehabilitation programmes. The hemiparetic gait is characterized by the slow speed, the short step length and the increased energy consumption, due to drop the foot and to drag toes. An ankle-foot orthosis (AFO) is used to correct a spastic drop or equinus foot, which are both commonly seen in spastic stroke. This study was performed to investigate the gait pattern with or without plastic AFO in stroke patients. *Goals:* To evaluate the AFO usage effects for improvement of gait in stroke patients. *Patients and Methods:* Twelve subjects (45–74 years old) with hemiparesis after stroke undergoing in-patient rehabilitation were enrolled in the investigation. Rivermead Mobility Index (RMI), Ashworth scale, muscle power testing by Kendall, 3D gait analyzing were used to measure function, spasticity, kinetic gait parameters, stride length, step length, symmetry, cadence and velocity of gait. *Results:* Comparison of gait showed significant improvements in some gait parameters in the assessment sessions when AFO was used: stride length of the paretic and non-paretic legs, weight-bearing on the paretic leg, gait velocity and cadence. All AFO conditions improved the angular orientation of the ankle during walking compared to walking without an AFO. *Conclusions:* Using of ankle-foot orthosis for patients with hemiparetic gait pattern normalize the lower extremity position during the gait (swing phase relation). Using of ankle-foot orthosis for patients with hemiparetic gait pattern smooth out step time with paretic and partly with non-paretic lower extremity during the gait.

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CERVICAL DYSTONIA – CASE REPORT

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Patient: 36-year-old was sent by primary physician to physical therapy because of left sided head tilt lasting for 20 days, appearing during work and communication with other people. For the past four years the patient during writing feels cramps in fingers of the right hand, with consequent bad handwriting. The presence of others aggravates disturbances, and he cannot willingly reduce them. Neurological examination, head CAT scan, evoked potentials, and EMNG gave normal findings. EEG indicated on slight left temporo-parietal dysfunction, and neck radiography on foramen arcuate atlantis. The initial diagnosis of Idiopathic graphospasm was made. On admission, present left head and neck lateroflexion. Muscles are eutonic on palpation. Full range of motions is obtained during active and passive movements. There are no signs of focal lesion. Muscle reflexes are regular and symmetric. Plantar responses are negative. Cerebellar signs are negative, as well as Romberg test. So, the diagnosis Torticollis spastica was made, and referred the patient to neurologist. MRI gave unspecific left frontal white mass lesion. Ceruloplasmin values were 30.4 mg/dl. The final diagnosis was Dystonia segmentalis, and botulinum toxin A was administered. The first botulinum toxin A application was: left *m. semispinalis* 100 u., upper *m. trapezius* 100 u., *m. splenius capitis* 100 u., upper *m. trapezius* 100 u. Physical therapy included: stretching, range-of-motion and positioning exercises during sitting and supine and prone lying, muscle relaxation, manual massage and laser therapy. Cervical brace was applied. The second botulinum toxin was applied in six months later in identical muscles, as well as Tetraxepam 40 mg twice a day, and psychotherapy. The results of therapy are presented according to Toronto Western Spasmodic Torticollis Rating Scale (TWSRTS). Significant improvement was achieved for each analyzed parameter.

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ACCESSORY NERVE LESIONS: ETIOLOGY, DIAGNOSTICS AND OUTCOME

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Accessory nerve is a motor nerve that supplies sternocleidomastoid and trapezius muscle. Between these two muscles the nerve passes through posterior triangle of a neck where the nerve is superficial and susceptible to injury, particularly iatrogenic. The patients have shoulder pain and incapability to elevate the arm above 90°. The aim of this paper was to demonstrate etiologically different accessory nerve lesions and their outcome. From January 2005 until December 2007 in Clinic for Physical Medicine and Rehabilitation we have made the diagnosis of accessory nerve palsy in 9 patients. Six of them were sent because of shoulder pain and dysfunction after surgical procedure in neck region and 3 patients had neck distension (one patient from the second group was misdiagnosed and operated as cervical disc herniation). We checked them and performed electromyography 15–60 days after the beginning of symptoms (except the mentioned patient who came at our ambulance in December 2007, 9 months after distension). In all of iatrogenic injured patients we found severe accessory nerve lesions. Two patients with distension had moderate lesions and one patient had severe lesion with signs of recovery. All the patients were treated with physical modalities including electrostimulation. In all of 6 iatrogenic injured patients (100%) there was no accessory nerve recovery one year after the operation and 3 of them still had shoulder pain. Two patients with distension injury recovered after 9 months. Severe iatrogenic accessory nerve lesions with no recovery demand that surgeons must know exact topographic anatomy and preserve the nerve during operation.

But if injury happens, physiatrist has to think of accessory nerve in patients with shoulder pain and movement difficulties with anamnesis of cervical surgery and has to perform all for nerve recovery including neurosurgery consultation.

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OUR EXPERIENCES WITH SHOULDER PAIN IN PATIENTS AFTER A SPINAL CORD INJURY

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Introduction: Spinal cord injury patients suffer from significant problems concerning shoulder joints. Those problems are related to the neurological deficit and to the specific overloading of the joints due to substitution of both locomotive and weight bearing functions of palsy lower limbs. Symptoms are related to both the level and the extent of spinal injury. **SCI Patients:** Possible causes of shoulder pain according to level of injury: A high-level injury (spinal segments C1–4) leads to the combined paralysis of muscles of the shoulder girdle. Pain of myoskeletal origin is frequent and a neuropathic pain may also be present. In the cases of proximal cervical intumescence injury (spinal segments C5–6) a partial neurological deficit of the shoulder girdle and distal paralysis are usually observed. Muscular imbalances are usually more complex and the pain may also be the consequence of radiculopathy. In the cases of distal cervical intumescence injury (spinal segments C7–Th1) the patients have preserved normal strength of the shoulder girdle muscles. Dysfunction and pain are rather related to overloading. In addition, a severe insufficiency of postural trunk muscles contributes to the problem. In the thoracic spinal injuries (spinal segments Th2–12) paresis of trunk muscles is important. Weak trunk stabilization and insufficient fixation of the shoulder blade may result in painful and dysfunctional shoulder. The patients with an injury at the level of lumbar spine often overload their shoulders because of transfers and mechanic wheelchair using. Clinical manifestations of the incomplete spinal injuries are varied and depend on preserved functional sensomotoric capacity. **Methods of Treatment:** The main aim of treatment is the prevention of development of chronic functional disorders and later irreversible structural abnormalities. Proper nursing care, positioning and physiotherapy based on neurophysiological principles are the most important. Principles of developmental kinesiology are applied in order to integrate the shoulder joint in postural functions and movement patterns. Occupational therapy is focused on the grasp training and supporting function of the arms. Adequate pharmaceutical and physical pain treatment as well as treatment of the anxiety and depression and psychological support are necessary parts of the comprehensive approach.

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AUTONOMIC DYSREFLEXIA IN A PATIENT WITH MULTIPLE SCLEROSIS – A CASE REPORT

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Objective: To report manifestation of autonomic dysreflexia (AD) in a patient with Multiple Sclerosis (MS). **Case Report:** A young male with a history of several admissions to Emergency Department with complaints of hypertensive attacks, palpitations, difficulty in breathing, headaches, flushing has been presented. No abnormality has been shown by physical examination and laboratory tests in order to find out aetiology of hypertensive attacks. The reason of hypertensive attacks were assigned to anxiety disorder as he had palpitation, tachy-

cardia and diaphoresis accompanying his hypertensive attacks. He started to receive treatment for his panic disorder. Later, he admitted to Physical Medicine and Rehabilitation Department for his left leg numbness. He got diagnosis of Multiple Sclerosis (MS) after physical examination, laboratory tests, and cranial and spinal MRI findings. Despite appropriate treatment of anxiety disorder, his hypertensive attacks recurred. Autonomic dysreflexia (AD) was suspected. The noxious stimulus was found to be the bladder distension and his hypertensive attacks have been controlled with the management of neurogenic bladder. **Conclusion:** This report emphasizes that AD can occur in MS. Somatic symptoms of the patients with psychological problems should not be underestimated due to their psychological status and should be investigated in detail.

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CLINICAL AND DEMOGRAPHICAL CHARACTERISTICS BY CAUDA EQUINA SYNDROME

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Introduction: Cauda Equina Syndrome is a severe neurological disorder caused by compression of nerve roots forming cauda equina. Specific signs: a sharp radicular pain, 'saddle anesthesia', lower extremity weakness, decreased or absent deep tendon reflexes, disorder of bowel or bladder function, sexual dysfunction. Cauda equina syndrome may result from any lesion that compresses cauda equina nerve roots. It may be caused by a ruptured disc, tumor, infection, fracture, or narrowing of the spinal canal. It may also happen because of a violent impact, such as a car crash, a fall from significant height, or a penetrating injury, such as a gunshot. **Aim:** The aim of this study was to demonstrate cauda equina injured patients for their clinical data. **Patients and Methods:** The records of the patients were retrospectively analysed. 15 patients, 10 men and 5 women, aged 16–74 years were recruited for the study. All were treated in our rehabilitation department. Functional Independence Measure (FIM) was applied to these patients when they were admitted in the clinic and on discharge. **Results:** 10 male (67%) and 5 female (33%) patients were included in this study. Their mean age was 41.6±15.6 years. The major etiological factor was fall from significant height with 6 patients (40%) (5 patients=33.3% after lumbar disc surgery, 2 patients=13.3% after gunshot injury, 1 patient=6.66% after epidural blockade). The average length of stay in the rehabilitation clinic was 45.4±21.6 days. The mean FIM at admission was 80.6±25, the mean FIM at discharge was 106.4±14.4. **Conclusion:** Cauda equina syndrome is a disease affecting the patients' quality of life. Rehabilitation and follow up in the long term is important for these patients. Motor weakness and urinary incontinence were the most prominent complaints in this group.

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B12 VITAMIN DEFICIENCY: A DIAGNOSIS NOT TO BE MISSED

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Introduction: B12 vitamin deficiency is a well known cause of central and peripheral nervous system dysfunction. Its several

clinical manifestations include behavioural and cognitive disturbances, myelopathy, polyneuropathy and optic atrophy with blindness. *Aim:* Understanding and leading the neural repercussions of B12 vitamin deficiency. *Patients and Methods:* A 35-year-old woman, with prolonged alcohol abuse and dietary disregard, presented with a 2-month relentlessly progressive history of apathy, generalized lack of strength with gait difficulties (needing wheelchair) and urinary bladder retention – pressure-flow study: Without detrusor over activity or voluntary contraction of the detrusor. Upon examination she was apathetic, confused and inattentive; a lower limb predominant tetraparesis could be seen, with enhanced myotatic reflexes and bilateral extensor responses; there was also hyposthesia in a glove and stock fashion; oculomotor and cerebellar disturbances were absent. Brain and spinal cord MRI were normal, as it was CSF examination. Electromyography showed lower limb axonal degeneration. Analytic screen revealed a megaloblastic anemia and a low B12 vitamin titer. *Results:* After B12 vitamin supplementation and an adequate rehabilitation program, a progressive normalization of cognitive and motor function could be observed; 6 months later the patient was independent, with only slight difficulty in fine movements and spontaneous bladder discharge. *Conclusions:* B12 deficiency should be suspected in every case of unexplained behavioural disturbances, cognitive decline and combined 1st and 2nd motoneuron dysfunction. Early recognition and adequate treatment, combining vitamin supplementation and physical rehabilitation, can lead to a full recovery of an otherwise progressive and irreversible disease.

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NIEMANN PICK TYPE C IN ADULT PATIENT: A CASE REPORT

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Introduction: Niemann-Pick type C (NPC) is an autosomal recessive disorder of cholesterol intracellular trafficking, leading to a continuous lysosomal accumulation of unsterified cholesterol. The age of presentation is variable, with very heterogeneous but progressive clinical manifestations and course. The late forms have dominant neurological and psychiatric affectations. Nowadays these patients can potentially benefit of substrate deprivation therapy with miglustat. *Case Report:* A 21-year-old Caucasian male had been admitted for investigation for an ataxic gait and dysartic speech. Family history relevant for an older brother with psychiatric disorder. He had an excellent school performance until he was 19 years old, when he begun a slow deterioration with psychomotor lentification, worsening school performance and gait difficulties. At 21 years he presented dysartic speech, saccadic eye movements, limb hypotonia, dismetry and an ataxic, broad based gait. An extended investigation was performed, but was not conclusive. In the follow-up it was noticed an hepatosplenomegaly leading to suspicion of storage disease. The biochemical study of cholesterol intracellular trafficking in fibroblasts confirmed NPC. Molecular study identified a mutation in NPC1 gene. The patient was proposed to start treatment with miglustat. At the baseline the patient was observed in PMR department (included in the multidisciplinary team) and an evaluation protocol was instituted with several neurological and functional parameters. The main goal was to observe periodically the patient and evaluate the global treatment efficacy. He started in the PMR department specific intervention with speech and occupational therapists. After one year of treatment the patient did not present neurological deterioration and even improved in some of the daily activities tasks. The authors present the evaluation protocol used as well as the obtained results focusing the importance of the multidisciplinary team intervention.

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SCIATIC NERVE INJURY AND POST-POLIO SYNDROME: A CASE REPORT

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Introduction: Post-polio syndrome (PPS) is a condition that affects polio survivor's years after recovery from an initial acute attack of the poliomyelitis virus. PPS is mainly characterized by new weakening in muscles that were previously affected by the polio infection and in muscles that seemingly were unaffected. Symptoms include slowly progressive muscle weakness, unaccustomed fatigue, and, sometimes, muscle atrophy. The incidence ranges from 22–68% of previous acute polio patients. *Case report:* A 54-year-old Caucasian male, was admitted in the hospital with a colonic perforation and peritonitis and was submitted to surgical treatment developing afterwards abdominal abscess with septicemia. In the post-operative period it was noticed a flaccid monoparesis of the left lower limb with sensitive alterations grossly described as below the knee; he also presented a muscle atrophy of the left thigh, that was present since childhood. The patient denied poliomyelitis previously, but referred neurological illness of childhood that he could not specify. He was previously independent for daily living activities and practiced sports (football). In the hospital a CT cerebral scan was performed without any conclusive changes; the EMG of the left lower limb showed changes compatible with lesion of the left sciatic nerve and also chronicle muscle atrophy of the left vastus internus and externus compatible with poliomyelitis sequels. The patient started a PMR therapeutic program with intervention in physiotherapy. The authors propose to discuss the therapeutic approach on this particular patient that represented a clinical challenge due to the concomitant occurrence of two clinical syndromes with implications on the functional outcome of the patient.

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MULTIPLE SCLEROSIS – BOTULINUM TOXIN: REHABILITATION UNIT EXPERIENCE

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Introduction: Spasticity cause disability in more than 85% multiple sclerosis (MS) patients and 30% of them must modified their activity levels. Botulinum toxin (BT) is considered an effective instrument in controlling hypertonia and spasms in MS. It could also facilitate hygiene, decrease pain caused by spasmodic contractures and being combined with other treatment measures. *Objective:* To describe the clinic course and treatment results MS patients controlled in the Rehabilitation Unit in Morales Meseguer Hospital during 2000–2005. *Material and Method:* Prospective descriptive study on case history of MS patients submitted to a specific consultancy for the indication and application of BT. *Results:* In the study period 7 MS cases (2 women; 5 men) whose mean age was 41±7 (32–49) were treated. 5 had secondary progressive and 2 recurrent progressive course approximately during 11 years. 86% needed wheelchair and 83% presented tetraplegia. Adductors were infiltrated with Dysport® in 3 patients (50–500U); knee flexors in 4 (100–250U); knee extensors in 1; plantar flexors in 5 (100–250U); cervical rotators in 1 (250U per muscle); lumbar extensors in one (1000U). A woman develops a pseudobotulinic syndrome after receive 100 U. All were infiltrated one time and 43% more than two times in study period. Patients experienced spasms (4), pain (2) and tone (7) reduction, improves hygiene (2) and orthoses adaptation (1). *Conclusions:* TB improves quality life in MS patients who suffer painful spasm and interference with hygiene, wheelchair and orthoses adaptation. Its effectiveness increase if we associate other antispastic measures (drugs, orthoses).

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FACIAL HEMISPASM – BOTULINUM TOXIN*Sevilla Hernández E., Lozano Guadalajara J.V., Martínez González-Moro I., Giménez-Abadía M.A.**Rehabilitation Unit, Hospital Universitario Morales Meseguer, Murcia, Spain*

Introduction: Facial hemispasm (FH) consists of unilateral co-contraction of facial muscles controlled by facial nerve. It starts in orbicularis oculi, can affect other groups and platysma colli and associate stapedial contractions (tinnitus), blepharospasm, inferior facial' musculature retraction and painful spasms. Also produces disability and quality life impairment with physical and cosmetic alterations. Botulinum toxin type A (BTA) considered election treatment for FH has proved its effectiveness in symptoms control: muscular spasms and pain. **Objective:** To describe the clinic course and treatment results of FH controlled in Rehabilitation Unit during 2004–2005. **Material and Method:** Retrospective descriptive study on case history of two patients submitted to a specific consultancy for the indication and application of BTA. **Results:** A 56-year-old woman who suffer from painful spasms and cosmetic alterations because of idiopathic FH which affects orbicularis oculi and oris was infiltrated 60 Units and 40 Units of Dysport® respectively; and a 60-year-old man with spasms of orbicularis oculi and visual interferences secondaries to Herpes zoster infection, 25 Units of Botox®. Both experienced a reduction in Visual Analogue Pain Scale score of 2 and 3 points and reported light/moderate decrement of spasms. The patient global impression of results was positive despite a one week duration syndrome of general weakness in man case. **Conclusions:** BTA is an effective treatment in facial hemispasm. It can improve patients' quality life not only in terms of pain and spasm frequency reduction but also in disability and cosmetic interference. Medical specialities implicated in study and control of neurological disorders should be trained in the use of BTA.

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CHRONIC TENSIONAL HEADACHE – BOTULINUM TOXIN*Sevilla Hernández E., Martínez González-Moro I., Lozano Guadalajara J.V., Giménez-Abadía M.A.**Rehabilitation Unit, Hospital Universitario Morales Meseguer, Murcia, Spain*

Introduction: Botulinum toxin (BT) can be a therapeutic option in chronic tensional headache (CTH). Positive results have been reached in a 80% of patients improving pain, quality life and costs. BT induces a chemodenervation of impulses to Central Nervous System generation sites: multimodal neurons of trigemine nerve and first to third cervical roots. **Objective:** To describe the clinic course and treatment results of a patient with CTH controlled in the Rehabilitation Unit in Morales Meseguer Hospital during 2004–2005. **Material and Method:** Retrospective descriptive study on case history of CTH case submitted to a specific consultancy for the indication and application of TBA. **Results:** A 62-year-old man who suffered from CTH was submitted from Neurology Unit in 2004 to take in consideration the possibility of being infiltrated with BT. His previous treatment consists of pregabalin (150 mg/24 h), paracetamol (3 g/24 h) and tramadol (150 mg/24 h). We used 25 Units of Dysport® distributed in 10 different sites (5 in each side) of frontal muscle. The patient only improves his pain score 2 points in Visual Analogue Scale (VAS) and global impression was poor. None adverse event appeared. **Conclusions:** Poor results could be due to a dosage insufficient to control pain, an inadequate technique or to a misunderstood of VAS functioning. Most accurate doses and specific valuation systems for headache as Migraine Disability Assessment Scale (MIDAS) must be considered in future cases.

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CAN BOTULINUM TOXIN IMPROVE GAIT IN PERSONS WITH INCOMPLETE SPINAL CORD INJURY?*Short C.¹, Bonaparte J.², Deluzio K.³, Alneaimi Y.¹**¹Division of Physical and Medicine and Rehabilitation, Dept. of Medicine, Dalhousie University, Halifax, NS; ²Faculty of Medicine, Dalhousie University, Halifax, NS; ³School of Biomedical Engineering and Dept. of Surgery, Dalhousie University, Halifax, NS, USA*

Introduction: Spinal Cord Injury (SCI) is a rare but devastating disease. Many individuals who suffer incomplete SCIs regain the ability to ambulate. These individuals face many challenges including spasticity, which can interfere significantly with walking capabilities. It can cause many problems and in some individuals may be the only factor preventing ambulation. Spasticity is usually generalized in SCI and treated with oral medications. However individual muscles or groups may cause problems with gait and ambulation and may be amenable to local spasticity therapies such as botulinum toxin. Literature in this area for SCI is lacking. **Objective:** To evaluate use of Botulinum toxin therapy on ambulation capabilities in persons with incomplete SCI. **Design and Methods:** An open label, pilot study of 8 patients with spastic gait and incomplete SCI was conducted to evaluate the effects of botulinum toxin on ambulation ability. Our primary outcome measure was ambulation speed. Secondary measures included active and passive range of motion, manual muscle testing, and Modified Ashworth Scale which were assessed before treatment, four weeks and twenty-four weeks post-treatment. We administered botulinum toxin to one or both lower extremities. Ambulation parameters pre and post-treatment were also assessed using an ambulation profile tool developed at our centre. **Results:** We observed improvement in the total ambulation speed (at 4 and 24 weeks post-treatments) in 6 of the 8 patients that participated in the study. This also correlated well with the Subject Global Impression (SGI) and Clinician Global Impression (CGI) of improvement. **Conclusion:** Botulinum Toxin may be beneficial in improving ambulation capabilities in persons with incomplete SCI. Further research in this area is needed.

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TWO-YEAR FOLLOW-UP IN A CASE OF POST-ANOXIC VEGETATIVE STATE WITH PAROXYSMAL NEUROVEGETATIVE INSTABILITY WITH DYSTONIA*Estraneo A., Saltalamacchia A.M., Loreto V.**Dept. of Neurorehabilitation, Salvatore Maugeri Foundation, IRCCS, Scientific Institute of Telese Terme (BN), Italy*

Episodes of acute neurovegetative instability, sometimes associated to fever and dystonic postures, the so-called “paroxysmal sympathetic storms” (PSS), represent an often under-recognized and poorly understood phenomenon of episodic central dysautonomia. Usually PSS have a negative prognostic value and can complicate management of care and rehabilitative therapy. In the present study, we describe a young woman with post-anoxic vegetative state (GOS=4, LCF=2), with hyperintense bilateral thalamic lesions on MR, who presented frequent and severe PSS five weeks after disease onset. The episodes of PSS were typically characterized by agitation, diaphoresis, hyperthermia, hypertension, tachycardia, tachypnea, and extensor posturing with opisthotonus; PSS lasted about 1 h and occurred almost every day repeatedly, even five times a day. At that time the patient showed autonomic dysregulation as revealed by prevalent sympathetic component on heart-rate variability (HRV) and lack of sympathetic skin response (SSR) to different types of cutaneous stimuli. PSS persisted for several weeks, but propranolol titrated to 40 mg t.i.d. determined

progressive reduction of PSS, and eventually complete remission in about four months. One year after onset, the patient had regained consciousness, but was severely tetraparetic and dysarthric. PSS were not observed anymore; instrumental evaluation of autonomic regulation revealed progressive normalization. Propranolol therapy was reduced and discontinued. Two years post-onset the patient had further recovered responsiveness and motor function, and did not present PSS, even though she did not undergo any specific pharmacological treatment. Starting from this observation, we offer a detailed review on differential diagnostic criteria, therapeutic approaches, and clinical and functional outcome of PSS.

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NON-TRAUMATIC SYRINGOMYELIA AS A CAUSE OF PROGRESSIVE NEUROLOGIC DYSFUNCTION: CASE REPORT

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Introduction: Syringomyelia is a condition characterized by formation of a fluid-filled cavity within the spinal cord. The blockage of CSF (Cerebral Spinal Fluid) flow leads to imbalance of the flow and pressures of the CSF originating cavities (Syrinx). Expansion of the cavity often results in a clinical course of progressive neurologic deficit, including pain, sensory loss and weakness. **Aim:** Demonstrate the benefits of inpatient rehabilitation programme in idiopathic syringomyelia. **Patients and Methods:** The authors describe one 58-year-old, obese, female patient without a history of spinal column or cord injury, infection or other pathologic processes, who presented with progressive paresis and decreased sensation on the left leg 29 years ago. Progressive neurologic impairment led to MRI which demonstrated cervical and thoracic syringomyelia. Ten years ago was submitted to surgical procedure with neurologic decline and deficits involving both inferior limbs, needing a walker to deambulate. Fall resulting in right tibial fracture one year ago, becoming wheelchair-dependent and a bed-resting patient, dependent for ADL (FIM score: 81/126). Admitted three months ago in Serviço de Lesões Vértebro-Medulares of Alcoitão to start a dynamic rehabilitation programme. **Results:** The functional progress achieved was recorded in video. By the date of discharge the patient's FIM Score was 117/126, being able to walk with walker, and ADL-independent. **Conclusion:** A structured rehabilitation programme is essential for the development of the whole functional potential in a spinal cord patient. The prognosis of a certain neurological condition also relies on the ability to recognize what social and environmental issues might compromise quality of life, responsible for a poorer outcome than expected when motor skills are reasonably preserved.

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ASSESSMENT OF FUNCTIONAL IMPROVEMENT AFTER STROKE PATIENTS REHABILITATION

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Introduction: Recovery and functional condition of stroke patients depends on various factors: patient, illness or treatment. One of

the most used scales for analysing functional recovery of stroke patients during and after rehabilitation is FIM (Functional Independence Measure) scale. **Aim:** Assessment of functional recovery in stroke patients. Evaluation of factors that can influence on results and duration of intrahospital phase of rehabilitation. **Patients and Methods:** Twenty patients were monitored after stroke during intrahospital phase of rehabilitation (2–6 weeks after onset of stroke). Rehabilitation treatments were consisted of kinesitherapy procedures, occupational therapies, FES (functional electrical stimulation) and speech correction treatments. Motor FIM scale (on admission date and on discharge date) was used for estimation of functional recovery. Motor FIM scale consists of 13 items, that are marked through seven level of independence (complete independence (7) – total assist (1)). Monitored factors that can have influence on recovery results and duration of rehabilitation period were: age, type of stroke (ischemic / haemorrhagic confirmed on CAT scan), previous or repeated stroke and presence of other diseases (cardiovascular, diabetes mellitus, hyperlipoproteinemia, urinary infections). **Results:** Younger patients without previous stroke had higher motor FIM score on discharge as well as shorter hospitalisation. Arterial hypertension and diabetes mellitus were the most common diseases affected hospitalisation duration and functional recovery of stroke patients. **Conclusion:** Monitoring of functional recovery in stroke patients using motor FIM score is reliable and simple way for estimation of rehabilitation efficiency. Duration of hospitalisation and results of rehabilitation have multifactor connections that should be observed as such.

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EFFECT OF CONSTRAINED INDUCED THERAPY ON BARTHEL INDEX IN PATIENTS FOLLOWING STROKE: 6 MONTHS FOLLOW-UP STUDY

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Objective: The main goal of this study is to investigate the effect of constrained induced therapy on Barthel index in stroke patients as a widely used tool to assess ADLs in stroke survivals and to investigate the long term effect of this therapy on Barthel index. **Materials and Methods:** Twenty subjects 16 men, mean age (58±10.8) and four women, mean age (60±6.3) were participated in the study. Upper limb of contralateral side was constrained in removable cast for 6 h per a day during the day for 4 weeks. Barthel index was assessed on admission and on discharge from rehabilitation program. After 6 months, 18 subjects (14 men and 4 women) were reevaluated by BI measure to assist long term effect of CITM on their ADLs. **Results:** Mean duration of stroke was (81.75 days ±25). Side of weakness was 9 right side and 11 left side where all of the subjects were right hand dominants. Barthel index was (70.7±9.7) and (97.1±3.4) on admission and on discharge, respectively. There was a significant improvement of Barthel index after CIT rehabilitation, p value <0.05=0.0008. In the follow-up study after six months BI was (91.3±2.7), p value <0.05=0.003. **Conclusion and Discussion:** Following stroke it is common to exhibit deficits in mobility of the upper extremity. Barthel index is as an ADL assessment intended for long-term patients in hospital with neuromuscular or musculoskeletal disorders

and it is one of the most widely used generic disability measures. However, the effect of CIT as promising therapy for stroke is not very well clinically investigated. As a conclusion of this study, CIT therapy is effective rehabilitation tool on ADL assessment following stroke and has significance long term effect.

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EVALUATION OF COGNITIVE FUNCTIONS BY NEUROPSYCHOLOGICAL TESTS AND EVENT RELATED ENDOGEN POTENTIALS (P300) IN STROKE: EFFECT OF REHABILITATION INTERVENTIONS ON COGNITION

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Introduction: The value of neuropsychological assessment is increasingly recognized in patients with stroke. The P300 components of auditory event related potentials (ERPs) are objective measures related to information and cognitive processing. **Aims:** The aim of this study was to assess the cognitive function and emotional status, depressive symptoms of the post-stroke patients and to compare patients with age-, sex- and education-matched healthy controls and controls with systemic diseases. We also investigated the effect of rehabilitation interventions on cognitive functions by means of neurocognitive tests and P300 ERPs. **Patients and Methods:** A comprehensive neuropsychological test battery evaluating attention, memory, language-related areas, visual-spatial and executive functions and ERP records were applied to 20 patients with a first unilateral stroke, (age 40–69), and to two control groups comprising 21 healthy volunteers and 21 persons with a risk factor who were compatible with patients in terms of age, sex and educational level. Hospital Anxiety and Depression Scale (HADS) was used to discard major depression and Mini Mental Status Examinations (MMSE) to discard dementia. Stroke group received physiotherapy and traditional rehabilitation therapy for 45 min, five days a week for three weeks. Functional Independent Measurement (FIM) and Brunnstrom instruments were used to assess functional status. All of participants were reassessed for above mentioned parameters at the end of third week. **Results:** Performance in neuropsychological tests evaluating attention, memory, language-related areas, visual-spatial and executive functions and in ERP paradigms (Cz, Fz and Pz latencies) were lower in stroke group, in comparison to both of the control groups ($p < 0.001$) at entry and the end of third week. All of neuropsychological tests, P300 latencies, Brunnstrom grades and FIM scores were significantly improved in stroke group. Percent changes in some of neuropsychological tests, P300 Cz and Pz latencies were significantly different between stroke patients and controls ($p < 0.016$) after three weeks course of follow-up. **Conclusion:** Although screening tests like MMSE are widely used, they only provide a roughly knowledge about cognitive decline particularly in elderly population. The specific nature of impairment and its relation to daily living activities is only obtained by completing a more detailed assessment with provision of individualized results. Rehabilitation interventions had a positive effect on cognition which could be documented using detailed neuropsychiatric tests.

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OEP-BASED EVALUATION OF CHEST WALL KINEMATICS IN POST-STROKE HEMIPARETIC PATIENTS

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Respiratory function depends on numerous neurological structures, the organization of which extends from the cerebral cortex to the medulla. The study of stroke patients has allowed deductions about this organization, and various neurological pathways have been increasingly recognized. It has been observed that hemiparetic stroke in acute phase produces an asymmetric ventilatory involvement of the respiratory system with a decrease in voluntary ventilation on the paretic side. Moreover experiments on healthy subject demonstrated that, if forces applied to the upper rib cage are out of proportion to those applied to the lower rib cage, distortion might ensue during fits of coughing, which influenced cough effectiveness. In post-stroke hemiparetic patients, the respiratory muscle weakness on the paretic side could reduce the ability to generate intermittent large volume and the force and effectiveness of coughing could be decreased, preventing adequate clearing of the airways. These abnormalities could lead to progressive micro-atelectasis in the periphery of the lung with decreasing pulmonary compliance, increasing pulmonary vascular shunt and enhance risk of pneumonia. We investigated respiratory movements in patient with chronic unilateral stroke during quiet breathing, voluntary hyperventilation and coughing. Before participating in the study, all subjects underwent a complete medical assessment that included medical history, physical and neurological examination. Optoelectronic plethysmography has been used for monitoring the three-dimensional motion of markers positioned on chest wall, allowing to compute the overall changes in volume of chest wall as well as those of the abdominal and rib cage compartments. The system can be used in unconstrained subjects breathing without a mouthpiece. Once the markers have been applied, on-line processing allows to quickly analyse the large amount of data and with relatively modest data storage requirements. The aims of the study were as follows: (1) to provide a quantitative description of breathing pattern and chest wall kinematics during quiet breathing, voluntary hyperventilation and coughing, (2) to use the assessment of cough effectiveness as prognostic index of pneumonia.

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THE EFFECT OF EARLY BALANCE AND COORDINATION TRAINING ON BRAIN PLASTICITY OF STROKE RAT MODEL

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Introduction: Although rehabilitation programs in stroke patients usually include motor tasks, the optimal time window, method, intensity of therapeutic intervention are unclear. Previously it was reported balance and coordination training in stroke rat model improved functional outcome and facilitated a synaptogenesis of the brain. **Aim:** To evaluate the effect of early balance and coordination training on Rota-rod on functional recovery and brain plasticity in ischemic stroke rat model, as compared with simple locomotor exercise on treadmill. **Materials and Methods:** Sixty male Sprague-Dawley rats (250–320g) with ischemic stroke in left hemisphere were used. They were trained under each of four conditions: 1) controls, 2) simple exercise on treadmill, 3) motor balance training on Rota-rod, 4) the simultaneous Rota-rod and treadmill training. All types of exercise were performed from post-operation 1 day to 14 day for 30 min per day. Motor function was evaluated by Menzies' scale, prehensile test, and limb placement test at post-operation 1 day, 7 day, and 14 day. Synaptic plasticity in brain was evaluated by brain-derived neurotrophic factor (BDNF) and synaptophysin western blot after training procedures. **Results:** Total 45 rats completed the intervention protocol. There were no significant differences of motor functions between the training conditions during and after the protocol. The expression of synaptophysin was almost same in both hemispheres between the groups (84 to 97%; % control). The expression of BDNF was increased in the Rota-rod training group, especially in the left hemisphere (132.9±60.9% in the right hemisphere, 242.2±173.9% in the left hemisphere). The statistical

significance was not proven because of small sample size. *Conclusion:* Early balance and coordination training might increase the expression of BDNF especially in the ischemic hemisphere, but it could not improve motor function rather than simple locomotor exercise or controls. The exercise protocol of this study was begun very early (24 h after operation), as compared with previous studies. These results suggest that balance and coordination training may have some effect on brain plasticity, but the optimal timing of training must be considered for better functional outcome.

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THE EFFECT OF EXERCISE AND NUTRITION ON PRIMARY DYSMENORRHEA OF GIRL STUDENTS' UNIVERSITY OF ARAK

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Objective: The main objective of this research was to determine the effects of exercise & nutrition on primary dysmenorrhea in the university girl students. *Study Design:* This study was a randomized clinical trial of 240 students of different course (without physical education course), suffering from severe dysmenorrhea. After getting permission from those appropriate for this study, complete explanation was taken from them and they were studied in three exercise, nutrition and 'non exercise and nutrition' groups. Then all of them were studied in accordance to the prospectus, the signs of the dysmenorrhea (intensity of the pain, duration of the pain and the number of used medicine) for two periods. Then the 'exercise' group were given some exercises and the results of the two periods after the exercise were registered. All in all, the study took four periods in each group. The descriptive statistics, repeated measure design and the least significant different way were used for analyzing the statistical information. *Results:* The intensity of the pain in the exercise group declined from 8.59 to 4.63 in the third period and 2.84 in the fourth period, hence, the difference is $p < 0.01$ in two groups. The average of the duration pain declined from 7.15 h to 4.22 h in the third period and 2.23 in the fourth period, and the difference of $p < 0.01$ is seen in the groups. The average of using sedative tablets also decreased from 1.13 tablets to 0.35 tablets in the third period and 0.0 tablets in the fourth period, which the difference is $p < 0.01$ between the two groups. *Conclusion:* The exercise will decrease duration and severity of dysmenorrhea and also using of sedative tablets in high school girls.

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THE ASSESSMENT OF THE COMPLEX REHABILITATION TREATMENT IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Objective: To demonstrate the influence of complex rehabilitation treatment on clinical and functional status and the quality of life in patients with rheumatoid arthritis (RA). *Material and Method:* The descriptive study included 20 patients with RA (85% women), mean age 50.1 years, mean disease duration of 6.15 years. 12 patients (60%) were included in the 2nd functional Steinbrocker class and 8 patients (40%) in the 3rd functional Steinbrocker class. Pain was evaluated on a visual analogue scale (VAS), functional status using specific index (WOMAC, LEE) and the quality of life using HAQ questionnaire.

Results and Discussions: The global functional status has improved (the mean initial HAQ value was 14.6 and the final mean HAQ value was 17.1). The rehabilitation program also produced pain decrease from an initial mean value of 6.5 to a final mean value of 3.8 on a VAS. The improvement of the functional status was proved by the decrease of the mean values of the WOMAC scale. The statistic analysis of the obtained data emphasized important correlations between the disease stage and the patients age (Pearson index=0.595) and the functional Steinbrocker class (Pearson index=0.554). LEE functional index was correlated with the disease duration both for the initial and the final value (Pearson index=0.469 respectively 0.431), also the mean values initial and final of the LEE index were correlated with the presence of the rheumatoid factor (Pearson index=0.438, respectively 0.432). *Conclusion:* The rehabilitation in rheumatoid arthritis is a complex medical act, with a precocious initiation by a multidisciplinary medical team. Without a proper rehabilitation program will appear definitive disabilities with a negative influence on the upper limb rehabilitation and on the apprehension.

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INVESTIGATION OF RELATIONSHIP BETWEEN DEPRESSION AND SOCIAL SUPPORTS IN ELDERLY PEOPLE OF K.B PROVINCE IN IRAN

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Introduction: Depression is more common in older persons that it is in the population. Various studies have reported prevalence rates ranging from 25% to almost 50%. The role of social support in depression has been considered since long ago. It is reported that elderly could result in a lot of problems: physical or mental, which depression is one of these. Therefore any activity to determinate of depression, causal factors also any preventive strategy could help this group of people to have a safe elderly and enjoy from life. The present study was established to investigate the prevalence of depression and its relationship with social supports. *Materials and Methods:* Using cluster sampling 353 people with age more than 65 years was selected from rural (200) and urban (153) areas of Bovairahmad area In Iran. For collection of data two questionnaire (Philips social support and geriatric depression scale) were used. Data were analyzed by SSPS package. *Results:* Data showed that 27/5 percent of this population was suffering from sever depression. The average score in GDS was 47/7. The average scores in women, in people who were not satisfied with income, people who participated in religious ceremony and activities, and none educated peoples were significantly high. There were significant relationship between depression and income rate (negative correlation) and there was no significant relationship between depression and social support. *Conclusion:* This research showed that the prevalence of depression in older people is high. Participation in religious activities and the high rate of income could reduce the depression in this group of people. In addition, the women in this age should be considered more than men.

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PATIENT-DOCTOR INTERACTION AND PARTNERSHIP

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Background: The importance of including patient preferences in decisions regarding their care has received increased attention in

recent years, and a positive interaction and good communication are essential in the doctor-patient relationship, particularly if the patient is to self-manage his/her health problem effectively. Poor communication and lack of information is often associated with poorer outcomes and patient dissatisfaction (2). The 'Expert Patients Programme' was established in 2002 with the aim of fostering good doctor-patient communication. *Aims:* The programme is based on a concept that better doctor – patient interaction and partnership can be achieved by addressing the following aspects: communication, teamwork, self-efficacy, action planning, problem solving and patients taking action. *Methods:* Based on these principles the EPP (UK) is a six week lay-led self-management programme. Add-on modules have been developed for specific health conditions such as persistent pain, musculoskeletal, or respiratory problems. EPP trained volunteer tutors deliver 26 different self-managing activities during this period. Participants receive a EPP Handbook which also available on CD, Cassette, large print brail and 6 other languages. EPP liaises with central and local government health care agencies. EPP has also developed partnerships with universities and other learning institutions and the voluntary sector. *Results:* A Dept of Health (2005) internal study reported 7% reductions in GP consultations 10% reductions in outpatient visits, 16% reductions in A&E attendances 9% reductions in Physiotherapy use among persons attending the EPP courses. Over 94% who have attended EPP said they felt satisfied and supported by the course. *Conclusion:* Using these simple and effective 'patient-doctor interaction and partnership' methods, better outcomes can be achieved for both the patient and the doctor.

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INFLUENCE OF PHYSICAL ACTIVITY ON SKELETAL MUSCLE OXIDATIVE INDICES MEASURED BY 31P MRS

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Physical conditioning is recommended as part of rehabilitation programs for many patients with chronic diseases as well as in healthy subjects with sedentary life-style. It has been shown to relieve symptoms and improve effort tolerance and health-related quality of life. However, the physiologic mechanisms underlying the beneficial consequences of training programs are poorly understood. Groups of researchers hypothesized that improvement after training is directly and mainly related to enhancement of skeletal muscle bioenergetics during sub maximal exercise. The phosphorus-31 magnetic resonance spectroscopy (31P-RMN) has been used to monitor muscles' metabolic adaptations to aerobic training; however few works have succeeded to determine the impact of a muscle activity level on 31P-RMN indices. The aim of this study is to evaluate the effect of physical activity on skeletal muscle oxidative metabolism as evaluated by phosphorus-31 magnetic resonance spectroscopy (31P-RMN). *Material and Method:* 24 healthy subjects (12 controls and 12 physically actives) granted consent to participate in the study. All the subjects physically actives were specifically trained in activities and sports that involved use of the calf musculature. The exercise consisted of plantar flexion at a frequency of 1/s, with foot against one pedal lifting a weight using variable resistance until volitional fatigue. Measures were taken using an experimental spectrometer Brüker Biospec BNT-100, 2.4 Teslas. Phosphorus spectra (Pi, PCr, Pi/PCr, pHi, rPCr) was obtained from 5 cm surface coil placed over the muscle gastrocnemius. Each subject performed first, an incremental exercise lifting a weight which gradually increased 1 kg each minute, every 60 s; and second, one constant-load (square-wave)

protocol, at 70% of individual muscle maximum power achieved in previous exercise. Spectra was recorded at rest, exercise, and during recovery from in-magnet exercise. *Results and Discussion:* Results obtained show significant differences between physical active and sedentary subjects regarding cellular bioenergetics (PCr, Pi/PCr, pHi, half-time of PCr recovery), with less metabolic disturbance during exercise and faster PCr recovery. Ours results point out that active subjects have better comprehensive muscle oxidative metabolism than deconditioned subjects and reinforces the idea that 31P-RMN can be used to monitor training effects on the peripheral skeletal muscle of patients and normal subjects.

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INFLUENCE OF INSPIRED OXYGEN FRACTIONS ON SKELETAL MUSCLE OXIDATIVE METABOLISM IN SEDENTARY AND PHYSICAL ACTIVE HUMANS – A 31P MRS STUDY

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During exercise, O₂ disposal has been documented either as way of adjusting muscle bioenergetics or as determinant of maximal oxidative capacity. The effect of different rate of inspired oxygen on muscle fatigue and performance is not only clearly visible at maximal work rates but also at sub maximal workloads. Therefore, there is an increasingly support of the idea that supply and demand limitations in maximal metabolic rate are dependent on the population studied (sedentary vs. exercised trained). *Aim:* The aim of this paper is to study the response of muscle metabolism using 31P-RMN in two working groups: physically actives and control group, during inspiration at low oxygen rate. *Material and Method:* 8 healthy subjects participated in the study (4 controls and 4 physically actives trained in activities that involved use of the calf musculature). The exercise consisted of plantar flexion at a frequency of 1/s, with foot against one pedal lifting a weight using variable resistance until volitional fatigue. Phosphorus spectra was obtained from 5 cm surface coil placed over the muscle gastrocnemius with Brüker Biospec BNT-100, 2.4 Teslas. Each subject performed first, an incremental exercise lifting a weight which gradually increased 1 kg each minute, every 60 s; and second, one constant-load at 70% of individual muscle maximum power achieved in previous exercise. Spectra was recorded at rest, exercise, and during recovery from in-magnet exercise. Same protocol was then repeated in hypoxic conditions (FIO₂=0.10). *Results and Discussion:* PCr and pHi had a significant reduction at sub maximal workloads during incremental exercise in hypoxia, showing longer metabolic disruption in physically actives subjects. Half-time of PCr recovery showed faster kinetics in subjects physically actives but pointed out significant slowly kinetics when different inspired oxygen ratio was used. The results suggest that the maximal muscle oxidative rate in sedentary subjects may be limited by mitochondrial capacity, unlike their physically actives counterparts, perhaps more limited by oxygen availability.

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DISTAL MYOPATHY IN A PATIENT WITH WALKING DIFFICULTIES

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Introduction: Although most muscle disorders produce proximal weakness, some myopathies are characterized by predominant distal weakness. The distal myopathies are uncommon and most of these are inherited forms. Mutation in the dysferlin gene on chromosome 2p13 can cause either limb girdle muscular dystrophy

type 2B and Miyoshi distal myopathy. Recently distal anterior compartment myopathy has been described. *Objective:* A 34-year-old man presented to outpatients complaining of being unable to run. He had started to stumble whilst walking some months previously and he had noticed weakness in both legs, especially on the right. Clinical examination revealed atrophy of the right quadriceps muscle and of the distal muscles of the posterior and anterior compartment of both legs more pronounced on the right. He could not walk on his toes or on his heels. There was no weakness in the arms or sensory disturbance. Blood sample showed marked elevated serum creatine kinase level up to 7309U/L (57-374U/L). Electromyographic findings showed positive sharp waves, fibrillation potentials and complex repetitive discharges and small, brief myogenic motor unit potentials in different muscles of both legs. These myogenic abnormalities were illustrated by muscle imaging. Biopsy findings confirmed the diagnosis of muscle dystrophy and histochemical analysis showed the absence of dysferlin. *Conclusion:* Distal muscle weakness in a patient can also be caused by an inherited muscular dystrophy. Based on the clinical, laboratory, electromyographic and histological findings the diagnosis of a dysferlinopathy was made in our patient. Blood sample was taken for DNA-analysis to confirm this tentative diagnosis.

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BENIGN JOINT HYPERMOBILITY SYNDROME IN PATIENTS WITH ATTENTION DEFICIT HYPERACTIVITY DISORDERS

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Background: Attention deficit hyperactivity disorders (ADHD) is the most common psychiatric disorder in children. Many musculoskeletal findings have been reported in children with ADHD such as postural anomalies, chronic fatigue syndrome, widespread musculoskeletal pain, fibromyalgia. Also ADHD signs have been reported in disorders with joint laxity. The aim of this study was to determine the relationship between benign joint hypermobility syndrome (BJHS) and attention deficit hyperactivity disorders (ADHD). *Materials and Methods:* A total of 54 patients with ADHD and 36 healthy control with a mean age of 9.70 ± 2.17 and 9.75 ± 2.34 years respectively, were included in the study. The sociodemographic and clinic characteristics of the individuals included joint pain, pain severity were recorded. Pain severity was assessed with visual analog scale (VAS) and likert scale. The joint hypermobility was evaluated by using Beighton score and Brighton criteria for diagnosing of BJHS. *Results:* Benign joint hypermobility syndrome was found in a ratio of % 31.5 patients with ADHD and % 13.9 of control group. There were no statistically significant differences in VAS and likert scales between groups ($p > 0.05$). A statistically significant increase was observed in Beighton total score, in ADHD patients compared to control group ($p = 0.012$). No relationship was found between joint pain and ADHD. *Conclusion:* Our study results support that joint hypermobility seems to be associated in patients with ADHD and this should be taken into consideration in assessing patients' musculoskeletal complaints.

P487

ORGANIZATION AND INTRODUCTION OF SYSTEM OF HEALTH-RESORT TREATMENT OF PREGNANT WOMEN IN UKRAINE

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Crisis demographical situation in Europe, low level of data of health of children and women of reproductive age, from the qual-

ity of life of whom depends state and development of fetus and newborn, make important the necessity of search of effective ways of decreasing of mother's and perinatal pathology and mortality, development and introduction of new organization forms of obstetrics and gynecology service activity and new techniques of prophylactics and treatment in pregnant women. In Ukraine for the first time was cultivated the concept of health-resort treatment of pregnant, worked out the model of health-resort department, pathogenic grounded and developed differentiated system of health-resort treatment of pregnant with extragenital and obstetrics pathology. It was proven that health-resort treatment is obliged stage in rehabilitation of pregnant women. Including of health-resort methods in system of prophylactics in health pregnant also is very useful as the influence on many systems of organism of mother and for the formation of adequate conditions for development and birth of healthy child. The preference of health-resort treatment upon the traditional medication is non-invasive usage of natural and physical agents, that provoke in ill pregnant nonspecific positive moves in flow of compensation adaptation pathophysiological reactions. The absence of teratogenic, embryo- and fetotoxic influence while using of health-resort treatment is of a great importance. The practical outcome of the work is in organization of the unique departments for the treatment of pregnant women almost in all administrative regions of Ukraine, that work under principles worked out by the authors, in grounding and development on the scientific base programs and standards of resort treatment. The separate field of work was development of programs of resort treatment of pregnant of elder age, of those who live in radioactive dirty regions; pregnant with the scar on the uterus, artificially pregnant. For the first time on the base of influence on pregnancy flow and state of fetus were worked out indications, doses, intensity and zone of influence of different physical factors, physical loading and movement regimens, programs of psychocorrection. Data of pregnancy and birth flow, state of fetus and newborn after health-resort treatment shown improvement of quality of life of pregnant, increase of physical state and adaptive-compensatory state of mother and fetus.

P488

MOTIVATED OPTIONS OF THE OSTEOPOROSIS PATHOPHYSIOLOGY FIELD FOR THE PROFILACTIS EXERCISES IN OSTEOPOROSIS FRACTURES

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In the past 20 years, numerous articles have tried to define: what type of exercises are genuinely effective, what program is more suitable, what is the manner to apply it and for what period of time. The first to demonstrate the complexity of the osteogenic response at the action of mechanical stimulus was Frost in 1964. He introduced the hypothesis of mecanostat used in the turnover of the bone according to which if the stimulus exceeds the bone resistance, the balance will orient toward osteo-formation and remodeling, thus increasing the strength and the force of the bone as it becomes larger. If the stimulus maintain under the lower threshold of stimulation, the balance of the bone formation will be oriented toward the decrease of the resistance mechanism. Duncan showed that the exercises with high impact that can produce significant deformations in the matrix trabecular with better transport of the fluids through the canalicular network and especially the stretching applied at a high frequency, stimulates effectively the osteogenesis. Rubin and Lanyon showed that the mechanical receptivity of the bone decreases if the stimulus lasts longer. According to these results, Turner demonstrates that the bone suffers a phenomenon of desensitization after a prolonged stretching stimulus, and suggest the osteogenic index as an osteoformation response to the exercises that could increase significantly the bone density. *Conclusions:* The stimulus produced by a

stretching must have the following characteristics: – to be higher than a minimal effective threshold and to correlate with BMD; – to be applied dynamic and intermittently; – to produce a different stimulus than the standard one; – to be applied with high speed a few repetitions because of the risk of ‘desensitization’; – the osteogenic response to the stimulus can be increased by a program of exercises that has a short intermission between the stretching sessions; – to be applied during a period of time long enough to produce a positive effect on the balance of bone density, so that the results to be relevant.

P489

INFLUENCES OF SYSTEM STRUCTURES AND RESEARCH DEMANDS ON THE STUDY DESIGN OF A RCT IN RETURN TO WORK

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A RCT testing the effect of an interdisciplinary return to work program, consisting of a work hardening and a workplace intervention, on presence at work, was designed to meet the given local conditions and to fulfil the scientific criteria of a RCT. Timely and successful recruitment are key factors. Health care and insurance system in Switzerland make recruitment of sub-acute BP patients only achievable by companies. Accurate case definition and incidence of cases for this type of recruitment are not well researched. In a pilot study, 104 absence patterns due to BP from a retail company with 7,400 employees have been analyzed. Concurrent occurrence of neck/shoulder and low BP was dominant. No clear cut-off point for prolonged absences was noted. This led to a case definition including the two locations of BP and a minimum of 20 days of cumulative absence and no planned return to work within the next 10 days. 0.45% of employees would have fulfilled the case definition and indicated willingness for participation. 0.5% of the employees of a second company would have met our criteria. Recruitment was successfully tested in those two companies (14 patients in one month). To achieve our inclusion goal (240 subjects), collaboration with companies at least representing 27,000 workers has to be set up. Recruitment by companies is feasible. Labor market and company structure are changing and will influence motivation to participate in our RCT thus demanding an accurate randomization procedure and a continual adaptation from the research team. Randomized controlled trials (RCT) are designed on paper but executed in the real world.

P490

PROBLEMS IN REHABILITATION PROGRAM IN OVERWEIGHT PATIENT – A CASE REPORT

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Female with nosological overweight (>210 kg) aged 53 with fracture in ischial tuberosity was admitted one year ago in an Orthopedic Clinic for management. The obesity of the patient made surgery an impossible option. The result was an angulus porosis of the fracture. She was admitted in our clinic 8 months later for a rehabilitative attempt. Because of the fear of a fracture to the other femur, we made an effort to gain the up right position with the help of a special sized lift. We failed due to the presence of derma ulcers where the bands were in contact with her skin. Also the lift in our pool it was not adapted for her weight (max load

170 kg). The only help we can provide her is a special construction in her house room, and the assistant of a special lift to her bed. Our target is to gain the up right position in order to prevent long term complication of bed rest and diminish the osteoporosis so in the future is being able to walk. We postered the problems because of understanding that the no surgery solution in this case or the delayed rehabilitation is a negative factor for the treatment of this patient.

P491

PRACTICAL USING OF ICF OF PATIENTS AFTER TBI (MHADIE)

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The Department of Rehabilitation Medicine First Medical Faculty Charles University (DRM) is one of participants of project MHADIE (Measuring Health and Disability in Europe: supporting policy and development, of Sixth Framework). The goal was to implement the ICF (International Classification of Functioning, Disability and Health) model and ICF - based instruments for every day use. The study prepares Core set for patients with different diagnoses with help of multidisciplinary rehabilitation team. The data are collected in three different time points of assessment. ICF is a biopsychosocial multipurpose model and health related classification which can be used by sectors such as health care system, rehabilitation, insurance, social policy, labor, education, economics, statistics etc. The members of our multidisciplinary team used ICF on the patients after Traumatic Brain Injury (TBI). We prepared for them special Core set for patients after TBI. The task of our multidisciplinary team was to examine 100 patients after TBI. Case Report Form (CRF-HP) contains: Demographic information, condition specific information, risk factors, stress, 9 questions regarding the health system responsiveness and 2 questions regarding satisfaction with Health care. Case Report Form for the patient (CRF-PT) contains: SCQ (The Self - administered Co morbidity Questionnaire), SF-36 and WHODAS II. The quantification of the extent of problem is mandatory in ICF categories. Study goals were: 1) to train interviewers (professionals) using the ICF tools; 2) to demonstrate the applicability of ICF - linked measurement instruments, such as the ICF checklist, Core set and the SF 36, WHODAS II in a variety of clinical settings; 3) to evaluate the quality of care and satisfaction with care of patients of clinical settings when using functioning as an outcome in different clinical health conditions. Data were collected by the health professionals and given into computerized CRFs after interview with the patients and the data were automatically saved. We finished the data study by the end of 2007 and then the partners in Munich, Germany and in Madrid, Spain will provide statistic analysis and evaluation.

P492

CARDIAC REHABILITATION PROGRAMME

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Introduction: The benefits of cardiac rehabilitation programmes, are clinics and economics. Reduction of death, reduction the hospital admissions has been demonstrated. Despite the evidence, in Spain cardiac rehabilitation programmes benefits a 2–3% of patients. **Aim:** Prove that it is possible carry out a cardiac rehabilitation programme in regional hospital. Achieve as soon as possible the patient integration to his daily life. **Patients and Methods:** Were studied 33 patients: 15 females, 18 males. Average age 67.3 years. Until December, 2007 have been completed the program 19 patients. Other 12 are in different moments of the program. One patient dead and other was

retired. There were in three groups: ischemic cardiopathy (16 patients), Cardiac Failure (12 patients), Cardiovascular Surgery (5 patients). The patients were admitted in a regional hospital, Campdevanol, from December 2006 to December 2007. Multidisciplinary team includes a cardiologist, rehabilitation doctor, physiotherapist, psychologist and a dietician. The initial evaluation of functional class was cardiac stress test or 6' walking test. Psychological assessment with Hamilton anxiety scale, Zung or Yesavage scale for depression. The programme was desevoluped between 3 and 6 months, 36 sessions average. Intensity of training is individualized, contains initial stretching, training, and recovery phase. The psychotherapy sessions in group and/or individualized. *Results:* 8 patients in CF.III, 4 they have passed to CF.II and 4 a CF.I.; 8 patients in CF.II, all there have passed to CF.I.; 2 patient in CF.I, continue a CF.I.; 1 patient in CF.IV passed a CF.III. The psychological results in over age 65 a 56.26% showed anxious or depressive symptoms that reduced at 13%. Depressive symptoms predominates over anxious symptomatology, is more significant than the relating one to depression. In 65-year-old or minor patients, 73.3% was anxious or depressive symptoms in the beginning and only in a 13% the symptomatology persists at end. *Conclusion:* It is possible to carry out a cardiac rehabilitation programme in a regional hospital. It needs a multidisciplinary team. The adherence to the program is 90%. Improvement has been observed in functional ability and psychological level.

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ELECTRODIAGNOSTIC CHANGES IN UPPER LIMB OF STROKE PATIENTS AFTER INJECTING BOTULINUM TOXIN A

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Introduction: Spasticity is a motor disorder characterized by a velocity-dependent increase in tonic stretch reflexes (muscle tone) with exaggerated tendon jerks. Several electrodiagnostic studies are in use for investigation of motor neuron excitability, pre or post synaptic inhibition and reciprocal inhibition. *Aim:* This study was conducted to evaluate the reciprocal inhibition in spastic wrist of post stroke patients after injection of botulinum toxin A (BTX-A). *Patients and Methods:* Five patients with old post-stroke spastic hemiplegia took part in the study. Spasticity was measured with Modified Ashworth Scale (MAS) score. 150 U of BTX-A were injected to flexor carpi radialis. Electrodiagnostic studies that performed were peak to peak Hmax/Mmax ratio counting hyperexcitability of a-motor neurons, H-reflex with wrist tonic dorsiflexor contraction (Hdf/Hctrl ratio) counting natural reciprocal inhibition, Hmax/Mmax ratio changes during stretching in 0° and 30° before and one week after treatment. Hmax was recorded at 25% of the intensity of Mmax. *Results:* Mean MAS spasticity was 3.2 before and 2.3 after treatment. Peak Hmax/Mmax mean ratio was 57.5±0.4 before and 48.4±0.8, H-reflex with wrist dorsiflexor contraction (Hdf/Hctrl ratio) was 48±2.3 before and 45.2±0.3. Hmax/Mmax ratio changes during stretching in 0° was 42.12, and in 30° was 37.04 before and 40.11 nad 35.12, respectively. *Conclusion:* It seems that despite the limited subjects, treatment with botulinum toxin-A reduces peak to peak Hmax/Mmax, leaving unaffected natural reciprocal inhibition.

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