

1st Baltic and North Sea Conference on Physical and Rehabilitation Medicine “Reclaim Function!”



*Stockholm, Sweden
April 14–16, 2010*

In cooperation with ESPRM and UEMS Section PRM

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**1ST BALTIC AND NORTH SEA CONFERENCE ON PHYSICAL AND REHABILITATION MEDICINE
“RECLAIM FUNCTION!” APRIL 14–16, 2010**

In cooperation with ESPRM and UEMS Section PRM

Track 1: Vocational Rehabilitation (OP01–08)

Wednesday 14 April: 14:00–17:30

Vocational Rehabilitation: European Aspects: *M. Anne Chamberlain*

Vocational Rehabilitation: A Multi-Faceted Problem – Risk Factors of No Work Resumption After Disease or Injury – Multidisciplinary Aspects: *Jan Ekholm*

Linking Medical Rehabilitation to the Workplace – ICF-based Model and Application: *Christoph Gutenbrunner*

Vocational Rehabilitation and Co-morbidities: *Kristina Schöldt Ekholm*

Rehabilitation to Work in an EU-Legislative Perspective: *Lotta Vahlne Westerhäll*

Vocational Rehabilitation: Current State in the UK: *Andrew Frank*

Vocational Rehabilitation in Baltic States: *Alvydas Juocevičius, Aivars Vētra, Varje-Riin Tuulik Leisi*

Concept for Vocational Rehabilitation after Trauma: *Jean-Jacques Glaesener*

Track 2: Neuroplasticity: Principles and New Interventions (OP09–14)

Friday 16 April: 09:00–12:30

Neuroplasticity in an Old Concept with a New Meaning: *Jörgen Borg*

Basic Plasticity Mechanisms in the Central Nervous System: *Michael Nilsson*

Brain Plasticity – Functional Brain Imaging Methods: *Per Julin* (ABSTRACT IS MISSING)

Neural Correlates to Cognitive Training Effects: *Torkel Klingberg* (ABSTRACT IS MISSING)

Plasticity of the Motor Unit: *Kristian Borg*

Use of Information and Communication Technology (ICT) in Stroke: *Katharina Stibrant Sunnerhagen*

Special Issue Session: Pain Chronification (OP15–18)

Thursday 15 April: 09:00–10:30

Mechanisms of Chronic Pain: *Carl Molander*

Assessment of Chronic Pain: *Bengt H. Sjölund*

Rehabilitation Strategies Based on Neuroplasticity: *Eva Kosek*

Interaction of the Temporomandibular System in Chronic Pain Syndromes: *Michael J. Fischer*

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Special Issue Session: Patient Education programmes (OP19–26)

Thursday 15 April: 11:00–12:30

ESPRM – Aims and Perspective: *Elena Ilieva* (ABSTRACT IS MISSING)

Principles of Patient Education: *Jean-Pierre Didier*

Principles of the Evaluation of Patient Education Programs in Rehabilitation: *Monika Schwarze*

Patient Education Programs in Rheumatic Disorders: *Julia Pönicke, Inge Ehlebracht-König*

Patient Education Programs in Neurological and Neuromuscular Disorders: *Jan Lexell*

Education of Parents in Rehabilitation: *Aivars Vētra* (ABSTRACT IS MISSING)

Education of Women Suffering from Multiple Sclerosis Referring to Pregnancy, Child-birth and Puerperium: *Jozef Opara*

Management of Osteoarthritis and the Significance of Patient Education: *Elena Ilieva*

Special Issue Session: Rehabilitation Medicine Across Borders (OP27–34)

Thursday 15 April: 14:00–15:30

Rehabilitation Medicine Across Borders: *Christoph Gutenbrunner*

Rehabilitation in Scandinavia: *Jari P. Arokoski*

Rehabilitation Medicine in the Baltic states: *Aivars Vētra* (ABSTRACT IS MISSING)

Rehabilitation Medicine in the United Kingdom: *Anthony B. Ward*

Rehabilitation Medicine Across Borders in Ireland: *Angela McNamara*

Rehabilitation Medicine in Poland: *Piotr Tederko* (ABSTRACT IS MISSING)

Rehabilitation Medicine in Belgium: *Carlotte Kiekens*

Rehabilitation Medicine in The Netherlands: *Henk Stam*

Symposium 1: Post-polio – Northern European Perspective (OP35–37)

Thursday 15 April: 11:00–12:30

Post-polio in Sweden – Swedes and the Rest of the World: *Katharina Stibrant Sunnerhagen*

Post-polio in the Baltic Countries: *Tiina Rekan*

Polio in a European Perspective – The European Polio Union:
Frans Nollet

Symposium 2: Research Strategies in Rehabilitation Medicine (OP38–40)

Thursday 15 April: 14:00–15:30

Identification and Prioritization of Research Topics in Rehabilitation Medicine: *Henk Stam*

Strategies in Research Design in Rehabilitation – With Special Reference to ICF and Choice of Instrument: *Gunnar Grimby*

How to Successfully Apply for a European Grant: Agenda Setting, Writing the Work Programme, Preparing a Proposal and Being Evaluated: *Alfredo Cesario*

Symposium 3: New Technology in Rehabilitation (OP41–45)

Thursday 15 April: 16:00–17:30

New Technology in Rehabilitation: *Aniko Bartfai*

Reducing Everyday Memory Problems by an Electronic Memory Aid with Individually Spoken Reminders: *Inga-Lill Boman, Monika Löfgren*

A New Method for Advanced Analyses of Muscle Tone: *Johan Gäverth* (ABSTRACT IS MISSING)

An ITC Based Neurorehabilitation System Employing Telemedicine, Haptics 3D-visualisation and Serious Games: *Jurgen Broeren* (ABSTRACT IS MISSING)

In Search of an Ecologically Valid Measure of the Dysexecutive Syndrome: Can Virtual Reality Help in Rehabilitation? *Ashok Jansari*

Free Communications: Neuroplasticity: TBI, Stroke and SCI Rehabilitation (OP46–52)

Wednesday 14 April: 16:00–17:30

Recovery of Cognitive and Psychosocial Functions for Stroke Patients in Early Stage of Rehabilitation: *Aleksandras Krisciunas, D. Petrusevičiene, R. Savickas*

The Factors Affecting Rehabilitation Effectiveness of Patients with Traumatic Brain Injury: *Lina Varzaityte*

Central Nervous System Plasticity and Functional Effects in Stroke Patients Receiving Comprehensive Focal Spasticity Management – an FMRI Study: *Ulla Bergfeldt, Tomas Jonsson, Lennart Bergfeldt, Per Julin*

Validation of a Biomechanical Model for Quantification of Spasticity in Chronic Stroke Patients: *Johan Gäverth, Pável Lindberg, M. Islam, A. Fagergren, Jörgen Borg, Hans Forsberg*

Quantitative and Qualitative Validation of a Group Treatment Program for Mild Acquired Brain Injury: *Aniko Bartfai, Peter Sojka, C. Nilsson, A. Rudolfsson, Monika Löfgren, R. Forsgren, B. Holmlund*

Early Intervention to Prevent Persisting Disability after Mild Traumatic Brain Injury: *Giedre Matuseviciene, Jörgen Borg, Britt-Marie Stålnacke, Trandur Ulfarsson, Catharina Deboussard*

The Realistic Goals in a Robotic-assisted Treadmill Training for Spinal Cord Injury Patients Subgroup: *Varje-Riin Tuulik Leisi, Pille-Riika Lepik*

Free Communications: Vocational rehabilitation – Participation in Work and Employment (OP53–58)

Thursday 15 April: 09:00–10:30

Development of the Motivation for Change Questionnaire (MCQ): *Gunvor Gard, Birgitta Grahm*

The Prognostic Value of Various Short-term Rehabilitation Success Markers and of the Patients' Self-Assessment of Their Health Status for Early Retirement: Results of a Prospective Cohort Study: *Maria Weyermann, Ralf Neuner*

Describing Functioning and Disability by Means of a Comprehensive ICF Core-set-based Profile: *Marie-Louise Schult, Philipe Njoo, Jan Ekholm*

To Tailor Health Promoting Interventions to User Needs: Effects of Work Ability and Health Promoting Interventions for Women with Musculoskeletal Symptoms: *Agneta Larsson, Lena Karlqvist, Gunvor Gard*

Whiplash-associated Disorders in Lithuanian Patients Following Motor Vehicle Collision: *Evelina Preisegolaviciute, Gintaute Samusyte, Jolita Janauskaite, Kestutis Petrikonis, Indre Bileviciute-Ljungar*

How Can We Help Employees with Multiple Sclerosis to Keep On Working? An Overview of Vocational Rehabilitation for People with Multiple Sclerosis: *Sven-Uno Marnetoft, Amparo M. Assucena*

Free Communications: Neuroplasticity: Postpolio, Stroke and Brain Injury Rehabilitation (OP59–67)

Thursday 15 April: 16:00–17:30

Fatigued Post-polio Patients – A Subgroup: *Gunilla Östlund, Ake Wallin, Kristian Borg*

Reproducibility of Knee Muscle Strength Measurements and Gait Performance Tests in Persons with Late Effects of Polio: *Ulla-Britt Flansbjerg, Jan Lexell*

The Frequency, Consequences and Circumstances of Falls in Prior Polio Patients: *A. Bickerstaffe, Frans Nollet, Anita Beelen*

About Overwork Weakness in Charcot-Marie-Tooth: *Annette J. Videler, Anita Beelen, Frans Nollet*

A Multidisciplinary Team Approach is Urgently Needed to Reclaim Functioning in Critically Ill Patients: Results From Two Observational Studies on Functional Outcome of Intensive Care Unit Patients: *Marika Van Der Schaaf, Anita Beelen, Phd, Frans Nollet*

Incidence of Pulmonary Embolism During Early Rehabilitation after Stroke: *Jana Intchite, Külli Margus, Aet Lukmann*

Energy Balance and Metabolism after Severe Traumatic Brain Injury: A Pilot Study Using Doubly Labelled Water: *Karolina Krakau, Lars Ellegård, Bo Michael Bellander, Torbjörn Karlsson, Catharina Nygren De Boussard, Mikael Karlsson, Jörgen Borg*

Sex Hormones and Mental Fatigue: *Marika C. Möller, Angélique Flöter Rådestad, Aniko Bartsai*

Pituitary Insufficiency Following Traumatic Brain Injury or Subarachnoid Haemorrhage: *Anna Tölli, Bo-Michael Bellander, Charlotte Höybye, Anna-Lena Hulting, Seija Lund, Jörgen Borg*

Free Communications: Movement Related Functions/Mobility, Long-Lasting Pain Conditions and Education (OP68–75)

Friday 15 April: 11:00–12:30

Multidisciplinary Approach is a Prerequisite in an Exercise Program for Patients With a High-Risk Diabetic Foot: *Boukje M. Giele, Pt, Msc, Noline M. Otterman, Marika Van Der Schaaf, Carine H. Van Schie, Arianne Van Bon, Tessa E. Busch, Frans Nollet*

Quadriceps Femoris Muscle Strength and Postural Sway in Women with Osteoarthritis Before Total Knee Arthroplasty:

D. Vahtrik, Helena Gapeyeva, Herje Aibast, Tatjana Kums, Jaan Ereline, G. Schneider, Tiit Haviko, Aare Märtson, Mati Pääsuke

Static Standing Balance Six Months Following Total Knee Arthroplasty in Patients with Primary Knee Joint Osteoarthritis: *Helena Gapeyeva, Herje Aibast, Jaan Ereline, Tatjana Kums, Tiit Haviko, Aare Märtson, Mati Pääsuke*

Recovery Of Shoulder Muscle Function Characteristics and Active Range of Motion in Patients with Frozen Shoulder after Manipulation under Anaesthesia: *J. Sökk, Helena Gapeyeva, Jaan Ereline, M. Merila, Mati Pääsuke*

Convex Side Muscular Activity and Scoliotic Curve Progression: *G. Rusovs, Aivars Vetra*

Mindfulness and Acceptance-based Rehabilitation Program for Patients with Long-lasting and Widespread Pain: A Pilot Study: *Graciela Rovner, Katharina Stibrant Sunnerhagen*

The Acceptance and Commitment Therapy As a Base for Multimodal Rehabilitation of Patients Suffering From Chronic Pain: *Åsa Storkamp, P-O Olsson, K. Granholm, L. Thermaenius-Spångmark, L. Carlsson, Marie-Louise Schult*

Development of Rehabilitation Education and Practice in Estonia: *Dagmar Narusson, Tiina Tammik, Mari Reilson*

POSTER LIST

Wednesday 14 April–Friday 16 April

PP1: Predictors of Functional Outcome in Stroke Rehabilitation: *Egle Milinaviciene, Daiva Rastenyte, Aleksandras Krisciunas*

PP2: Deficiency in Gross-motor Function in Preschool Boys with Minor to Moderate Developmental Speech and Language Disorder: *Iti Mürsepp, Mati Pääsuke*

PP3: Postconcussional Disorder Following Mild Traumatic Brain Injury – Does Emotional Coping Style Play a Role?: *Christian Oldenburg, Catharina De Boussard, Anders Lundin, Jörgen Borg, Gunnar Edman, Aniko Bartfai*

PP4: Urinary Incontinence 3 Months after Acute Stroke: *Illa Mihejeva, Anita Vetra*

PP5: Jobrehab in A Vocational Prevention and Rehabilitation Programme: Physician Reported Outcomes on Interface Management and Interdisciplinary Collaboration: *Monika Schwarze, N. Teichler, J. Beuker, C. Korallus, Christoph Gutenbrunner*

PP6: From Rehab to Work in Neurological Rehabilitation. Integrating Medical and Vocational Training into The Return-To-Work Process: *H Kulke, W Schupp*

PP7: Short-term Occupational Therapy with the Profilax® Model In Psychosomatic Disturbances Problems with Vocational Background: *E. Post, W. Schupp, B. Held*

PP8: Increased Work Activity and Health – Rehabilitation of Patients with Stress-related Symptoms: *Rose-Marie Herlin, Aniella Besèr*

PP9: Multi-disciplinary Rehabilitation of Myocardial Infarction: *Piret Rebasoo*

PP10: Implementation of an Ambulant After-care Programme for Patients with Chronic Pain and Musculoskeletal Disorders

after In-Patient Rehabilitation (Nachsorge Schmerz – Nasch): *Julia Pönicke, Inge Ehlebracht-König, Monika Schwarze, Christoph Gutenbrunner*

PP11: Abnormal Movement Stereotypes in Music School Pupils: *Zinaida Kasvande, Ieva Tropa*

PP12: Gait Parameters In Persons With Total Hip Arthroplasty: *T. Ananjeva, Z. Pavare, Aivars Vetra*

PP13: Early Multimodal Intervention in Patients Suffering from Acute WAD: *E. Roeck-Hansen, M. Hellman, M. Andersson, J. Brännval, K. Moa, L. Tate, Marie-Louise Schult*

PP14: Pilot Study on Mechanisms of Pain-descending Modulation of Mastication Behaviour in Rats at Spinal Level: *Boya Nugraha, Henning Rahne, Heike Nave, Andreas Schmiede, Michael Fischer, Christoph Gutenbrunner*

PP15: Patients Referred to Pain Specialty Clinics, their Characteristics and Differences after Allocation Into Rehabilitation Programs, According to the Swedish Quality Registry: A Descriptive Pilot Study: *Graciela Rovner*

PP16: Influence of Baldone Mud Therapy in Patients with Chronic Knee Osteoarthritis: *Tatjana Eglite, Dzintra Vavere, Ints Zeidlers*

PP17: Muscle Properties in a Patient with Low Back Pain after Therapeutical Exercises. A Case Study: *Helena Gapeyeva, Tatjana Kums, Jaan Erelene, Mati Pääsuke*

PP18: The German Version of the Health Education Impact Questionnaire (HEIQ) for Evaluation of Patient Education – Interim Results of the Adaption and Validation: *Roland Kirchhof, Gunda Musekamp, Michael Schuler, Inge Ehlebracht-König, Sandra Nolte, Richard Osborne, Christoph Gutenbrunner, Hermann Faller, Monika Schwarze*

PP19: Influence of Physiotherapeutical Measurements on Respiratory System Function of Smokers and Non-smokers Among Patients after Coronary Artery Bypass Grafting: *Gaudenta Stasiūnienė, Jūratė Samėnienė*

INVITED LECTURES

VOCATIONAL REHABILITATION

OP1.

VOCATIONAL REHABILITATION: EUROPEAN ASPECTS

M Anne Chamberlain, FRCP, OBE

Academic Department of Rehabilitation Medicine, University of Leeds, Leeds, UK

Work has always had individual significance not only for its purchasing power but for the status and fulfilment it brings. Recently the state in many European countries has become more interested in the large economic effects of not working. Many professionals have recognised that vocational rehabilitation is important, needs a better academic base and must again have a recognised place in clinical practice and teaching. Pathways within health services need to include vocational rehabilitation. Vocational rehabilitation has been shown to be effective but systems which return those with health problems or disability to work often have to cross organisational boundaries and so may be weak. Some models can overcome the problems. Legislation and policy will have profound effects. Sometimes the problem is not one of absenteeism but of presenteeism. In a time of economic difficulties for individuals and services it is important that practitioners of rehabilitation medicine assist their patients in remaining or returning to work. This presentation will give an overview of the area and some of the recent research.

OP2.

VOCATIONAL REHABILITATION: A MULTI-FACETED PROBLEM – RISK FACTORS OF NO WORK RESUMPTION AFTER DISEASE OR INJURY – MULTIDISCIPLINARY ASPECTS

Jan Ekholm, MD, FRCP (Lond)

Division of Rehabilitation Medicine, Department of Clinical Sciences, Karolinska Institutet at Danderyd Hospital, Stockholm, Sweden

There are different kinds of risk factors for decrease in work resumption after long-term sick-leave due to disease or injury, and factors associated with increased chance to resume work. Such factors are (i) principles of social welfare law/social security law (ii) application of the laws, (iii) rehabilitation actors' effectiveness and resources, (iv) co-operation in rehabilitation type and effectiveness, (v) economic factors, labour market, (vi) other environmental factors, (vii) medical factors, (viii) personal factors. How the system works will be discussed; the more positive factors an individual has, the greater the chance for work resumption, the more negative factors the lesser chance to resume work. Many of these factors can be influenced. A selection of these factors will be discussed, e.g. influences of new legislation in Sweden, effects of new forms of co-operation between rehabilitation actors, effectiveness of multimodal rehabilitation programmes for patients with protracted pain conditions¹, and economic consequences for society^{2,3}. The conclusions of reviews regarding protracted pain conditions demonstrate that pain is reduced, more people resume work, and sick leave periods become shorter if a multimodal rehabilitation programme is followed compared with controls, and compared with less comprehensive programmes comprising, e.g. unimodal input¹.

References:

1. Chamberlain A, Fialka-Moser V, Schüldt Ekholm K, O'Connor R, Herceg M, Ekholm J. Vocational rehabilitation: an educational review. *J Rehabil Med* 2009; 41: 856–869.
2. Ekholm J, Schüldt Ekholm K: Guest editorial. Vocational rehabilitation. *J Rehabil Med* 2009; 41: 113–114.

3. Norrefalk JR, Ekholm K, Linder J, Borg K, Ekholm J: Evaluation of a multiprofessional rehabilitation programme for persistent musculoskeletal-related pain: economic benefits of return to work. *J Rehabil Med* 2008; 40: 15–22.

OP3.

LINKING MEDICAL REHABILITATION TO THE WORKPLACE – ICF-BASED MODEL AND APPLICATION

Christoph Gutenbrunner, MD, PhD

Department for Rehabilitation Medicine, Coordination Centre for Rehabilitation Research, Hannover Medical School, Hannover, Germany

Purpose: Return-to-work rates after medical rehabilitation still are unsatisfactory. Studies show, that they amount only to 55 and 75%. In order to increase return-to-work rates after rehabilitation, a model for appropriate measures based on the ICF-model and driven by results of the literature has been developed. Two such strategies have been evaluated in pilot studies. *Materials and Methods:* The literature has been reviewed in order to identify barriers for return-to-work after acute disease and in chronic conditions. Additionally studies aiming at an improvement of return-to-work after rehabilitation have been included. In a second step the identified factors were classified according to the dimensions of the ICF. Using the ICF model, strategies for new elements for rehabilitation interventions were identified. Two of the strategies were implemented in pilot studies. *Results:* The most relevant barriers for return-to-work identified were psychosomatic co-morbidities, lack of motivation and empowerment, insufficient coping strategies, payment of pensions during rehabilitation, lack of communication between rehabilitation and vocational doctors, and insufficient focusing of rehabilitation measures to the requirements of the work place. They can be classified according to the ICF model mainly as personal and environmental factors and the link between these and the medical strategies. Most important, measures have to overcome the gap between these contextual factors and rehabilitation measures. Two strategies' result: the first one aims at strengthening personal resources of the individual, the second one aims at focusing all rehabilitation measures to the requirements of the work place. This includes linking of rehabilitation and occupational activities. After implementing the first strategy in a German rehabilitation centre, the motivation has been improved significantly compared to a control group. The second approach led to a significant reduction of sick-leave days compared to a historical control. *Conclusion:* Using a systematic approach based on results of the literature and the ICF model, relevant strategies to increase return-to-work rates could be identified. The implementation of two of these strategies already improved the situation. Based on the conceptual work, further strategies should be derived and evaluated.

OP4.

VOCATIONAL REHABILITATION AND CO-MORBIDITIES

Kristina Schüldt Ekholm, MD, PhD

Division of Rehabilitation Science, Department of Health Sciences, Mid Sweden University, Stockholm Rehabilitation Medicine University Clinic, Danderyd Hospital, Stockholm, Sweden

The high level of long-term sick leave and disability pensions is a major problem in several European countries. There are many factors influencing this situation. One of these factors is the occurrence of co-morbidity among these patients. There are relatively few studies in this research area. The lecture will present studies of comparisons between psychiatric-somatic co-morbidity in long-term sick leavers with difficulty in resuming work^{1,2}. Patients with fibromyalgia syndrome are common among long-term sick leavers³. About half of these patients have psychiatric co-morbidity and these patients will be described. Depression is

a common co-morbidity in protracted somatic pain conditions. The effect of depression as co-morbidity on symptoms, quality of life and functioning in long-term sick-leavers with protracted musculo-skeletal pain conditions will be discussed.

References:

1. Linder J, Schüldt Ekholm K, Brodda Jansen G, Lundh G, Ekholm J. Long-term sick-leavers with difficulty in resuming work: comparisons between psychiatric-somatic co-morbidity and monodiagnosis. Proceedings of the 7th Mediterranean Congress of Physical and Rehabilitation Medicine. Portoroz, Slovenia, Sept, Edizioni Minerva Medica, Turin, 2008; pp 48–49.
2. Linder J, Schüldt Ekholm K, Brodda Jansen G, Lundh G, Ekholm J. Long-term sick-leavers with difficulty in resuming work: comparisons between psychiatric-somatic co-morbidity and monodiagnosis. *Int J Rehabil Res* 2009; 32: 20–35.
3. Linder J, Schüldt Ekholm K, Lundh G, Ekholm J. Long-term sick-leavers with fibromyalgia: comparing their multidisciplinary assessed characteristics with those of others with chronic pain conditions and depression. *J Multidisciplinary Healthcare* 2009; 2: 23–37.

OP5.

REHABILITATION TO WORK IN AN EU-LEGISLATIVE PERSPECTIVE

Lotta Vahlne Westerhäll, LL, D

Faculty of Law, School of Economics, University of Gothenburg, Göteborg, Sweden

For the sick or disabled migrant worker, living in one country and having the workplace in another, rehabilitation often raises complicated issues. Rehabilitation consists of measures that enable individuals to regain their capacity for work, meaning that a precondition for rehabilitation is that an individual has been declared to have incapacity for work due to sickness or invalidity. The precondition for receiving benefits, e.g. what should be considered as sickness or invalidity generating incapacity for work, is set within national legal frameworks. It means that the content of the concepts of sickness and incapacity for work will be interpreted differently in different EU-countries. For someone who has worked in different Member States, it will be impossible to understand why he/she can be declared a 100% disabled in one country, 50% in the other, and fit for work in the third. What can make up for these shortcomings? In the perspective of free movement of services, the mentioned situation manifests the need of a mutual recognition of doctor's certificates. This would result in a mutual recognition of each Member State's legal meaning of the concepts of sickness and incapacity for work. One can also argue that the concepts of sickness and incapacity for work should be interpreted in the same way in all Member States, e.g. be harmonised. My hypothesis is that the content of international medicine-scientific documents from WHO on diagnoses and functional status can serve such a purpose. This will be discussed in my speech.

OP6.

VOCATIONAL REHABILITATION: CURRENT STATE IN THE UK

Andrew Frank, MD, FRCP

Vocational Rehabilitation Association, London, UK

In 2000 it was recognised that the National Health Service had lost the understanding of the inter-relationships between work and health. Employment was the exclusive responsibility of the Employment Services. Costs to the state through 'Incapacity Benefits' became excessive and the government was forced to have a major policy re-think. Approaches to Vocational Rehabilitation in the UK are now seen to be either 'top-down' or 'bottom-up'. Top-down (governmental) approaches include the amalgamation of 'Employment' and 'Benefits' into the Department for Work and Pensions (DWP) and the creation of a cross-departmental team (Health and DWP) led by a former president of the Royal College of Physicians. This resulted in the publication of a 'Health and Well-being Strategie'

to: *i*) Reform sickness certification; *ii*) Enhance management of health issues within business; *iii*) Improve the health of the nation's workforce. Recent NHS initiatives involved a cross-government approach to attacking the stigma attached to mental ill health at work with increased support for employers and patients. Bottom-up approaches included the signing of a consensus statement by 37 professional bodies to 'promote and develop ... supporting individuals to achieve the ... benefits of work'. Members of all the health professions are becoming involved with the formation of the multiprofessional Vocational Rehabilitation Association and the belated introduction of case management into the UK. Work instability measures have been developed, standards introduced and the 'flag' system widely used to assist in identifying obstacles to working. The voluntary sector remains an important partner with professionals and the state.

OP7.

VOCATIONAL REHABILITATION IN BALTIC STATES

Alvydas Juocevičius¹, Aivars Vētra², Varje-Riin Tuulik Leisi³

¹Vilnius University, Medical Faculty, Vilnius, Lithuania, ²Riga Stradins University Medical Faculty, Riga, Latvia, ³Tallin Hospital Rehabilitation Unit, Estonia

Introduction: The independent period from 1990 allowed a dramatic change in social and economical life of Estonia, Latvia, and Lithuania. New models of multidisciplinary rehabilitation are already implemented in all three countries' social systems. But still, lack of services to support those with disabilities back to work can be recognized. *Purpose:* The aim of the study was to evaluate the process of implementation of vocational rehabilitation in Estonia, Latvia, and Lithuania. *Methods:* Comparison and analysis of services, structures, numbers of professionals, organization and management of vocational rehabilitation in different countries were done. *Results:* Reintegration of disabled persons is one of the Baltic States societies' key concerns. Even from the beginning of developing modern rehabilitation model elements of vocational rehabilitation were founded in all countries. Some delay, compared with medical rehabilitation model implementation is visible. Retraining of staff with support of colleagues from Western Europe, new training programmes for the new generation of specialists of rehabilitation medicine were started in the first decade of independent time. Development of vocational rehabilitation as a complex system was started later on. Two compensatory mechanisms are used: keeping, as far as possible, the workers at their original job or their reintegration at a job after a rehabilitation period, if needed. If it is not possible – an adapted work place is needed and persons shall have the opportunity to be supported by authorities. *Conclusions:* According to demographic developments in all Baltic States need to improve economy and social welfare systems, it is necessary to guarantee reintegration of disabled persons. Measures for professional rehabilitation are still taken too rarely and, unfortunately, often too late. *Key-words:* disability, vocational rehabilitation.

OP8.

CONCEPT FOR VOCATIONAL REHABILITATION AFTER TRAUMA

Jean-Jacques Glaesener

Hamburg, Germany

Introduction: In Germany accidents at work and accidents commuting to and from work are covered by Workmen's Compensation Insurance. The principles state that primary care and rehabilitation have to reduce the sequelae of trauma "with all possible and adequate means", that surgery and subsequent rehabilitation all come "from one source" and aim on reintegration in social life and former occupation. The aim of this invited lecture is to show, that by this system, in which

rehabilitation, reintegration and financial payments are all entrusted to the same insurer. An optimized situation for a successful back-to-work-strategy can be achieved. *Contents:* At the Center of Rehabilitation Medicine Hamburg, we have a huge rehabilitation department in a Trauma Hospital, both belonging to the Workmen's Comp. We have chosen the way of an intensive case-management, as we realised (as many others did before) that not just health impairments but much more the personality of the patient and his/her actual occupational and social setting are decisive for the future healing process and the reintegration. During intensive medical rehabilitation after trauma we start very soon with step 1) i.e. the motor-functional exercise therapy, one to two hours/day. In step 2) we continue to specifically exercise parts of the patients former daily work increasing the duration and intensity of therapy (2–4 hours/day). In step 3) the patient leaves the clinic setting to exercise work in an authentic working set up (up to 4 hours/day). The last step 4) is dedicated to exercising work half a day or three quarters of a day in his own working place or a similar one. The patients are accompanied and cared for during the whole process by the rehab doctors in charge but even much more by the highly skilled therapists in a multidisciplinary approach with physiotherapists and sport-therapists.

NEUROPLASTICITY: PRINCIPLES AND NEW INTERVENTIONS

OP9.

NEUROPLASTICITY – AN OLD CONCEPT WITH A NEW MEANING

Jörgen Borg, MD, PhD

Department of Clinical Sciences, Division of Rehabilitation Medicine, Karolinska Institutet, Danderyd Hospital, Stockholm, Sweden

Achievements in basic and applied neuroscience have provided increasing insights into the plasticity of the nervous system since more than a century. Today, brain plasticity refers to the inherent property of the nervous system to respond to various experiences and allowing us to learn as well as to relearn e.g. after brain lesions. Thus, knowing the potential and limitation of brain plasticity is considered a key issue in order to optimise the rehabilitation programs for patients with such lesions as well for patients with chronic pain. There is now consistent evidence that functional recovery after an acquired brain injury corresponds to reorganisation of central networks of neurons and also that such reorganisation is activity driven. However, data on the optimal timing and composition of interventions, such as intense task training, drugs or electrical stimulation that may modulate nerve cell excitability, in relation to specific, structural and functional brain lesions are still scarce. Loss of lower motor neurons may induce significant restructuring of the motor unit architecture as well as modified central drive of remaining motor units, as demonstrated e.g. in patients with late post-polio. This lecture will highlight some aspects on the development behind today's view on neuroplasticity as a background to the following lectures, which will give an update on some of the cellular and molecular mechanisms involved in neuroplasticity, new brain imaging methods enabling visualisation of brain structure and function in continuously increasing detail and new treatment models intended to drive beneficial neuroplasticity.

OP10.

BASIC PLASTICITY MECHANISMS IN THE CENTRAL NERVOUS SYSTEM

Michael Nilsson, MD, PhD

Center for Brain Repair and Rehabilitation, Institute of Neuroscience and Physiology, Gothenburg University and Sahlgrenska University Hospital, Göteborg, Sweden

The central nervous system (CNS) has potential to structurally and functionally recover after a stroke or traumatic brain injury. A key challenge for the future is to elucidate the underlying mechanisms of spontaneous and facilitated functional recovery and with a translational approach evaluate them in the neuro-rehabilitation setting. Experimental studies have so far provided some important information about the cellular mechanisms involved in the recovery processes. Human studies based on e.g. brain mapping have demonstrated strong mechanistic similarities with the experimental studies. Functional recovery after e.g. stroke is dependent on the plasticity of affected and unaffected parts of the neural networks. Neural plasticity is an intrinsic property that enables the mammalian brain to adapt to environmental changes during development and adulthood. Different types of multimodal stimulation, or environmental enrichment (EE), promote brain plasticity. EE involves various types of stimulation, including social interactions and physical activities, and could therefore be a powerful tool to prevent cognitive decline during normal aging as well as to facilitate brain tissue repair and functional recovery following brain injury. Studies of brain plasticity have traditionally focused on neuronal functions, in particular the function of the synapse. However, other neural cell types like the astrocytes are key elements in the plasticity mechanisms and are also profoundly influenced by EE. The role of reactive gliosis and inflammation needs to be further investigated in this context. Revascularisation and angiogenesis are other crucial components necessary for successful remodeling of the CNS. A better understanding of these processes will ultimately lead to improved rehabilitation programs.

OP13.

PLASTICITY OF THE MOTOR UNIT

Kristian Borg, MD, PhD

Division of Rehabilitation Medicine, Department of Clinical Sciences, Karolinska Institutet Danderyd Hospital, Stockholm, Sweden

When losing motor units several compensatory phenomena are activated in order to maintain muscle strength. The most powerful compensatory phenomenon is reinnervation by means of collateral sprouting from neighbouring motor units. The contractile tissue is increased by means of muscle fibre hypertrophy and the contractile properties are changed both in the motor neurone with altered firing properties and in the muscle fibre with altered isomyosin content. Poliomyelitis affects anterior horn cells leading to a loss of motor units. Some patients with a critical degree of muscle weakness due to prior poliomyelitis, compensate with increased use of remaining motor units. When analyzing remaining motor units, an increase of the motor unit area and altered firing properties of the motor neurone were found. Furthermore, there was an increased proportion of slow-twitch muscle fibres and muscle fibre hypertrophy. Beneficial effects and negative "side-effects" of the compensatory phenomena for the patients, concerning function and activity, are discussed.

OP14.

USE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN STROKE

Katharina Stibrant Sunnerhagen, MD, PhD

Department of Clinical Neuroscience and Rehabilitation, Institute of Neuroscience and Physiology, Sahlgrenska Academy, University of Gothenburg, Sweden

In Sweden there are different projects ongoing where ICT is used for rehabilitation of persons with stroke. Three different companies in Western Sweden are involved in trials where the goal are the same but the road to get there different. After a stroke it is common with an affection of motor function on the arm/hand on one

side, which commonly remains to a certain extent. This can lead to increased need for assistance in common daily activities. The three models all aim to achieve better motor skills in the impaired upper extremity by the use of computer games. The first model uses haptic feedback and 3D experiences where when different games are used for training (Curictus). This model is using games where one hand is used and has two different grips (pen grip or cross hand grip). This is the model we have most experience of and have used in several publications. Another model is using bimanual activities where the persons use handles and lines and the games are shown on an ordinary screen (Elinor). This model has been put in the persons' homes and they have practiced in there. The third model is developed from a joy-stick which allows movement in 5 dimensions and has different handles which allows uni- or bimanual training (Simball) and is combined with different computer games. This is used in the clinic as well as in a training study in the acute phase where it will be compared with traditional training for arm/hand function. To conclude, persons with stroke have generally been interested in testing computer games as a way for achieving better function in the upper extremity. The staff has had a varied interest in testing computer games in rehabilitation, sometimes perhaps due to a feeling of insecurity when it comes to using computers. The effectiveness of computer games in rehabilitation is yet to be shown in a convincing way. Therefore, this type of intervention should be seen as projects and should be assessed as such.

PAIN CHRONIFICATION

OP15.

MECHANISMS OF CHRONIC PAIN

Carl Molander, MD, PhD

Department of Rehabilitation Medicine, Uppsala University Hospital, Uppsala, Sweden

Chronic pain can be defined as pain that persists beyond the expected period of healing. It is often associated with low quality of life and various levels of disability and therefore the need for rehabilitative intervention. Affected individuals as well as rehabilitation professionals need models of explanation of the mechanisms that may cause and maintain chronic pain in order to design individualised rehabilitation plans. The transition from acute to chronic pain states might therefore be one of the most important challenges in research to improve treatment and rehabilitation. Indeed, numerous explanations have been advanced in the last decades, each reflecting the paradigms and scientific methods of the disciplines that approach the problem: geneticists, basic neuroscientists, physicians, behavioural scientists, and sociologists. Their results and suggestive explanations are rarely viewed and criticised together. This talk attempts to review a selection of the surviving and new theories of how chronic pain develops, how these theories may relate to each other, and how they may be used in clinical assessment and rehabilitation.

OP16.

ASSESSMENT OF CHRONIC PAIN

Bengt H Sjölund, MD, DMSc

Rehabilitation and Research Centre for Torture Victims, Copenhagen and University of Southern Denmark, Odense, Denmark

Chronic non-malignant pain is a common sensory impairment in PRM practice. From epidemiological studies, we now know that such pain is very common also in the population. In fact, it may be assumed that it is the disabling effect of a pain condition that turns a citizen into a 'pain patient'. In spite hereof, pain clinics pay great attention to search for the cause of the pain condition and to temporarily alleviate it, usually through pharmacological interventions, without considering the patient as a whole. How-

ever, it may be difficult to isolate a specific peripheral source of pain. Changes in the sensory nervous system, such as a decreased central inhibition or an increased sensitivity to stimuli via synaptic modification, may contribute. Moreover, the impact of a pain condition on an individual in a certain life situation may vary greatly, depending on the contextual factors at hand. Thus, pain-related disability is a complex, highly individual perception, depending on a number of factors related to the patient in pain, for example his/her overall interpretation of the situation and its consequences for behaviours (Sjölund BH. Dysfunctional pain and the International Classification of Function. In: Schmidt RR, Willis WD, editors. Encyclopedia of pain, vol. 1. Berlin: Springer; 2006; p. 670–672). Therefore, assessment is best carried out by a multiprofessional team, consisting of a PRM physician, a cognitively oriented psychologist, a physiotherapist/occupational therapist focusing on activity rather than passive treatment or assistive devices and a social worker/vocational adviser. There is consensus that the team should use an interdisciplinary approach, where a joint assessment of thought patterns, behaviours, context but also pain mechanism, results in shared goals for the rehabilitative process and plan.

OP17.

REHABILITATION STRATEGIES BASED ON NEUROPLASTICITY

Eva Kosek, MD, PhD

Department of Clinical Neuroscience, Karolinska Institutet, Stockholm, Sweden

Musculoskeletal pain is a major cause of sick-leave and has great economic impact. Although peripheral pathology such as radiological changes in osteoarthritis or muscle ischemia in muscular pain can be documented, the relation between the degree of peripheral pathology and pain is weak at best. Modern pain research has highlighted the importance of neuroplasticity leading to pain amplification in chronic pain patients. Signs of pain amplification, such as increased pain sensitivity and augmented cerebral processing of nociceptive stimuli have been reported in various chronic pain conditions such as fibromyalgia, whiplash-associated disorder, chronic low back pain and localized myalgias. Furthermore, dysfunction of endogenous pain inhibitory mechanisms has been identified in patients with chronic pain such as osteoarthritis and fibromyalgia. Recently, we could document an inability of patients with shoulder myalgia and fibromyalgia, respectively, to activate segmental as well as plurisegmental pain inhibitory mechanisms during exercise with painful muscles. However, we found evidence that exercising non-painful parts of the body could have a pain relieving effect in myalgia patients by reducing pain sensitivity in the affected muscles. Patients with fibromyalgia failed to activate their pain inhibitory mechanisms at all times, which is in support of the recommendations of low intensity training regimes for fibromyalgia patients to keep exacerbation of pain to a minimum and favour compliance. Prospective studies have revealed that localized/regional pain is the major risk factor for the development of generalized pain. Little is known regarding secondary prevention, i.e., if early treatment of localized pain could prevent the development of generalized pain. However, we could document a normalization of pain sensitivity as well as a normalization of endogenous pain inhibitory mechanisms following successful treatment of osteoarthritic pain (surgery), showing that the neuroplastic changes were reversible. In addition, we have evidence that short pain duration was related to favourable treatment outcome when fibromyalgia patients were treated with a serotonin-noradrenalin re-uptake inhibitor (milnacipran), a drug believed to improve the function of endogenous pain modulation. Currently, we lack understanding of how rehabilitation modalities such as cognitive behavioural treatment and physical therapy influence pain amplification and other neuroplastic changes in chronic pain patients but several studies are under way.

OP18.**INTERACTION OF THE TEMPOROMANDIBULAR SYSTEM IN CHRONIC PAIN SYNDROMES****Michael J. Fischer, MD, PhD***Rehabilitation Medicine, Hannover Medical School, Hannover, Germany*

Dysfunctions in pain processing are thought to be a major factor in the transition from acute to chronic pain. Processing occurs at different levels of the central nervous system and many systems are involved. The mechanisms of pain modulation are very complex and currently available pain control strategies are inadequate to successfully manage patients with chronic pain conditions. Therefore we are required to continue the search for new pathways to specifically target system components for chronic pain control. Different endogenous pain inhibitory mechanisms activated by heterotopic noxious stimulation, distraction, acute stress, or exercise are capable of inducing antinociception. There is recent evidence that the masticatory system possesses antinociceptive functions. There is, however, not only the possibility of a top-down control of pain, but also a pathway of remote pain interacting with the masticatory system, which results in temporomandibular disorders. An overview of recent publications demonstrating the interaction of the temporomandibular system in chronic pain syndromes is given.

PATIENT EDUCATION PROGRAMMES**OP20.****PRINCIPLES OF PATIENT EDUCATION****Jean-Pierre Didier, MD, PhD***CHU Rééducation, University of Burgundy, France*

Learning appears as a new science leading to rethinking PRM. In PRM the learning process is dealing with the plasticity: one part dealing with brain systems that mediate the practice of a motor skill and a second one concerning brain activity associated with motor skill acquisition during teaching. The patient and the caregiver are two characters, the patient commonly has to learn by practice and/or by instruction how to do or how to perform a task, using implicit or explicit learning procedures and the caregiver is the teacher who has to know and to understand the principles of teaching and learning. Is this indeed the case? Probably not. Currently the caregiver uses “classical” instructions, summarized as follows “Do it like that”, “Do it like I do it”, “Do it in a way that feels right for you”. Those could not be pertinent because it suppose norms, but what are the correct norms? Moreover the caregiver has to know correctly the mechanisms implied by his instructions, but is it still the case? It is classical, but what happens with new learning paradigms involved by new rehabilitation technologies including virtual reality or robotics? We are beginning to understand that different principles are converging to create a new science of learning that may transform educational practices. Thus we have to reconsider the rehabilitation’s procedures having to achieve better functioning of the person in respect to their human rights.

OP21.**PRINCIPLES OF THE EVALUATION OF PATIENT EDUCATION PROGRAMS IN REHABILITATION****Monika Schwarze, Dr Dipl-Psych***Coordination Centre for Applied Rehabilitation Research, Department of Rehabilitation Medicine, Hannover Medical School, Hannover, Germany*

Patient education and self-management programmes are frequently used and are an important part of the rehabilitation of patients with chronic disorders. For this reason, the evaluation of

their effectiveness and efficiency is important for health services research and health politics. In the past, rehabilitation sciences research programmes in Germany (funded by the German Pension Insurance scheme and the Federal Ministry of Education and Research) developed and evaluated patient education programmes. When integrating these results into previous research (taking both a national and international perspective), it can be concluded that patient education programmes are effective in term of medical, psychosocial and socio-economic outcomes, although their effect sizes may vary¹. In a national working group, “Patient Education” guidelines have been described the following categories: principles of the evaluation, object of the evaluation, design, result criteria, confounder, interpretation and implementation into practice. The recommendations offer a practical view to the planning of evaluation studies in rehabilitation². The priority of current funding is again the development of efficient patient education in chronic conditions in the context of health services research and patient orientation. Recent findings suggest that an appropriate evaluation of patient education programmes should be based upon factors, such as empowerment and self-management skills. In Germany however the evaluation of such programmes has so far been conducted mainly through long-term, distal target criteria. The translation of the generic “Health Education Impact Questionnaire” (heiQ) into German aims to improve the lack of a German instrument to evaluate these criteria³.

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OP22.**PATIENT EDUCATION PROGRAMS IN RHEUMATIC DISORDERS****Julia Pönicke, Inge Ehlebracht-König***Rehazentrum Bad Eilsen, Braunschweig-Hannover, Germany*

Rehabilitation of inflammatory rheumatic diseases is an interdisciplinary task adapted to the individual needs of patients and to the stage of their illness. It is important how patients cope with the disease and handle acquired techniques and abilities. Patient education imparts knowledge of the disease, improves skills, and influences and changes attitudes. Therefore, patient education is an important building block in medical rehabilitation. Patient education programs are based on educational theories for adults. Under standardized conditions, they can be put into practice during medical rehabilitation (1). The German Society for Rheumatology (DGRh) has developed different education programmes for patients with specific rheumatic disorders. The purpose is to improve health-related outcome and self-management. Meanwhile altogether seven programs are available. Most of the programs are evaluated, have good train-the-trainer seminars and are in a steady revision (2). Controlled studies were carried out on patients with arthritis and spondyloarthritis. The results show an increase in knowledge as well as a positive change in attitude. Economical advantages in health care also occur. Despite these results, the clinical implementation is difficult due to diverse causes. So far only a third of all patients took part in an educational program during their medical rehabilitation (1). A survey in clinical practice shows that the existing programs are not used by a large number of clinics. Bönisch and Ehlebracht-König (2) identified barriers and enablers and made recommendation to improve an optimized transfer.

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OP23.

PATIENT EDUCATION PROGRAMS IN NEUROLOGICAL AND NEUROMUSCULAR DISORDERS

Jan Lexell, MD, PhD

Division of Rehabilitation Medicine, Department of Clinical sciences, Lund University, Department of Rehabilitation Medicine, Skåne University Hospital, Orupssjukhuset, Lund, Sweden

Rehabilitation is often described as a pedagogical process with the aim to support a person with a disability to adapt to a new life situation. An important aspect in this process is shared decision making, which is more and more seen as the ideal model of patient–physician communication, especially in life-long disorders. The development of effective patient education program is a central component to enhance patient decision autonomy. Research on patients with multiple sclerosis has shown that they can handle evidence-based, balanced complex information, understand this kind of information and are able to transfer new abilities to other situations. The patients also indicated that they preferred an active role in decisions giving the shared decision and the informed choice model the highest priority. Research on persons with post-polio, who participated in extensive patient education during an individualized, goal-oriented, comprehensive rehabilitation programme, described it as a way to support them to take responsibility for various alterations to overcome problems in their lives. Rehabilitation was seen as a turning point in life, whereby they experienced positive changes in their management of daily activities. Various tools can be used to enhance the results of patient education program, such as an ICF-based rehabilitation plan, interdisciplinary team work and active goal-setting. Overall, patient education is a way to empower people with life-long disabilities and support them in their establishment of new habits, acceptance of a life with a disease or a disability, reappraisal of self and confidence in the future.

OP25.

EDUCATION OF WOMEN SUFFERING FROM MULTIPLE SCLEROSIS REFERRING TO PREGNANCY, CHILD-BIRTH AND PUERPERIUM

Jozef Opara, MD, PhD

Academy of Physical Education in Katowice, Poland, “Repty” Rehab Centre in Tarnowskie Gory, Poland

Multiple sclerosis (MS) can cause a variety of symptoms, including changes in sensation, visual problems, muscle weakness, depression, difficulties with coordination and speech, severe fatigue, cognitive impairment, problems with balance, overheating, and pain. MS will cause impaired mobility and disability in more severe cases. These are many problems when considering motherhood, referring to pregnancy, child-birth and puerperium (especially breastfeeding) in MS. There exist controversial and discrepant results on the risk of spontaneous abortions and teratogenesis induced by interferon treatment in people with MS. Problems considering motherhood, referring to pregnancy, child-birth and puerperium may cause rehabilitation of MS women very complicated. Information regarding the effect of MS on pregnancy and child-bearing and the effect of pregnancy on MS and its progression need to be made more accessible to women. Information would be a valuable resource for women going through this

decision-making process. The take-home message is that pregnancy does not hold adverse risks for the majority of patients with MS, or vice versa. The last three months of pregnancy offer a natural protection against relapses. During the first 3 months after delivery, the risk for a relapse is increased 20–40%. Postpartum-related relapse in MS may be treated with intravenous immunoglobulin. Pregnancy does not seem to influence long-term disability. Children born to mothers with MS are not at increased risk for birth defects or other problems. Females generally have a better prognosis than males. However their Patient-Reported Outcome (PRO) is lower than in men. Women more often fall in depression and more often feel fatigue, they also more often suffer from bladder dysfunction.

OP26.

MANAGEMENT OF OSTEOARTHRITIS AND THE SIGNIFICANCE OF PATIENT EDUCATION

Elena Ilieva, MD, PhD

Department of Physical and Rehabilitation Medicine, Medical University Hospital, Plovdiv, Bulgaria

Introduction: The aim of the author is to present the knowledge about the prevention, management and rehabilitation of knee and hip osteoarthritis and the role of patient education. *Material and Methods:* The author makes a review of the data from systematic reviews, meta-analyses of RCT and existing guidelines and presents evidence-based recommendations in the aspect of ICF. *Results:* The risk factors for osteoarthritis, the different interventions, including rehabilitation and the recommendations according to the grade of evidence are presented. One of the important rehabilitative interventions, besides muscle strengthening and aerobic exercises is education of the patients and self-management strategies. Evidences of metaanalysis of RCT prove the positive effect of patient education and self-management both in the early and late stage of the disease on pain and functional ability, thus reflecting activity and participation. That is why most of the recommendations include in the core treatment education, advice, information access to enhance understanding of the condition and its management, including positive life-style change and adherence to physical activity. The core concepts involve engagement in self-care, improved self-monitoring, interactions with health-care professionals and coping with disease. Concerning joint replacement the evidence show that preoperative education has a modest beneficial effect on preoperative pain and anxiety and should be targeted at those most in need of support. There is some evidence that it may positively impact the postoperative outcomes. *Conclusion:* The optimal management of osteoarthritis of the hip and knee combine different treatment modalities. The initial treatment should focus on patient empowerment and self-driven therapies and patients should receive education on life style changes, exercise and pacing of activities. The education of the patients should be an ongoing integral part of the management plan.

Key-words: osteoarthritis, rehabilitation, joint replacement, patient education.

REHABILITATION MEDICINE ACROSS BORDERS

OP27.

REHABILITATION MEDICINE ACROSS BORDERS

Christoph Gutenbrunner, MD, PhD

Department of Rehabilitation Medicine, Coordination Centre for Rehabilitation Research, Hannover Medical School, Hannover, Germany

Rehabilitation care differs significantly from country to country. Reasons for this are different historical roots and differences in national health policies. This, on the one hand, will rise the question how to optimize rehabilitative care by choosing

most effective elements from different rehabilitation systems. On the second hand, this will influence professional practice of specialists in Physical and Rehabilitation Medicine (PRM). From a theoretical point of view professional practice of PRM is besides education, research and quality assurance, influenced at three main levels: 1) the level of persons or patients: pathologies (International Classification of Diseases, ICD), functioning (International Classification of Functioning, Disability and Health, ICF), interventions (International Classification of Health Interventions, ICHI) (Micro level); 2) the level of services: facilities, programmes, payment, equipment, team (ICF, International Classification of Health Accounts, ICHA) (Meso level); 3) the level of systems: health system, epidemiology, health policy (ICF, ICHA) and others (Macro level). A uniform system to compare rehabilitation systems of countries does not exist up to now. Taking into consideration the International Classification of Health Accounts (ICHA) of the OECD some parameters can be identified to be useful in order to classify rehabilitation systems. These could be, among other things: 1) the type of services; 2) the time along the continuum of a disease; 3) the intensity and complexity of interventions; 4) the providers of care (including team structure); 5) the payment system of care; 6) the coordination of different services (e.g. case management). To compare rehabilitation across borders within the Baltic & North Sea region the following aspects need to be discussed: 1) general aspects of the rehabilitation system in your country, including the rehabilitation policy and aspects of legislation; 2) the kind of rehabilitation services in acute, post-acute and long-term care; 3) the role of different professions in rehabilitation system, e.g. PRM specialists, other medical specialties, physiotherapists, occupational therapists, speech and language therapists, and others. Finally the scientific work in the field could be seen as a relevant parameter to assess a rehabilitation system. The comparison of systems in a systematic way may open the opportunity to improve rehabilitation care within the Baltic and North Sea area.

OP28.

REHABILITATION IN SCANDINAVIA

Jari P Arokoski, MD, PhD

Department of Physical and Rehabilitation Medicine, Kuopio University Hospital, Kuopio, Finland

The structure of rehabilitation and health systems varies across Scandinavian countries. This presentation is focused on the Finnish system of rehabilitation. Rehabilitation is arranged by several service providers in Finland, under various provisions in legislation. Pension insurers are responsible for on-the-job vocational rehabilitation. State-funded social security is managed by the Social Insurance Institution of Finland (KELA), which arranges vocational rehabilitation for those who are not entitled to rehabilitation-based on pension or on accident or motor liability insurance. Health centers and hospital districts are responsible for medical rehabilitation. Medical rehabilitation of severely handicapped individuals and discretionary rehabilitation is administered by KELA. There are obvious differences between Scandinavian countries in the working areas of Physical and Rehabilitation Medicine (PRM) specialists. Also the specialist training program is different in each country. In Finland, PRM (in Finnish "Fysiatría") specialists work in several healthcare sectors such as health centers, occupational health services, hospital rehabilitation units and rehabilitation centers and as private doctors. Generally the PRM specialists work in a multi-professional teams conducting the assessment of working and functional capacity, evaluating the rehabilitation needs and making individual rehabilitation plans. PRM has developed strongly in Finland in the past twenty years. In the field of musculoskeletal disorders some new rehabilitation methods have been developed and evaluated and are now applied in patient care. Today the core competence focus is into therapy and rehabilitation of back, neck, upper and

lower extremity musculoskeletal disorders. PRM specialists are also involved in neurological and spinal cord injury patients' rehabilitation.

OP30.

REHABILITATION MEDICINE IN THE UNITED KINGDOM

Anthony B Ward, MD, PhD

North Staffordshire Rehabilitation Centre, University Hospital of North Staffordshire, Stoke on Trent, UK

This presentation will attempt to address the following statements: 1) A description of the medical specialty of Rehabilitation Medicine (RM) in the UK at both clinical and policy levels; 2) The range of RM services for people with highly complex disabilities; 3) The work of RM consultants in multidisciplinary teams – both in acute settings and in the community. Their specialist medical skills are required in the assessment of complex needs and in the provision of a range of specific interventions; 4) The leadership role of RM as the lead NHS resource for most Quality Requirements in the implementation of the National Service Framework for Long-Term Conditions; 5) The crucial contribution of RM to the implementation of other NHS policies, including the development of primary care-led services; 6) The work of RM in accumulating the evidence of cost-effectiveness of rehabilitation services. Three principal economic contributions of RM are (a) the prevention of costly complications and avoidable hospital admissions; (b) reduction in the duration of admissions through co-ordination of complex discharges; and (c) facilitation of employment for disabled people; 7) The reason why the UK lags behind all but one other comparable country in the provision of Rehabilitation Medicine services and the number of physicians in the specialty.

OP31.

REHABILITATION MEDICINE ACROSS BORDERS IN IRELAND

Angela McNamara, MD

64 Stillorgan Grove, Blackrock, Co. Dublin, Ireland

The specialty of Rehabilitation Medicine has made significant progress in Ireland since it separated from the combined specialty of Rheumatology and Rehabilitation 20 years ago. Consultant human resources in rehabilitation medicine in Ireland have doubled and all are currently based at the tertiary National Rehabilitation Hospital (NRH) and linked to University Medical Teaching and Research Centres. The specialist training programme in Rehabilitation Medicine has attracted high calibre candidates. The three doctors who have already completed their training have successfully graduated with the European Board certification. There still remains a great need to expand consultant positions particularly in neuro-rehabilitation in Ireland (pop. 4 million). Health services were radically reformed 5 years ago when 9 independent health boards were restructured and centralised into one authority, the Health Service Executive (HSE). Major changes have been made in identifying new centres of excellence for key medical services, in particular cancer care. These new developments are challenging politically. Accreditation and quality assurance of service delivery is becoming mandatory bringing new implementation challenges. To further improve access and delivery of services, the HSE is implementing a decentralisation model in core medical services including rehabilitation, into four regional divisions. A framework is awaited with proposals that will develop primary care and community rehabilitation teams, four regional rehabilitation centres with inpatient and outpatient services and further developments at the tertiary centre (NRH). The NRH is expected to be allocated responsibility by the HSE for implementation of policy in rehabilitation medicine with the statutory authorities, going forward.

OP33.**REHABILITATION MEDICINE IN BELGIUM****Carlote Kiekens***Physical and Rehabilitation Medicine, University Hospitals Leuven, Campus Pellenberg, Belgium*

Historical developments have led to an unclear and problematic situation in Belgian musculoskeletal and neurological rehabilitation. Before 1991 the federal "Fonds Maron" regulated and financed all aspects of the rehabilitation facilities. Because of the Belgian political defederalisation this Fund was replaced by four different Regional Funds. Acute and post-acute rehabilitation remained incorporated in the federal health care regulation and rehabilitation services are since then financed by the RIZIV/INAMI, mainly with a fee for service system. Rehabilitation activities can be provided within two systems: *i*) Rehabilitation agreements ("conventions") of which different types exist; *ii*) Nomenclature of PRM (a fee schedule: "K"; art. 22 and 23 "Physiotherapy"). There is a substantial overlap between the different systems and it is not always clear which system to use. The only inclusion criteria are diagnosis related. Both systems can be applied to hospitalized as well as ambulatory patients. The hospitalisation of these patients is mostly organized in a day price system of specialized beds (Sp). The "day price" also covers some therapists and infrastructure for rehabilitation. However, the different financial modalities of rehabilitation activities can also be applied to acute, pediatric or even geriatric beds. On government order a study was performed concerning the organization and financing of musculoskeletal and neurological rehabilitation in Belgium. The most important conclusions were that the organization is historical and mainly resource based and that there is a substantial overlap between the different financial systems. By using a 3-level stratified rehabilitation model, based on a patient classification system and imbedded in an organizational network, the rehabilitation budget might be spent in more efficient way. Unfortunately, these proposals are not being implemented so far.

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OP34.**REHABILITATION MEDICINE IN THE NETHERLANDS****Henk Stam, MD, PhD, FRCP***Erasmus MC, University Medical Center Rotterdam, The Netherlands*

In this presentation some specific characteristics of rehabilitation medicine in The Netherlands are discussed and illustrated. Rehabilitation Medicine is part of basic and mandatory health insurance and all inhabitants of The Netherlands have access and full reimbursement. In the acute phase every hospital has a rehabilitation medicine physician on call and a multidisciplinary team is available. The rehabilitation medicine physician is responsible for the discharge destination to rehabilitation facilities. Besides inpatient rehabilitation centers there is a network of outpatient departments covering the country. The inpatient rehabilitation centers are completely run by rehabilitation medicine physicians with other specialists only on call. The training for residents in rehabilitation medicine takes 4 years. 10% of the time has to be spent on research activities. All major rehabilitation centers have a formal cooperation with the departments of rehabilitation medicine in the university hospitals. The strength of rehabilitation medicine in The Netherlands includes not too many specialists, strong network of centers, RM in all hospitals, insurance for everybody, 0–100 years lifespan perspective. Weaknesses include many unfulfilled posts, suboptimal contribution to medical curriculum, many part-time workers and the fact that the priority for care is less than priority for cure.

OP35.**POST-POLIO IN SWEDEN – SWEDES AND THE REST OF THE WORLD****Katharina Stibrant Sunnerhagen, MD, PhD***Department of Clinical Neuroscience and Rehabilitation, Institute of Neuroscience and Physiology, Sahlgrenska Academy, University of Gothenburg, Sweden*

Polio is in many countries today a forgotten disease. However, in the developing parts of the world, still many fairly new cases are seen and the World Health Organization still report on acute cases. In Sweden, the estimate of persons affected with polio ranges from 15,000 to 20,000. The number of persons is decreasing since the last epidemic in Sweden occurred in 1953, but there is an influx through immigration. At the polio clinic of the Department of Rehabilitation Medicine we have a multidisciplinary team approach with a physician, nurse, occupational therapist, physical therapist, social worker and a secretary. At the clinic more than 800 persons have been assessed which 25% were born outside Sweden. The reason for coming to the clinic is known or suspected polio. Before the visit, a questionnaire is sent out with questions regarding the acute polio illness, problems today in function and activity, use of assistive devices etc. The patient is examined by the physician, physiotherapist and occupational therapist. As part of the assessments when the person is first seen at the clinic, electromyography (EMG) examinations are performed and muscle tests with an isokinetic dynamometer. During one year (2006) a total of 186 persons were seen at the clinic of which the majority was women (65%). The mean age at examination was 60 years (SD 14). There were no significant differences between men and women regarding age at polio onset (although the men were on average 4 years younger) or age at onset. In this year, 48% of the persons seen at the clinic were born outside Sweden. Those born outside Sweden were significantly ($p < 0.000$) younger (mean 46 years) compared to those born in Sweden (mean 65 years). The social workers are mainly involved with those born outside Sweden. There is a need for help with practical things, as well as supportive talks. The needs for health care are more prominent in those born outside Sweden; orthoses, crutches, assistive devices and sometimes reconstructive surgery. Many are refugees and have experienced war as well as torture, which sometimes interfere with EMG examinations.

OP36.**POST-POLIO IN THE BALTIC COUNTRIES****Tiina Rekand, MD, PhD***Department of Neurology, Haukeland University Hospital, Bergen, Norway*

Poliomyelitis was a major health problem in the Soviet Union until the initiation of mass immunizations with Sabin vaccine in the end of 1950s and in the beginning of 1960s. The exact number of polio patients in this area is not known. Late sequels of polio after last epidemic in 1958 have been studied in Estonia. In the studies, 565 polio patients (418 paralytic cases) were found registered during the outbreak in 1958. 193 patients with polio were identified in 1993, 128 of them were studied using questionnaires and clinical examinations. A comparison with similar cohort from the outbreak in Norway 1950–54 (148 patients) was made. Fifty-two percent of Estonian patients reported new muscular weakness, 34% new muscular pain and 46% fatigue. The symptoms occurred more often among the patients with persistent paresis than those with transitory neurological findings in 1958. The late post-polio symptoms occurred in similar extent both in Estonia and in Norway. In Estonia, polio patients were less physical active and it seemed to be predictor to development of muscle pain and fatigue in late phase. Increasing age was identified as another predictor for development of late muscle pain, fatigue and breathe shortness among

all studied patients. Estonian polio patients experienced greater socioeconomic problems with significantly less independence in daily activities, less employment and earlier disability pensions than Norwegian patients. Health problems related to polio sequels need further studies in the Baltic countries.

OP37.**POLIO IN A EUROPEAN PERSPECTIVE – THE EUROPEAN POLIO UNION****Frans Nollet, MD, PhD***Department of Rehabilitation, Academic Medical Center, University of Amsterdam, The Netherlands*

In 2006 the European Polio Union (EPU) was founded, an umbrella organisation at a European level of national organisations of people affected by polio. The EPU strives for greater recognition of at least 500.000 people affected by polio and post-polio syndrome (PPS). The main goals of EPU are 1) to collect data on people with polio and PPS and to make these data available for countries and researchers, 2) to create a web site with information, 3) to encourage co-ordinated research to improve the lives and treatment, 4) to campaign to keep polio-vaccination programmes high on the agenda, 5) to produce and disseminate information on ways to arrest the deterioration due to PPS. At present organisations from 13 countries are members. At the end of 2008 an enquiry was made among board members of national polio organizations on quality of care and research issues to be prioritized. Organizations from 12 countries replied (75% response rate). The responding countries encompass 73% of the European citizens. No information was obtained from Eastern European countries. The main results were that 1) PPS is recognized in all but one country, 2) in general knowledge and interest in PPS among healthcare providers is low, 3) specialized multidisciplinary care is scarce, 4) access to 'help' is considered insufficient in more than half of the countries for social work, psychologists, adaptations at home and work, transportation and housing, 5) research should focus on symptom management, especially pain and fatigue, and on therapies including medication and conservative ways to preserve functioning. In conclusion, care for people affected by polio and PPS needs to be improved in many countries. EPU can be instrumental to promote international cooperation between specialized care centers and research institutions.

RESEARCH STRATEGIES IN REHABILITATION MEDICINE**OP38.****IDENTIFICATION AND PRIORITIZATION OF RESEARCH TOPICS IN REHABILITATION MEDICINE****Henk Stam, MD, PhD, FRCP***Erasmus MC, University Medical Center Rotterdam, The Netherlands*

Identifying potentially successful research topics or choosing between different topics can be approached from the individual, the local (e.g. department) or national (e.g. Society of Rehabilitation Medicine) level. In this lecture I will address only the individual and departmental perspective. From the personal level training, talent, ambition and passion for research are the most important prerequisites for starting any research project. Other issues include availability of subjects or patients, facilities (such as computers, gait laboratory, trained supported personnel etc). Individual researchers and the departments rely on grants and funding and the prioritization also depends on the preferences of the funding organizations. It is advisable to discuss priorities with these organizations, including patient organizations. If you plan to spend

time on research you may need to find strong partners to cooperate with, like a successful research group in your hospital. Do not invent the wheel again. Funding organizations are more likely to sponsor your project when it is embedded in a larger group with a good track record. Finally, it is important to focus on one or two topics and to avoid heterogeneity in your research activities. The ICF domains can be very helpful in making a choice about the kind of research topics you may want to choose.

OP39.**STRATEGIES IN RESEARCH DESIGN IN REHABILITATION – WITH SPECIAL REFERENCE TO ICF AND CHOICE OF INSTRUMENTS****Gunnar Grimby, MD, PhD, FRCP***Dept of Clinical Neuroscience and Rehabilitation, Sahlgrenska Academy at University of Gothenburg, Göteborg, Sweden*

ICF can be used as a framework to define and organize functional and rehabilitation research in scientific fields: Human functioning studies, Bioscience in rehabilitation, Integrative rehabilitation sciences, Biomedical rehabilitation sciences and engineering, Professional rehabilitation sciences. Different types of clinical studies in rehabilitation will be exemplified. The use and limitations of randomized controlled trials (RCT) in rehabilitation will be discussed. Certain questions ought to be raised in designing a clinical study and in choosing instruments: in what setting and context is the study to be performed, what is the size of the material, in which area of functioning will it be performed, Instruments should be characterized with respect to validity, reliability, reproducibility, sensitivity, appropriateness for the aim, interpretability, administrative burden etc. The specific aspects on the use and treatment of data from ordinal scales should be taken into consideration. The use of Rasch analysis will be shortly presented as also computer adaptive testing (CAT).

OP40.**HOW TO SUCCESSFULLY APPLY FOR A EUROPEAN GRANT: AGENDA SETTING, WRITING THE WORK PROGRAMME, PREPARING A PROPOSAL AND BEING EVALUATED****Alfredo Cesario, MD***IRCCS San Raffaele Pisana, Department of Thoracic Surgery, Catholic University, Rome, Italy*

Within the European Commission 7th FP, a Work Programme (WP) is issued every year in the Cooperation Health Theme. In the WP a list of areas and "topics" identifies in detail the priorities for research for that given year and outlines the funding instruments. This is generally known as the "call for proposal". The agenda setting of the thematic priorities up to the definition of each single topic in the call for proposal is a complex process where major players are the European Institutions (Parliament - EP, Council and Commission - EC), the specific "Program Committee" (PC), the National Contact Points (NCPs) and the "Research Community". Following the strategic indications from the Member (and Associate) States and the EP, the EC defines a working document that is therefore edited according to the comments and recommendations of the PC. This process lasts for one year and, when the call is published, the deadline is normally set at three months. The evaluation procedures can therefore be single- or double-staged. The main funding instruments are the Large, Medium and Small scale integrating projects (budget up to 12, 6 and 3 millions euros), Network of Excellence (12 millions €), Coordination Actions and Support Actions (1 million, half million). The evaluation process is a world class procedure run by EC staff where expert independent

reviewers from all over the world are selected from a centralised database. It consists in a remote evaluation and a panel evaluation run in person in Brussels. Projects are ranked according to a final score created by scores (from 0 to 5) given to three main criteria: Scientific and Technological Excellence, Management and Impact. Thresholds are normally put for each of these criteria as well as a final threshold is put on the sum. Competition is extremely tough: on average less than 10% of projects are funded and these achieve very high scores. This presentation focuses on details of how the overall process is managed in order to give some pragmatic suggestion on how to have an impact on it. Disclaimer: The views in the present abstract do represent the view of the writer only and under no circumstances are to be considered as officially representing the European Commission policies and regulations. Please refer to <http://cordis.europa.eu/fp7/dc/index.cfm> for official and specific information.

NEW TECHNOLOGY IN REHABILITATION

OP41.

NEW TECHNOLOGY IN REHABILITATION

Aniko Bartfai, PhD

Division of Rehabilitation Medicine, Department of Clinical Sciences, Karolinska Institutet Danderyds Hospital, Stockholm, Sweden

Rehabilitation medicine has the responsibility within the Health care sector to push the development towards a society without disabilities. A cornerstone in this process is development of assistive technology. Advanced IT-based assistive technology implies today both possibilities and challenges. New areas of application have been defined, such as the use of assistive technology for diagnostic purposes and for intensive functional training based on new neurobiological driven treatment paradigms. The symposium will present studies from all three areas, the use of assistive technology in cognitive and motor diagnostics, cognitive and motor training and as advanced assistive technology for support and reminding in the home environment.

OP42.

REDUCING EVERYDAY MEMORY PROBLEMS BY AN ELECTRONIC MEMORY AID WITH INDIVIDUALLY SPOKEN REMINDERS

Inga-Lill Boman¹, Monika Löfgren²

¹Division of Rehabilitation Medicine, Stockholm, ²Department of Clinical Sciences Danderyd Hospital, Division of Rehabilitation Medicine, Stockholm, Sweden

In previous studies we have found that electronic memory aids in a training apartment in a hospital, and in two prototype apartments, could help persons with cognitive impairments after acquired brain injury to carry out everyday activities. In this study we have ex-

amined the possibilities of a newly developed electronic memory aid with a wireless design and individually spoken reminders as support to carry out everyday activities in the participant's own home. Five participants with memory impairments after acquired brain injury got reminders for activities that they usually forget to carry out. The participants and three spouses were interviewed after the intervention. Data were analysed with a comparative approach. The participants described that the electronic memory aids were very useful and they wanted to continue to use the electronic memory aid. Participants who lived with a spouse could carry out everyday activities without support, unburdening the spouse. However, there were a lot of problems with the technology and the participants did not get any reminders and spouses had to interfere. Overall the flexible wireless design with individually adjusted sensors and reminders proved to be useful. The results indicate that it is important to put high demands on the technical reliability of electronic memory aids and increase collaboration with engineers to develop appropriate electronic memory aids that can bridge the gap between the user's expectations and desires and the user's abilities and disabilities.

Key-words: electronic aids to daily living, new technology, cognitive impairment

OP45.

IN SEARCH OF AN ECOLOGICALLY VALID MEASURE OF THE DYSEXECUTIVE SYNDROME: CAN VIRTUAL REALITY HELP IN REHABILITATION?

Ashok Jansari, Dr

University of East London, London, UK

The accurate assessment of individuals with dysexecutive syndrome (DS) is vital for effective rehabilitation. Although neuropsychological tests of executive function exist, they are not necessarily ecologically valid or predictive of real-world adjustment (Shallice & Burgess, 1991). The JAAM (Jansari, Agnew, Akesson & Murphy, 2004) paradigm is an office-based role-playing task constructed to tap the major deficits seen in DS; it employs a virtual reality environment presented on a standard laptop computer making it highly portable. To assess cross-cultural validity, two sets of individuals in brain rehabilitation centres and matched controls were used in London and in Sweden. Results showed that JAAM can successfully differentiate patients with DS from normal controls; importantly, the same paradigm was successful on a Swedish population. As well as showing overall performance, the assessment provides a profile of performance across eight cognitive constructs central to executive functions; this means that the fine-grained analysis of an individual's performance to guide future rehabilitation is possible. Further studies have shown that JAAM is also sensitive to changes in executive functions as a result of healthy ageing, androgen-deprivation therapy for prostate cancer, the long-term effects of chronic alcohol use and the intake of nicotine and can therefore be used as a tool in these areas of research. The use of Virtual Reality to assess executive functions in an ecologically-valid manner is an exciting prospect for the future. Translations into a number of other languages are planned.

**FREE COMMUNICATIONS:
ORAL PRESENTATIONS**

NEUROPLASTICITY: TBI, STROKE AND SCI

FC46.

RECOVERY OF COGNITIVE AND PSYCHOSOCIAL FUNCTIONS FOR STROKE PATIENTS IN EARLY STAGE OF REHABILITATION

*Aleksandras Krisciunas, D Petrusėvičiene, R Savickas
Kaunas University of Medicine, Lithuania*

Introduction: Cerebral palsy (CP) is a relevant medical and social issue, since only 20% of patients after stroke regain performance capacity. Occupational therapy for patients after stroke enables attainability of significant improvement in performance of the daily self-care and occupational skills. *Aim of the study:* To evaluate the recovery of cognitive and psychosocial functions in stroke patients during the early stage of the in-hospital rehabilitation. *Material and Methods:* The studied subjects comprised 100 cerebral stroke patients (47 men and 53 women). For evaluation of cognitive and psychosocial functionality, the Functional Independence Measure (FIM) was used. After the preliminary evaluation of the patients' functional status and socioeconomic and cultural conditions of the patients, individualized occupational therapy program including measures of self-care in the daily and leisure time for improvement were arranged. The study revealed that most common cognitive and psychosocial disorders in stroke patients during the early stage of rehabilitation were memory, social integration, and decision making. The FIM score at baseline (beginning of the early stage of rehabilitation) was 17.3 ± 7.7 . *Conclusion:* The stroke patients undergoing the early stage in-hospital rehabilitation partially recovered their cognitive and psychosocial functions. At the end of this stage the FIM score reached 25.9 ± 7.0 ($p < 0.01$, compared with baseline). The efficacy of occupational therapy during the early stage in-hospital rehabilitation was negatively influenced mostly by neglect syndrome ($p < 0.05$) and severity of the lesion - hemiplegia ($p < 0.01$).

FC47.

THE FACTORS AFFECTING REHABILITATION EFFECTIVENESS OF PATIENTS WITH TRAUMATIC BRAIN INJURY

Lina Varzaityte

Department of Rehabilitation, Kaunas University of Medicine, Lithuania

Objective: To determine the factors affecting rehabilitation effectiveness of patients with traumatic brain injury (TBI). *Method:* Study of 53 adults, both gender, patients with TBI: 32 (60.4%) patients were injured in car accident, 11 (20.7%) during falls, 10 (18.9%) patients were assaulted; 46 (86.8%) patients were diagnosed with severe TBI; 7 (13.2%) patients with moderate TBI. Rehabilitation effectiveness was evaluated by Barthel index. *Results:* The Barthel index at the start of rehabilitation was 23.4 ± 13.1 , after rehabilitation 55.2 ± 28.7 ($p < 0.001$); 56.0% of the patients achieved very good effectiveness, 22.6% achieved good effectiveness and 20.7% achieved unsatisfactory effectiveness. *Conclusions:* The evaluation of factors influencing very good and good rehabilitation effectiveness of patients with severe and moderate TBI has revealed that the factors with negative affect on very good rehabilitation effectiveness were the following: senior age, the lesions of frontal and parietal lobes, increased muscle tonus, communication and behaviour disorders, epilepsy, pneumonia ($p < 0.05$).

FC48.

CENTRAL NERVOUS SYSTEM PLASTICITY AND FUNCTIONAL EFFECTS IN STROKE PATIENTS RECEIVING COMPREHENSIVE FOCAL SPASTICITY MANAGEMENT – AN FMRI STUDY

Ulla Bergfeldt, RPT, PhD¹, Tomas Jonsson^{2,3}, Lennart Bergfeldt, MD, PhD⁴, Per Julin, MD, PhD^{1,3}

¹Division of Rehabilitation Medicine, Danderyd University Hospital, Karolinska Institutet, ²Hospital Physics and Radiology, Karolinska University Hospital Huddinge, CLINTEC, Karolinska Institutet, ³SMILE, Stockholm Medical Imaging Laboratory, Karolinska University Hospital, Huddinge, ⁴Department of Molecular & Clinical Medicine/Cardiology, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden

Objective: To study the central nervous system (CNS) correlates to a standardized right hand motor task in stroke patients – before and after comprehensive focal spasticity management – in comparison with healthy control subjects performing the same motor task. *Subjects:* Six first-time stroke patients with right-sided hand paresis and spasticity and 10 healthy volunteers. *Methods:* A Siemens Magnetom Vision 1.5 T and a block design of 5 repetitions of active extension-flexion for 30 s with 60 s interval on two occasions with 6–12 weeks interval was employed. fMRI data were analyzed using the FMRIB Software Library including the Jülich atlas for automated region-of-interest analysis. The BOLD intensity and extension were defined within specified Brodmann areas (BA4a, BA4p, BA6). The effects of focal spasticity therapy were assessed using the Ashworth Scale, the Lindmark Motor Assessment Scale, the Jamar dynamometer, and a verbal scale. *Results:* In healthy controls the CNS correlate was observed within expected regions and with a clear lateralization to the contra-lateral (left) hemisphere. The intensity and extension of BOLD activities varied moderately between sessions. In contrast, in patients the right hemisphere was more activated than the left before therapy, but changed towards the left hemisphere after therapy. The overall brain activity also remained more intense (higher BOLD activity) and extensive (more voxels) after therapy, suggesting increased blood flow, neuronal activation, and increased energy consumption during this motor task in stroke patients. *Conclusion:* Comprehensive focal spasticity management was associated with brain reorganization in a “normalizing” direction in addition to an improved motor function.

FC49.

VALIDATION OF A BIOMECHANICAL MODEL FOR QUANTIFICATION OF SPASTICITY IN CHRONIC STROKE PATIENTS

Johan Gäverth^{1,2}, Pål Lindberg, RPT, PhD^{1,3}, M. Islam¹, A. Fagergren¹, Jörgen Borg, MD, PhD³, Hans Forssberg, MD, PhD¹

¹Karolinska Institutet, Stockholm, Sweden, ²Department of Physiotherapy, Karolinska University Hospital, Stockholm, Sweden, ³Department of Rehabilitation Medicine, Danderyd University Hospital, Stockholm, Sweden

Background: There is a lack of valid measures of spasticity in patients with neurological disorders. *Objective:* To validate a model for quantification of muscle tone that allows estimation of the mechanical (muscle and tissue) and neural (reflex) components. *Method:* A biomechanical model of the hand composed of different factors that contribute to passive wrist movement was constructed, consisting of (i) inertia, (ii) elastic resistance (length-dependent), (iii) viscous resistance (velocity-dependent) and (iv) reflex mediated muscle contractions (Neural component (NC), velocity-dependent). We measured passive movement resistance and surface EMG (flexor carpi radialis) during 50° passive

wrist extension across four controlled velocities (5, 71, 142, and 236°/s) in stroke patients and healthy subjects. In a subgroup of patients, repeated measures before and after ischemic nerve block were obtained. **Results:** The model was validated in four ways. (i) NC was abolished or reduced drastically after the ischemic nerve block; (ii) NC correlated strongly to the EMG activity ($r=0.86$, $p=0.007$ at 236°/s), both in the same subject during the ischemic nerve block procedure and in the patient group; (iii) The total resistance, and NC, correlated to the modified Ashworth score ($r=0.68$, $p<0.001$, $r=0.70$, $p<0.001$ at 236°/s, respectively); (iv) NC was also velocity dependent. The profile of mechanical neural factors differed widely among patients. **Conclusions:** The results indicate a valid model for quantification of neural component of increased muscle tone in chronic stroke patients. The method may be developed to be used clinically to measure muscular and neural components of muscle hypertonus, i.e. "spasticity".

FC50.

QUANTITATIVE AND QUALITATIVE VALIDATION OF A GROUP TREATMENT PROGRAM FOR MILD ACQUIRED BRAIN INJURY

Aniko Bartfai, PhD¹, Peter Sojka, MD, PhD^{3,4}, C Nilsson¹, A Rudolfsson², Monika Löfgren RPT, PhD¹, R Forsgren², B Holmlund²

¹Department of Rehabilitation Medicine, Karolinska Institutet, Danderyds Hospital, Stockholm, ²Department of Rehabilitation Medicine, Umeå University Hospital, Umeå, ³Division of Rehabilitation Science, Department of Health Sciences, Mid Sweden University, Östersund and ⁴Department of Rehabilitation, Östersund Hospital, Sweden

We are reporting specific features of a group treatment program developed for mild acquired brain injury (mABI) based on qualitative and quantitative evaluations and an independent replication in a different clinical setting. The program was developed at Danderyds Hospital and evaluated quantitatively and qualitatively. The independent validation was done through running the same program with another staff in a different rehabilitation facility, at Umeå University Hospital. For the original program the results indicated a significant improvement in ratings of Quality of Life, significant increase in Self-Control and a trend to decreased anxiety according to the Psychological Well Being Scale and significantly improved recall and the Buschke Selective Reminding Test. At the three months' follow-up 91% of participants were very satisfied with the group treatment program. For the independent replication significant improvements ($p<0.05$; Wilcoxon signed rank test) were found for Social Support, MPI och IES. There was a tendency to improvement for BDI ($p=0.063$) and KASAM ($p=0.074$) and a subjectively reported improvement. The qualitative interview study found that this group treatment contributes to increased awareness by speeding up adaptation. Participants needed support for how to deal with changes and what are life's new priorities? Cognitive group rehabilitation according to the Danderyd model thus has had a positive effect in two different clinical settings and emphasizes the importance of group treatment for the integration of knowledge, strategies and self-image leading to changes in how to handle problems or prioritize in major life choices.

FC51.

EARLY INTERVENTION TO PREVENT PERSISTING DISABILITY AFTER MILD TRAUMATIC BRAIN INJURY

Giedre Matuseviciene¹, Jörgen Borg, MD, PhD¹, Britt-Marie Stålnacke, MD, PhD², Trandur Ulfarsson, MD³, Catharina DeBoussard, MD, PhD⁴

¹Department of Clinical Sciences, Rehabilitation Medicine, Karolinska Institutet, Danderyd Hospital, Stockholm, ²Department of

Community Medicine, Rehabilitation Medicine, Umeå University Hospital, Umeå, ³Department of Rehabilitation Medicine, Sahlgrenska University Hospital, Göteborg, ⁴University Department of Rehabilitation Medicine, Danderyd Hospital, Stockholm, Sweden

After mild traumatic brain injury (MTBI), a subgroup of patients report persisting problems. We used early symptom load, which correlates with symptom load at three months after MTBI, to select patients for an early, randomised, controlled trial to compare the effect of combined written information + follow-up by a specialist in neurorehabilitation within three weeks after the injury with written information and standard care alone. 174 patients, aged 15–70 years, with MTBI and a presenting Glasgow Coma Scale score of 14–15 were included and answered the Rivermead Post Concussion Symptoms Questionnaire at 10 days after the injury. Ninety patients fulfilling high risk criteria (three or more symptoms at ten days after injury) were randomised to either intervention. Eighty-four patients with low risk (fewer than 3 symptoms at ten days after injury) were also followed up. Attrition rate was low. At three months, symptoms, activity performance, participation and health service consumption were assessed. Here we report the outcome with regard to symptoms. At three months after MTBI, symptom load was not significantly different between the randomized groups, while the symptom load was significantly higher in the high risk group as compared with the low risk group. In conclusion, early, structured follow-up by a specialist in neurorehabilitation added no statistically significant effect to early, written information and standard care on symptoms at three months after MTBI. The low risk group reported significantly lower symptom load as compared with the high risk group, lending support to validity of the risk criteria.

FC52.

THE REALISTIC GOALS IN A ROBOTIC-ASSISTED TREADMILL TRAINING FOR SPINAL CORD INJURY PATIENTS SUBGROUP

Varje-Riin Tuulik Leisi, Pille-Riika Lepik

Tallin Hospital Rehabilitation Unit, Tallin, Estonia

The program is designed for 16–65 years old central nervous system (CNS) trauma patients. We followed 16 working age Lokomat® System. Lokomat allows vertical position, exact imitation of normal gait, errorless repetitions and bio-feedback. The Lokomat is an exo-skeletal robotic orthosis that attaches to a person's legs and assists the subject in achieving normal gait patterns. During training sessions with the Lokomat, patients will receive bio-feedback of their performance, allowing for goal-directed therapy. The two main principles of re-learning any function is errorless repetitions of movement and high motivation. The main goal of Lokomat program is retraining a walking ability. During the treadmill training, a periodic excitation of the cutaneous and muscular receptors provides a periodic afferent input to the neural circuits located in the spinal cord (central pattern generator). These circuits are responsible for coordinated muscle activation in the limbs required to generate locomotion. It was demonstrated that the treadmill training improves the muscle activation pattern generated by the central pattern generator, and therefore enables the patients a faster and better re-learning of the locomotion (walking). In many cases, walking is not a realistic goal in CNS trauma population. Is guided locomotion training useless in these cases? Does locomotion training influence on other functions of body and mind than locomotion? Is there any progress in an activity and participation on personal level because of participation in the intensive robotic-assisted gait training program? The International Classification of Functioning, Disability and Health (ICF) allow health professionals to describe the problematic areas of functioning and participation. In this study we found positive influence of intensive locomotion training on different functions (f) (energy and drive f, sleep f, pain f, defecation f, etc) and also on activity (lifting and carrying objects, transferring oneself, driving etc) and participation (school education etc).

VOCATIONAL REHABILITATION – PARTICIPATION IN WORK AND EMPLOYMENT

FC53.

DEVELOPMENT OF THE MOTIVATION FOR CHANGE QUESTIONNAIRE (MCQ)

Gunvor Gard, RPT, PhD, Birgitta Grahn

Department of Health and Rehabilitation, Luleå University of Technology, Luleå, Sweden and Department of Health Sciences, Lund University, Lund, Sweden. FoU Vålfärd, Kronoberg County Council, Växjö, Sweden and Department of Health Sciences, Lund University, Lund, Sweden

Motivation can be defined as everything that drives and sustains human behaviour and has been shown to be important for good rehabilitation outcomes. Reliable instruments to measure it is needed. The motivation for change questionnaire (MCQ) was developed from a literature search in the Medline, Cinahl and Psychlit databases concerning motivating factors for change in the life and work situation. Questions covering these factors were developed. Factor analysis of the questions implied a reduction of the number of questions. Inter-item correlation was assessed on the baseline administration of the questionnaire. When testing the structure of the scales, it was shown that the MCQ questionnaire could be described in two scales, one scale relating to motivation for change in the life situation and the other focusing on motivation for change in the work situation and in total 49 questions. The test-retest reliability was calculated using the intra-class correlation coefficient (ICC). Seven scales relating to the life situation were accepted by the analysis: social support, mastery in life, challenges in life, control in life, values, self-efficacy and self-confidence. Six scales relating to the work situation were also accepted; co-worker support, supervisory support, challenges in work, job control, interaction and job-satisfaction. The MCQ questionnaire with 48 questions is reliable for use on musculoskeletal pain patients in interdisciplinary rehabilitation. It can be used to identify each individual's motivating factors for change in life and work situation as a basis for motivational work within rehabilitation and/or to measure within-subject changes in motivation over time.

FC54.

THE PROGNOSTIC VALUE OF VARIOUS SHORT- TERM REHABILITATION SUCCESS MARKERS AND OF THE PATIENTS' SELF-ASSESSMENT OF THEIR HEALTH STATUS FOR EARLY RETIREMENT: RESULTS OF A PROSPECTIVE COHORT STUDY

Maria Weyermann¹, Ralf Neuner²

¹Niederrhein University of Applied Sciences, Krefeld, and ²Department of Epidemiology, University of Ulm, Ulm, Germany

The objective of this study was to evaluate the prognostic value of various short-term rehabilitation success markers and of the patients' self-assessment of their health status on early retirement by means of a prospective cohort study. We included 1416 patients aged 45–57 years with musculoskeletal diseases who underwent an in-patient rehab programme between January and December 2001 in 10 LVA Baden-Württemberg (Germany) rehab clinics. Follow-up information with regard to disability was collected until 2006. During follow-up (mean duration: 3.9 years) 146 (10.3%) patients retired because of health-related disability. The prognostic value of the patients self-assessment questionnaire and of the standardized documented items of short-term rehabilitation success markers was estimated by proportional hazards regression. After adjustment for sex, age and social index, a better self-assessment of functional status and pain status, respectively, was statistically significantly

associated with reduced risk for early retirement. Compared to patients within the lowest tertile of the distribution of the functional status scale, the hazard rate for patients within the upper tertile of the distribution was 0.3 (95% CI 0.2–0.6); compared to patients within the lowest tertile of the distribution of the pain scale, the hazard rate for patients within the upper tertile of distribution was 0.3 (95% CI 0.1–0.5). Pain reduction reported as a short-term rehabilitation success marker by a physician was also of prognostic relevance. Patients with unsuccessful pain reduction had an increased risk for early retirement compared to patients, for whom physicians had not reported pain reduction as short-term rehabilitation success marker (HR 2.4, 95% CI 1.4–4.3). Self-assessment of pain as well as pain reduction reported as short-term rehabilitation success marker by the physician clearly demonstrated a prognostic value in terms of risk for subsequent disability-related early retirement among patients with musculoskeletal diseases.

FC55.

DESCRIBING FUNCTIONING AND DISABILITY BY MEANS OF A COMPREHENSIVE ICF CORE- SET-BASED PROFILE

Marie-Louise Schult, reg.OT, PhD, Philippe Njoo, RPT, MS, Jan Ekholm, MD, PhD

Karolinska Institutet, Department of Clinical Sciences DS and the Stockholm Rehabilitation Medicine University Clinic, Danderyd University Hospital, Stockholm, Sweden

The aim of this pilot study was to get practical clinical experience of a new adapted 'comprehensive ICF core-set-based profile' (for low back pain and chronic widespread pain combined) using the qualifiers for describing the functioning and disability. Another aim was to investigate whether different patterns occurred in the profiles and, if so, whether they were related to e.g. current work status, assessed rehabilitation potential or other factors. *Methods:* A consecutive series of patients suffering from long-lasting pain and referred to a rehabilitation medicine university department (Oct 2009–Feb 2010) participated. All patients were comprehensively assessed using questionnaires included in the Swedish national quality register for pain rehabilitation (e.g. SF-36, EQ-5D, MPI, Tampa, CPAQ), demographic data, as well as profession-specific assessments (Self-efficacy, Tippa, 6-minutes-walk-test, Valpar). All data from patient interviews, questionnaires, observations and tests were transformed into a 'comprehensive profile' using the ICF core sets, qualifiers and team consensus. Preliminary results ($n=16$) showed moderate to severe impairments in body functions: motivation (b1301), sleep (b134), energy and drive (b1300) emotional functions (b152), exercise tolerance functions (b455), mobility of joint functions (b710). Results showed moderate to severe difficulties in activities/participation: carrying out daily routines (d230), handling stress (d240), lifting and carrying objects (d430), walking (d450), moving around (d455), household tasks (d630-d649), and remunerative employment (d850). Severe barriers were found in ICF environmental factors: support and relationships at work (e330), social security services, systems and policies (e570) and labour and employment services, systems and policies (e590).

FC56.

TO TAILOR HEALTH PROMOTING INTERVENTIONS TO USER NEEDS: EFFECTS OF WORK ABILITY AND HEALTH PROMOTING INTERVENTIONS FOR WOMEN WITH MUSCULOSKELETAL SYMPTOMS

Agneta Larsson, doctoral stud., Lena Karlqvist, RPT, PhD, Gunvor Gard, RPT, PhD

Division of Health and Rehabilitation, Luleå University of Technology, Luleå, Sweden

Background: Women working in the public human service sector in 'overstrained' situations run the risk of musculoskeletal symptoms and long-term sick leave. In order to maintain the level of health and work ability and strengthen the potential resources for health, it is important that employees gain greater control over decisions and actions affecting their health – a process associated with the concept of self-efficacy. The aim of this study was to describe the effects of a self-efficacy intervention and an ergonomic education intervention for women with musculoskeletal symptoms, employed in the public sector in the north of Sweden. **Methods:** The design of the study was a 9-month prospective study describing the effects of two interventions, a comprehensive self-efficacy strengthening intervention ($n=21$) and an ergonomic education intervention ($n=21$). Each employee selected which intervention she wanted to participate in. Data were obtained by a self-report questionnaire on health- and work ability-related factors at baseline, and at ten weeks and nine months follow-up. Within-group differences over time were analysed. **Results:** The two interventions attracted participants with somewhat different work ability at baseline. Over the time period studied there were small magnitudes of improvements within each group. Within the self-efficacy intervention group positive effects in perceived work ability were shown. The ergonomic education group showed increased positive beliefs about future work ability and a more frequent use of pain coping strategies. **Conclusion:** Both interventions showed positive effects on women with musculoskeletal symptoms, but in different ways. Future research in this area should tailor interventions to participants' motivation and readiness to change, and pay attention to prerequisites for participation.

FC57.

WHIPLASH-ASSOCIATED DISORDERS IN LITHUANIAN PATIENTS FOLLOWING MOTOR VEHICLE COLLISION

Evelina Preisegolaviciute, med. student¹, Gintaute Samusyte, med. Intern², Jolita Janusauskaite, neurology resident³, Kestutis Petrikonis, MD, PhD⁴, Indre Bileviciute-Ljungar, MD, PhD⁵

¹Kaunas University of Medicine, Kaunas, ²Department of Neurology, Jonava Hospital, Kaunas University of Medicine, Kaunas, ³Kaunas University of Medicine Hospital, Kaunas, ⁴Department of Neurology, Kaunas University of Medicine Hospital, Kaunas, Lithuania, ⁵Karolinska Institutet, Department of Clinical Sciences, Danderyd Hospital, Stockholm, Sweden

Background: In Sweden, approximately 10% of patients develop chronic whiplash-associated disorders (WAD) after vehicle accident resulting into high socioeconomic costs. It has previously been reported that WAD diagnosis in Lithuania was uncommon despite the high amount of traffic accidents (1996). **Aim:** To re-evaluate the appearance of WAD among Lithuanian patients by a 6-months follow-up. **Methods:** The study enrolled 10 men and 13 women (mean age of 32 years) who searched for medical help after motor vehicle collision at Department of Acute Emergency at Medicine Hospital of Kaunas University. Following questionnaires were used within 2 weeks and at 6 months after the accident: Visual Analogy Scale (VAS), Quebec Task Force questionnaire and Disability Rate Index (DRI). Sociodemographic data was also followed-up. The pre-accidental parameters scored by the patient during the first visit were used as a control. **Results:** Twenty-one of 23 patients developed acute WAD symptoms as compared to their pre-accidental status. After 6 months, 11 of 23 patients still had WAD symptoms, mostly neck/shoulder pain and numbness in the arms. In contrast, significant improvement was found in pain intensity and DRI ($Z=-2.09$, $p=0.037$ and $Z=-3.8$, $p<0.001$, respectively). During the first visit, 16 of the patients were employees and 7 students. Due to the accident 12 patients were on a sick leave for an average of 18 days. After 6 months all of them had ability to work. **Conclusions:** Our data indicate the presence of chronic

WAD after vehicle accident among Lithuanian patients. However, their social life and ability to work was unchanged.

FC58.

HOW CAN WE HELP EMPLOYEES WITH MULTIPLE SCLEROSIS TO KEEP ON WORKING? AN OVERVIEW OF VOCATIONAL REHABILITATION FOR PEOPLE WITH MULTIPLE SCLEROSIS

Sven-Uno Marnetoft, PhD¹, Amparo M. Assucena²

¹Department of Health Sciences, Mid Sweden University, Östersund, Sweden, ²PRM Department, Hospital de Requena, Requena, Spain

People with multiple sclerosis (MS) are usually in full-time work or education when the disease is diagnosed. As the condition progresses the number of patients in work decreases dramatically with employment rates ranging from 23% to 32%. MS has a decidedly negative impact on a person's opportunities of becoming part of or retaining a place in the work force. Several studies have shown that people with MS aspire to carry on working. Being unable to work can have a dramatic impact on an individual's self-esteem and it can also lead to increased financial stress. Participating in the labour market not only provides a person with material benefits, it also assists with identity construction and the maintenance of a preferred identity. Being engaged in preferred occupations as a paid worker has positive outcomes for people's health. The aim of the study was to present an overview on vocational rehabilitation for people with MS. A literature search was conducted in the literature databases MEDLINE, CHINAL, Cochrane Library and PsychINFO. The main keyword MS, combined with other relevant keywords, such as vocational rehabilitation, employment, work, retention, return to work or back to work, was used to carry out the search. The study showed that there is a lack of good methodological studies in the field of vocational rehabilitation and MS. Research neither supports nor refutes the effectiveness of vocational rehabilitation for people with MS. Further research is definitely needed.

NEUROLPLASTICITY: POLIO, STROKE AND BRAIN INJURY REHABILITATION

FC59.

FATIGUED POST-POLIO PATIENTS – A SUBGROUP

Gunilla Östlund¹, Åke Wallin, PhD², Kristian Borg, MD, PhD¹

¹Department of Rehabilitation Medicine, Karolinska Institutet Danderyd Hospital, ²Department of Psychology, Stockholm University, Stockholm, Sweden

Background: Multi-center study. One hundred and forty-three post-polio patients (PPS) were divided into fatigued, controls and non-fatigued, according to level of MFI 20 General fatigue variable. **Aims:** To characterize background, quality of life (QOL) and fatigue levels, examine correlation patterns and, to analyze the relative relationship of mental and physical fatigue in the three groups respectively. **Methods:** Descriptive statistics and correlations for background, QOL (SF36), fatigue (MF I20), sleep quality (SQS), and pain intensity (visual analogue scale, VAS). ANOVA and Chi2 for group comparisons. Regression analyses were performed to examine the effects of Mental and Physical fatigue on Vitality. **Results:** The fatigue group was younger, had shorter polio duration, higher Body Mass Index, more pain intensity, mental and physical fatigue, worse physical function, sleep quality and mental health and lower vitality compared to the other groups. Vitality and pain were similarly correlated with the

other variables in the non-fatigued and control groups, patterns lacking in the fatigued group. Mental fatigue had a relative larger importance than physical fatigue in the fatigued group. The opposite was observed in the other groups. *Conclusion:* Fatigued PPS patients may be considered as a subgroup.

FC60.

REPRODUCIBILITY OF KNEE MUSCLE STRENGTH MEASUREMENTS AND GAIT PERFORMANCE TESTS IN PERSONS WITH LATE EFFECTS OF POLIO

Ulla-Britt Flansbjer^{1,2}, Jan Lexell, MD, PhD^{1,2,3}

¹Department of Rehabilitation Medicine, Skåne University Hospital, Lund, ²Department of Clinical Sciences, Division of Rehabilitation Medicine, Lund University, Lund, ³Department of Health Sciences, Luleå University of Technology, Luleå, Sweden

Muscle weakness in persons with late effects of polio often affects the lower limbs, leading to difficulties to ambulate. To assess the reproducibility of measurements of knee muscle strength and gait performance, an intra-rater test-retest reliability study was performed with thirty men and women (mean age 63 ± 6.4 years) with verified late effects of polio. Knee muscles strength (isokinetic; Biodex dynamometer) (isotonic; HUR exercise machine) and gait performance (Timed “Up & Go”, Comfortable and Fast Gait Speed, and 6-Minute Walk tests) were measured twice, seven days apart. Reproducibility was evaluated with the intraclass correlation coefficient (ICC_{2,1}), the mean difference between the test sessions (d) and the 95% confidence intervals for d, the standard error of measurement (SEM and SEM%) and the smallest real difference (SRD and SRD%). The results showed that test-retest agreements were high (ICC_{2,1} 0.82–0.99) and measurement errors generally small. The standard error of measurement (SEM%), representing the smallest change that indicates a real improvement for a group of individuals, was small (4% to 14%). The smallest real difference (SRD%), representing the smallest change that indicates a real (clinical) improvement for a single individual, was relatively small for gait performance (12% to 21%) but somewhat higher for the isokinetic measurements, at most 39%. In conclusion, knee muscle strength and gait performance tests are reproducible and can be recommended to detect changes over time or after an intervention in persons with late effects of polio, but certain magnitudes of improvement are needed to state that a clinically relevant change has occurred.

FC61.

THE FREQUENCY, CONSEQUENCES AND CIRCUMSTANCES OF FALLS IN PRIOR POLIO PATIENTS

A Bickerstaffe, Frans Nollet, Anita Beelen

Academic Medical Center, University of Amsterdam, Department of Rehabilitation, Amsterdam, The Netherlands

Many prior polio patients suffer from a variety of symptoms that are known risk factors for falls in elderly and other patient groups. This study aims to determine 1) the frequency of, 2) the physical and psychological consequences of, 3) the circumstances of, and 4) the prevalence and role of known risk factors for, falls in prior polio patients. A survey was conducted among 371 prior polio patients known at the department of rehabilitation of AMC Amsterdam. Participants completed a falls history- and several related questionnaires. Additional information about medication use and the extent of paresis was obtained from the medical files. Of the 305 respondents (response rate 82%, mean age 57 years, 64% female). 74% reported at least one fall in the past year and 81% of these were recurrent fallers. 16% of fallers described a major injury after a fall in the last year and 63% of responders

reported fear of falling. A third of fallers had reduced the amount they walked because of their fear of falling. Most reported falls in a familiar environment (86%), while walking, de- and ascending stairs or during posture changes or transfers (72%) and in the afternoon (50%). Recurrent fallers were slightly younger than the rest and those with orthoses fell relatively more often, while average lower limb muscle strength was only slightly lower for fallers than non-fallers (MRC score: 60/80 for fallers and 66/80 for non-fallers). The high prevalence of falls and the severity of the consequences found in this study, indicate the clinical importance of falls for prior polio patients. Several of the fall circumstances reported by this group differed from those previously reported among other disease categories, highlighting the necessity of tailored fall intervention strategies.

FC62.

ABOUT OVERWORK WEAKNESS IN CHARCOT-MARIE-TOOTH

Annette J. Videler, PhD, Anita Beelen, Frans Nollet, MD, PhD

Department of Rehabilitation, Academic Medical Center, University of Amsterdam, Amsterdam, The Netherlands

Introduction: Recently, the hypothesis of overwork weakness in the hands of Charcot-Marie-Tooth disease (CMT) patients has been under discussion. Because of the direct implications for rehabilitation and life-style advice given to these patients, we reanalyzed the data of our recently performed study on hand function in CMT1A to evaluate a possible presence of overwork weakness in our population. *Methods:* Isometric hand strength (grip, two-point, tripod, and lateral pinch strength) was measured using digital dynamometers in 49 DNA-confirmed CMT1A adults. Hand strength was compared between the dominant and non-dominant hand by paired t-tests in the total study sample and in subgroups of less and more severely affected patients (i.e. tripod pinch strength of the dominant hand equal to/above or below the 50:th percentile score, 43N, of the total group). *Results:* No significant differences between dominant and non-dominant hand strength were found in the total sample. In the less-affected subgroup ($n=27$) all mean values for grip and pinch strength were higher in the dominant hand, although, not statistically significant. By contrast, in more severely affected patients ($n=22$) dominant hand strength was significantly lower: e.g. tripod pinch 17.3 (14.5) vs 23.1 (19.8) N, $p=0.015$). *Conclusion:* Dominant hand strength was found to be weaker in more severely affected CMT1A patients, which may fit with the hypothesis of overwork weakness. Nevertheless, before advising patients to limit the use of their hands in daily life, further, preferably longitudinal and electrophysiological research is needed to identify the underlying mechanisms of muscle strength differences between hands.

FC63.

A MULTIDISCIPLINARY TEAM APPROACH IS URGENTLY NEEDED TO RECLAIM FUNCTIONING IN CRITICALLY ILL PATIENTS; RESULTS FROM TWO OBSERVATIONAL STUDIES ON FUNCTIONAL OUTCOME OF INTENSIVE CARE UNIT PATIENTS

Marika van der Schaaf, RPT, PhD, Anita Beelen, PhD, Frans Nollet, MD, PhD

Academic Medical Center, University of Amsterdam, Department of Rehabilitation, Amsterdam, The Netherlands

Background: With increasing intensive care unit (ICU) survival rates, the proportion of patients with subsequent problems in daily functioning has been growing. It has been recognized that the intensive support of these patients needs to be continued after

discharge from the ICU, however rehabilitation treatment is hardly available for patients after discharge from the ICU. To develop adequate rehabilitation follow-up care, we investigated impairments in body functions, limitations in activities, and restrictions in participation after critical illness. *Patients and Methods:* In two observational studies of patients who were ventilated in the ICU for more than 48 hours, 12 months after discharge from the ICU daily functioning was assessed in 255 patients using the Sickness Impact Profile (SIP68), and in 20 patients impairments in functions, limitations in activities, and restrictions in participation were evaluated using the ICF checklist. *Results:* Fifty-four percent of the patients had restrictions in daily functioning. Walking and social activities were most frequently restricted (30–60% of the patients). The prevalence of impairments (joint mobility 46%, muscle strength 50%, attention 73%, memory 41%, fatigability 83%), limitations in activities (walking 46%, carrying objects 67%), and restrictions in participation (employment 46%, recreation 50%) was high. *Conclusion:* The extent and severity of lasting disability in patients who stayed in the ICU for at least 2 days implies that these patients are a potential target population for rehabilitation medicine. Multidisciplinary therapies need to be developed and evaluated in order to improve functional independence and return to work.

FC64.

INCIDENCE OF PULMONARY EMBOLISM DURING EARLY REHABILITATION AFTER STROKE

Jana Intchite, Külli Margus, Aet Lukmann

Department of Sports Medicine and Rehabilitation, Tartu University Hospital, Tartu, Estonia

Aim: To assess the incidence of pulmonary embolism (PE) and its contributing factors during early rehabilitation after stroke in the in-patient rehabilitation unit. *Methods:* Retrospective analyses of 431 case histories (years 2005–2008) including evaluation of baseline characteristics, clinical features, laboratory findings and treatment strategies. *Results:* Radiologically determined PE with rather nonspecific clinical manifestation occurred in 1.9% of patients (study group, $n=8$; control group, $n=423$) admitted for active multidisciplinary rehabilitation program 24 ± 13.0 days after stroke. Mean age of the patients was slightly higher in the study group than in the control group (77.1 ± 6.2 vs 70.7 ± 10.1 years, respectively); most of the subjects were overweight (BMI 30.5 ± 3.6 vs 28.5 ± 5.9 , respectively). All of the patients with PE had moderate to severe arterial hypertension; 50% of the subset had atrial fibrillation (AF) vs 82% and 40% in the controls, respectively. In patients with PE the level of D-dimers was higher than $10 \mu\text{g/l}$ which is a more than 25-fold increase from the reference value. The values of blood lipoproteins remained within normal limits in both subsets. AF was discovered in 50% of the study group versus 40% in the control group. Anticoagulation therapy (ACT) with low-molecular heparin/warfarin was started in 39% of patients with AF. *Conclusions:* in order prevent PE after a stroke in early rehabilitation setting it is mandatory to follow generally accepted clinical practice guidelines such as CHADS score. ACT with K vitamin antagonists, subcutaneous low-molecular heparin and recently developed trombin inhibitors should be considered in order to prevent serious thromboembolic complications. Anticoagulation is underused in stroke patients with AF.

FC65.

ENERGY BALANCE AND METABOLISM AFTER SEVERE TRAUMATIC BRAIN INJURY: A PILOT STUDY USING DOUBLY LABELLED WATER

Karolina Krakau, RN, BSc^{1,2}, Lars Ellegård, MD, PhD³, Bo Michael Bellander, MD, PhD⁴, Torbjörn Karlsson,

MD, PhD⁵, Catharina Nygren de Bousard, MD, PhD², Mikael Karlsson, RD, BSc⁶, Jörgen Borg, MD, PhD²

¹Department of Neuroscience, Rehabilitation Medicine, Uppsala University Hospital, Uppsala, ²Department of Clinical Sciences, Rehabilitation Medicine, Karolinska Institutet, Danderyd University Hospital, Stockholm, ³Department of Clinical Nutrition, Sahlgrenska Academy at the University of Gothenburg and Sahlgrenska University Hospital, Gothenburg, ⁴Department of Clinical Neuroscience, Section for Neurosurgery, Karolinska University Hospital Solna, Stockholm, ⁵Department of Surgical Sciences, Anesthesiology and Intensive Care, Uppsala University, Uppsala, ⁶Danderyd Geriatric Center, Danderyd University Hospital, Stockholm, Sweden

Objective: To explore the course of energy balance in patients with severe traumatic brain injury, from time of injury until twelve weeks post injury. *Method:* This prospective descriptive study included six patients with isolated, closed severe traumatic brain injury and an expected hospital stay of ≥ 2 -3 months. Energy balance was calculated from energy intake compared to total energy expenditure measured by continuous indirect calorimetry and doubly labelled water. Clinical and laboratory variables with possible influence on metabolism and nutritional delivery were recorded simultaneously. Intermittent indirect calorimetry measurements were used to differentiate components of the energy expended. *Results:* Patients were roughly in energy balance while on mechanical ventilation, but in negative energy balance from the 3rd week post injury. The total energy expenditure then increased while the daily energy intake declined. Concurrent with this period were difficulties in retaining enteral and/or parenteral nutrition delivery routes until oral feeding was satisfactory. Nitrogen balance was back to normal at about 1.5 months and the inflammatory period with increased C-reactive protein levels continued for 12 to 58 days from time of injury. During the first and second month post injury, patients lost 8–19% of their initial body weight. *Conclusion:* Data suggests that negative energy balance after a severe TBI could not only be explained by the elevated metabolic rate and catabolism induced by the trauma, but also by difficulties in securing alternative nutritional routes in the distressed patient.

FC66.

SEX HORMONES AND MENTAL FATIGUE

Marika C. Möller, MA¹, Angélique Flöter Rådestad, MD, PhD², Aniko Bartfai, PhD¹

¹Karolinska Institutet, Department of Clinical Sciences, Danderyd hospital, Division of Rehabilitation Medicine, ²Karolinska Institutet, Department of Women and Child Health, Division of Obstetrics and Gynaecology, Stockholm, Sweden

Objective: The aim of the present study is to investigate the relation between mental fatigability, self-rated well-being and hormonal levels, in oophorectomized women in relation to hormone replacement therapy with estrogen and additional testosterone. *Background:* Estrogen and testosterone insufficiency has been associated with fatigue, and reduced psychological well being. Effects of estrogen replacement therapy on memory and psychosexual well-being have been studied intensively over the years but studies on fatigability are few. The effects on testosterone treatment and objective neuropsychological functions are even less documented, especially in oophorectomized women. *Method:* Women with surgically induced menopause ($n=50$, mean age 54.0 ± 2.9 years) were randomly assigned treatment with estradiol valerate in combination with testosterone undecanoate or placebo for 24 weeks in a double-blind, cross-over study. The women were assessed with self-report questionnaires regarding psychological well-being (PGWB) and neuropsychological tests of visuomotor fatigability, visuomotor speed and incidental learning at baseline, at time of cross-over and after the end of treatment. *Results:* Visuomotor fatigability was not related to self-rated

psychological well-being nor with hormonal levels before treatment, but was significantly related to self-rated health and body mass index. Testosterone in combination with estrogen had no effect on visuomotor fatiguability. A post hoc analysis showed that estrogen alone had a negative effect on visuomotor speed in women who showed visuomotor fatigue before treatment. *Conclusions:* Testosterone has no beneficial effects on visuomotor fatigue in oophorectomized women and estrogen seems to have negative effect of visuomotor speed in women suffering from mental fatiguability at baseline.

FC67.

PITUITARY INSUFFICIENCY FOLLOWING TRAUMATIC BRAIN INJURY OR SUBARACHNOID HAEMORRHAGE

Anna Tölli¹, Bo-Michael Bellander², Charlotte Höybye³, Anna-Lena Hulting³, Seija Lund¹, Jörgen Borg¹

¹Department of Clinical Sciences, Danderyd Hospital, Karolinska Institutet, Stockholm, ²Department of Clinical Neuroscience, Karolinska Institutet, Stockholm, and ³Department of Molecular Medicine and Surgery, Karolinska Institutet, Stockholm, Sweden

Introduction: Traumatic brain injury or subarachnoid haemorrhage might cause pituitary insufficiencies, but there is a need for further studies to clarify the extent as well as the clinical impact of pituitary insufficiency after injury. The purpose of the study is to explore: (i) the prevalence and course of pituitary insufficiencies in patients until one year; (ii) if there is an independent effect of early pituitary insufficiency on the long term outcome; (iii) if persisting pituitary insufficiency is related to persisting disability at one year. *Methods:* Patients aged >17 years and treated at Neurointensive care are eligible for inclusion. Ten days post injury, a Synthene test is performed and thyroid function (fT3, fT4 and TSH) examined. Clinical assessment is performed at the Department of Rehabilitation Medicine according to a comprehensive study protocol at 3, 6 and 12 months post injury. Hormonal screening at 3 months include S-TSH, S-fT4, S-fT3 and S-Cortisol and at 6 and 12 months, S-TSH, S-fT4, S-fT3, S-IGF-I, P-GH, S-Prolactin and S-Cortisol. In addition, S-Estradiol, S-FSH and S-LH are examined in females and S-Testosterone and S-SHBG in males. *Results:* Until now, 45 patients have been examined. Although not conclusive, data collected until now, indicate thyroidal disturbances at day 10 and cortisol disturbances at three months post injury. *Conclusions:* Available data demonstrate thyroidal and cortisol disturbances after injury and indicate that these disturbances have different time courses. Data do not allow any conclusions on the extent or clinical impact of these disturbances and data collection will proceed until inclusion of 200 patients.

MOVEMENT RELATED FUNCTIONS/MOBILITY, LONG-LASTING PAIN CONDITIONS AND EDUCATION

FC68.

MULTIDISCIPLINARY APPROACH IS A PREREQUISITE IN AN EXERCISE PROGRAM FOR PATIENTS WITH A HIGH-RISK DIABETIC FOOT

Boukje M. Giele, PT, MSc, Nicoline M. Otterman, PT, Marike van der Schaaf, PT, PhD, Carine H. van Schie, PhD, Arianne van Bon, MD, Tessa E. Busch, MD, Frans Nollet, MD, PhD

Department of Rehabilitation of the Academic Medical Center, University of Amsterdam, The Netherlands

Background: Patients with a diabetic foot are often excluded from generic exercise programmes for patients with diabetes mellitus, due to lack of evidence on safety and effectiveness. A pilot was performed to primarily investigate feasibility of an exercise programme for patients with a diabetic foot and secondary the initial effectiveness. *Methods:* In the pre-post design study, 22 high risk diabetic foot patients with multiple complications participated in a 12-week combined aerobic and resistance exercise programme, led by physiotherapists. For safety precautions a xECG and foot screen were conducted and a multidisciplinary team consisting of a rehabilitation specialist, endocrinologist, podiatrist and diabetic specialist nurse was set up. Feasibility was assessed by programme adherence, patient satisfaction, adverse events and achievement of target training intensity. Effectiveness was evaluated in submaximal exercise capacity, muscle strength, HbA1c and perceived limitations in functioning. *Results:* Twenty patients completed the exercise programme with high adherence and satisfaction. Fifty two adverse events occurred, of which none was severe and all could be resolved by the multidisciplinary team. Target training intensity was achieved by 70% of the participants. Muscle strength, HbA1c and perceived limitations in functioning improved significantly. *Conclusion:* An exercise programme for patients with a high-risk diabetic foot and multiple long term complications was shown feasible and safe in a hospital setting. A multidisciplinary rehabilitation approach is recommended to adequately manage adverse events and thereby prevent drop-out and attain high attendance. With this meticulous approach clinical relevant training effects could be obtained in this population.

FC69.

QUADRICEPS FEMORIS MUSCLE STRENGTH AND POSTURAL SWAY IN WOMEN WITH OSTEOARTHRITIS BEFORE TOTAL KNEE ARTHROPLASTY

D. Vahtrik¹, Helena Gapeyeva¹, Herje Aibast¹, Tatjana Kums¹, Jaan Erelina¹, G. Schneider², Tiit Haviko², Aare Märtson², Mati Pääsuke¹

¹Institute of Exercise Biology and Physiotherapy, University of Tartu, Tartu, ²Department of Traumatology and Orthopaedics, Tartu University Hospital, Tartu, Estonia

The aim of the study was to compare maximal voluntary contraction (MVC) force of the quadriceps femoris muscle (QF) and static postural sway of total knee arthroplasty (TKA) scheduled leg (ASL) and non-scheduled leg (NASL) in women with knee joint osteoarthritis (OA). Eighteen OA women (mean age of 60.5 years) participated in the study one day before TKA. Isometric dynamometry was used to measure MVC force of QF. The static postural sway was assessed by the centre of pressure (COP) using static force platform (Kistler, Switzerland) and SWAY software of movement analysis system Elite (BTS, Italy). Subjects were asked to stand quietly during 30 s with eyes open on a platform (stable ground) and on special foam (Airex Balance pad, Alcan Airex AG, Switzerland). Significantly lower QF isometric MVC force was noted in ASL as compared to NASL (250 N and 306 N, respectively, $p < 0.05$). Significant increase of COP sway range in anterior-posterior axis was found during standing on the stable ground as compared with standing on the foam (25.2 mm and 52.6 mm, respectively, $p < 0.05$). Patients that participated in the study had the Knee injury and Osteoarthritis Outcome Score subscales "Pain" 50 and "Quality of Life" 27 points. Knee joint flexion active range of motion in ASL was lower than in NASL (99.4 and 112.6 deg, respectively, $p < 0.05$). In conclusion, women with knee joint OA demonstrated significant voluntary force-generation deficit of QF in ASL. Increased postural sway was noted during standing on foam as compared to standing on stable ground.

FC70.

STATIC STANDING BALANCE SIX MONTHS FOLLOWING TOTAL KNEE ARTHROPLASTY IN PATIENTS WITH PRIMARY KNEE JOINT OSTEOARTHRITIS

Helena Gapeyeva¹, Herje Aibast¹, Jaan Ereline¹, Tatjana Kums¹, Tiit Haviko², Aare Märtson², Mati Pääsuke¹

¹Institute of Exercise Biology and Physiotherapy, ²Department of Traumatology and Orthopaedics, University of Tartu, Tartu, Estonia

Pain reduction and improvement of physical function are the main expected outcomes of total knee arthroplasty (TKA). Flexion contracture and lower extremity muscle strength deficit influence functioning. The aim of the study was to estimate the static standing balance before and six months following TKA in patients with knee joint osteoarthritis (OA). Ten men aged 56–65 years with primary knee joint OA before the first TKA participated in the tests. Static postural sway characteristics of centre of pressure (COP) for TKA-scheduled leg (ASL) and non-scheduled leg (NASL) were studied during quiet standing for a 30 s period with bare feet on two force platforms (20 cm apart) (Kistler, Switzerland) using SWAY software (BTS, Italy). Two tests were performed – with eyes open (EO) and eyes closed (EC). Isometric maximal voluntary contraction (MVC) force of knee extensor muscles (KE) was measured. A significant decrease of COP sway range of ASL in anterior-posterior (AP) axis was found in EC as compared to pre-surgical ($p < 0.01$). A significant decrease of COP trace mean radius and equivalent radius of ASL was found post-operatively as compared to before surgery in EC ($p < 0.05$). As compared pre-surgery, COP sway geographic and equivalent areas of ASL were significantly lower six months after TKA in EC (37–40%, $p < 0.05$). In conclusion, a significant improvement of postural control during quiet standing in EC test and MVC of KE muscle was found six months after TKA in knee OA men. This study was supported by Estonian Ministry of Education and Research project SF0180030s07 and Estonian Science Foundation project 7939.

FC71.

RECOVERY OF SHOULDER MUSCLE FUNCTION CHARACTERISTICS AND ACTIVE RANGE OF MOTION IN PATIENTS WITH FROZEN SHOULDER AFTER MANIPULATION UNDER ANAESTHESIA

J. Sokk¹, Helena Gapeyeva¹, Jaan Ereline¹, M Merila², Mati Pääsuke¹

¹Institute of Exercise Biology and Physiotherapy, University of Tartu, Tartu, ²Department of Orthopaedics and Traumatology, Tartu University Hospital, Tartu, Estonia

The purpose of this study was to evaluate the changes in shoulder muscle isometric strength, endurance, and shoulder active range of motion (aROM) in patients with frozen shoulder syndrome (FSS) after manipulation under general anaesthesia (MUA). Sixteen FSS patients (10 women and 6 men with mean±SD age of 53±9 years) participated in this study. Shoulder muscle isometric strength, aROM in flexion, extension, abduction, and shoulder muscle endurance were measured before MUA and at one and six months postoperatively. A preoperative reduction ($p < 0.05$) in shoulder flexion, extension and abduction isometric strength and aROM, and shortening of endurance time in patients for involved compared with uninvolved extremity were found. These parameters for involved extremity were improved ($p < 0.05$) one month postoperatively as compared to the preoperative level. Six month postoperatively, shoulder muscle strength and aROM for involved extremity in extension and abduction did not differ significantly as compared with uninvolved extremity, whereas the

aROM in flexion and shoulder muscle endurance time remained shorter ($p < 0.05$). We concluded that the recovery of shoulder muscle isometric endurance in patients with FSS after MUA was more delayed than recovery of isometric strength of these muscles or shoulder aROM.

FC72.

CONVEX SIDE MUSCULAR ACTIVITY AND SCOLIOTIC CURVE PROGRESSION

G. Rusovs^{1,2}, Aivars Vetra²

¹Riga Stradins University, Riga, ²National Center of Rehabilitation "Vaivari", Jurmala, Latvia

Introduction: Muscular asymmetry is considered as an important etiological factor of idiopathic scoliosis. The present study analyses pathomechanisms leading to progression of scoliotic deformation as result of asymmetric paraspinal muscular activity. *Materials and Methods:* Comprehensive review was made of articles published in Medline, Science Citation Index and other searches on the topic scoliosis and paraspinal muscular activity whose content yielded data on the biomechanical approach associated with formation of spinal curvatures. *Results:* Higher paraspinal muscular activity at the convex side of the scoliotic curve is a well known and documented finding. Researchers investigate anatomical changes in back muscles and try to explain how it can lead to scoliosis. Very little information is available on the mechanisms by which such an imbalance could take place. *Discussion:* Unique mechanics of the fully upright human spine play a decisive role in progression of scoliosis. Everyday activities as walking and running are creating forces tending to bend the spine forward in the sagittal plane. One of the main tasks of paraspinal muscles is stabilization of the upright spine. Stability of the kyphotic thoracic spine is achieved by first class lever where paraspinal muscles play the role of effort. In a scoliotic spine position of load on the vertebra is asymmetric and unilateral activation of muscular response is a biomechanical consequence. Unilateral activity of paraspinal muscles creates a rotational moment between vertebrae. *Conclusion:* Rotating forces can be considered as side effect from the stabilization of scoliotic thoracic spine because of rotating position of muscles involved in this process.

FC73.

MINDFULNESS AND ACCEPTANCE-BASED REHABILITATION PROGRAM FOR PATIENTS WITH LONG-LASTING AND WIDESPREAD PAIN: A PILOT STUDY

Graciela Rovner, RPT Psychol, Katharina Stibrant Sunnerhagen, MD, PhD

Department of Clinical Neuroscience and Rehabilitation, Institute of Neuroscience and Physiology, Sahlgrenska Academy, University of Gothenburg, Sweden

Objective: To evaluate two rehabilitation-programs both based on Contextual-Behavioral theories, implementing Acceptance and Commitment Therapy (ACT) in groups for patients with long-lasting musculoskeletal and widespread pain. One program offered mindful physical therapy (PT) and the other combined PT with ACT (PT+ACT). Mindful physical therapy comprises movement training practiced with body awareness to help the patient find their inner motivation and functional way to move and be active. ACT increases acceptance and help to clarify values and goals in life as well as to be aware how our thoughts trigger behaviors that go against those values. The main target for this therapy is not to reduce pain intensity but, with an accepting attitude, increase activity, meaning, and function managing to 'act' and behave according to the life-values. One of the differences with cognitive behavioral therapy is that negative thoughts, emotions and sensations (as pain) are accepted (and not rejected) as part

of life but the patient learn to not behave according to them, but rather follow their inner values. The PT group met twice a week during six weeks in a gym and the PT+ACT group participated to the same PT group and in addition underwent ACT therapy: 2 individual assessments by the psychologist and 4 group therapy sessions led by both the physical therapist and the psychologist. *Methods:* The design consisted of a pilot-study with repeated measures (PT+ACT-group: $n=6$, PT-group 2: $n=10$). All participants were referred to a specialty clinic by GP and have had pain for more than 6 months. Therapeutic effects were registered by measures of anxiety (BY BAI and HAD), depression (by BDI and HAD), pain acceptance (by CPAQ), health outcome (by EQ-5D) and life quality and satisfaction (by SF-36 and LiSat-11). *Results:* PT+ACT patients increased their quality of life and function in spite of almost unchanged pain intensity compared with the PT group. *Conclusions:* The results of this pilot study suggest that: 1) acceptance can be useful in the rehabilitation of patients with chronic pain, 2) multiprofessional and well coordinated ACT-based treatment (i.e. physical therapy together with psychotherapy) might have better effectiveness than just one profession at the time, and 3) that despite pain, it is possible to increase quality of life for patients with chronic pain, implementing ACT-based therapy models. Randomized controlled studies are needed to empirically evaluate the effectiveness of this approach.

Key-words: acceptance and commitment therapy; contextual behavioral sciences, chronic pain, quality of life, mindfulness, multidisciplinary pain centers, pain/psychology/physical therapy/rehabilitation, treatment outcome.

FC74.

THE ACCEPTANCE AND COMMITMENT THERAPY AS A BASE FOR MULTIMODAL REHABILITATION OF PATIENTS SUFFERING FROM CHRONIC PAIN

Åsa Storkamp, MD, P-O Olsson, K Granholm, L Thermaenius-Spångmark, L Carlsson, Marie-Louise Schult, reg OT, PhD

Department of Rehabilitation Medicine Stockholm, Danderyd University Hospital, Karolinska Institutet, Department of Clinical Sciences, Danderyd Hospital, Section of Rehabilitation Medicine, Stockholm, Sweden

The third generation cognitive-behaviour therapies are bringing a change in pain treatment paradigms around the world. To apply the Acceptance and Commitment Therapy (ACT) the focus is on building the behaviour repertoire in valued life directions rather than emphasizing reductions in pain and distress. The aim of the present descriptive pilot study was to implement ACT in the context of a multimodal rehabilitation programme including professions such as psychologist, PMR specialist, occupational therapist, physiotherapist, social worker and assistant nurse, and furthermore to follow the effects of the rehabilitation. Twenty-two patients were followed during the rehabilitation process during fall 2008 and spring 2009. Follow-up data were collected by questionnaires, e.g. the Chronic Pain Acceptance Questionnaire and the Tampa Scale of kinesiophobia. The therapeutic process

is applied in a group format led by a psychologist and a social worker. The physical activities led by OT/PT provide opportunities for exposure. Following the ACT manual the themes included are: the present moment, cognitive defusion, values, self as context, acceptance, and committed action. The mayor clinical result experienced by the team was a complete change in the attitudes of pain patients, a shift from avoidance towards living a life. This was confirmed by significant changes in both decreased kinesiophobia and a higher degree of acceptance. ACT is suggested applicable in a rehabilitation team setting with promising *Results:* Further research and development of the method are planned.

FC75.

DEVELOPMENT OF REHABILITATION EDUCATION AND PRACTICE IN ESTONIA

*Dagmar Narusson, Tiina Tammik, Mari Reilson
Tartu University, Tartu, Estonia*

Introduction: This abstract presents the findings achieved in the Social Rehabilitation Training Project in 2009. Tartu University Pärnu College in Estonia developed a new graduate level training program in Social Rehabilitation. Training curriculum consists of 8 modules. The aim of the training project was to educate practitioners from rehabilitation teams (doctors, nurses, social workers, psychologists, speech therapists, physiotherapists, etc) to be experts in rehabilitation. Four hundred and twenty-two rehabilitation specialists finished the complete training program in 2009. Training was supervised by 25 lecturers and 3 foreign experts. The training project was funded by the European Social Fond and Estonian Ministry of Social Affairs. During the training and supervised practice, rehabilitation specialists developed mandatory course works. Two of the course works were 1) case study reports and 2) written projects of new rehabilitation programs. Case study reports included the client's assessment by using ICF categories. These written papers are main focus of this study analysis. Current study analysis was started in November 2009. The aim of this study is to describe how practitioners understand the concept of dialogical relationship between clients and specialists and how they share responsibility and empower disabled people during the collaboration period. *Methods:* A qualitative approach was chosen because it enables to find different aspects of collaboration experience. The study is based on analysis of written works of 230 specialists. Written texts of case reports and projects of rehabilitation programs were analysed by using content analysis. *Results and Conclusion:* The research results were described in different descriptive categories. Disabled persons inclusion/involvement in the rehabilitation process was divided into 5 categories: consideration of disabled persons expectations to the rehabilitation and readiness for a change, balance of persons and specialists responsibility in planned activities, role of informal network during the rehabilitation process, also ability to build up rehabilitation process on clients personal resources. Secondly was analysed how much specialists used the ICF model to plan intervention. Data analysis is still in process. Preliminary findings show that inclusion is related to consideration of personal resources and characteristics of disabled people. The study opens a new perspective of collaboration between disabled persons, families and professionals. *Key-words:* Participation, rehabilitation planning, ICF.

POSTER PRESENTATION

PP1.

PREDICTORS OF FUNCTIONAL OUTCOME IN STROKE REHABILITATION

Egle Milinaviciene¹, Daiva Rastenyte², Aleksandras Krisciunas³

¹Virsziglis Rehabilitation Hospital affiliated branch of Kaunas University of Medicine Hospital, Kaunas, ²Kaunas University of Medicine, Department of Neurology, Kaunas, ³Kaunas University of Medicine, Department of Rehabilitation, Kaunas, Lithuania

Purpose: To determine the factors influencing the recovery of functional state in stroke patients during inpatient rehabilitation, and their prognostic value. **The contingent and Methods:** The study included patients, who suffered the stroke and have undergone second stage rehabilitation at Virsziglis Rehabilitation Hospital (a branch institution of Kaunas University of Medicine Hospital). These were 226 subjects (109 men and 117 women), suffering ischemic or hemorrhagic stroke. The average of the patients was 67.8±10.4 years. The mean duration of rehabilitation was 38.8±8.9 days. The functional state of the patients was assessed by functional Independence Measure (FIM); the cognitive function, by the Mini Mental State Examination (MMSE), the severity of the stroke, in accordance with the National Institutes of Health Stroke Scale (NIHSS). The effectiveness of rehabilitation was evaluated using FIM data. The prognostic value of the factors was evaluated by the logistic regression method. **Results:** The study showed, that most patients had moderate neurologic condition at baseline: among men average NIHSS score was 7.8±3.9, among women 7.4±4.3. MMSE score among men was 21.6±9.2, and among women 19.1±9.3. During the second stage of rehabilitation, the score of the functional state of the patients assessed by the FIM significantly improved: from 65.9±20.3 to 93.5±20.9 ($p<0.0001$). At the end of rehabilitation, good efficacy of rehabilitation was determined in 64.2% of rehabilitees; moderate, in 19.4%; insufficient, in 16.4%. Low rehabilitation effectiveness during inpatient rehabilitation on functional status is predicted by hemiplegia (OR=11.15, $p<0.001$), severe cognitive dysfunction (OR=15.18, $p<0.001$), urinary incontinence (OR=14.91, $p<0.001$), joint diseases (OR=5.52, $p<0.05$), and heart diseases (OR=4.10, $p<0.05$). **Conclusion:** Insufficient efficacy of rehabilitation of rehabilitees with cerebral stroke during inpatient rehabilitation was influenced by impairment of motor and cognitive functions, urination disturbances and co-morbidities.

PP2.

DEFICIENCY IN GROSS-MOTOR FUNCTION IN PRESCHOOL BOYS WITH MINOR TO MODERATE DEVELOPMENTAL SPEECH AND LANGUAGE DISORDER

Iti Määrsepp, Mati Pääsuke

Institute of Exercise Biology and Physiotherapy, University of Tartu, Tartu, Estonia

Introduction: Speech disorders are the most common complaint in preschool-aged children and the usual treatment for them has been solely speech therapy. The aim of the study was to evaluate gross-motor abilities in 5-year-old boys with minor to moderate developmental speech and language disorders (DSL) in comparison of age-matched healthy children. **Methods:** Thirty-nine DSLD boys and thirty-nine control group (CG) boys participated in our study. Bilateral and unilateral maximal isometric strength of the leg extensors was measured by electromechanical dynamometer. Isometric hand-grip strength of the dominant hand was determined by mechanical hand dynamometer and vertical jumping height was tested on the force platform. **Results:** DSLD boys demonstrated

lower bilateral ($p<0.05$) isometric maximal strength of the leg extensors compared to control group. The unilateral isometric maximal strength of the right and left leg extensors was also lower ($p<0.05$) in DSLD boys compared to healthy boys. The hand-grip strength, as well as jumping height did not differ significantly in the measured groups. **Conclusions:** Deficiency in gross-motor function and, especially, decrease in isometric voluntary force-generation capacity of the leg extensor muscles was evident in boys with minor to moderate DSLD. It would be appropriate to provide DSLD children with more multifarious therapy, containing besides speech therapy also physiotherapy, for example.

PP3.

POSTCONCUSSIONAL DISORDER FOLLOWING MILD TRAUMATIC BRAIN INJURY – DOES EMOTIONAL COPING STYLE PLAY A ROLE?

Christian Oldenburg, Catharina de Boussard, Anders Lundin, Jörgen Borg, Gunnar Edman, Aniko Bartfai

Karolinska Institutet, Department of Clinical Sciences, Danderyd Hospital, Division of Rehabilitation Medicine, Stockholm, Sweden

Background: Postconcussional disorder (PCD) develops in a small but significant number of patients who has suffered a mild traumatic brain injury (mTBI). It is unclear why some people develop late persisting symptoms. Earlier studies have found a number of physiological, e.g. CT or MRI abnormalities, and psychological factors, such as premorbid personality of importance. However the influence of emotional coping style on symptom reporting after mTBI has not been studied. Emotional coping style was found to influence symptom reporting in other patient groups. For instance, chronic pain patients with a repressive coping style early suppress symptoms for immediate short-term tolerance but develops delayed sensitivity. **Method:** One hundred and twenty-two mTBI patients included in a prospective cohort study were administered self-report inventories and checklists of PCD symptoms at day 1, 7, 14 and three months post injury. Psychological testing was done on all occasions measuring motor speed, aspects of attention and memory. At three months an extended neuropsychological testing was done exploring attention, memory and executive functions. Emotional coping style was assessed using Swedish Universities Scale of Personality (SSP). **Results:** One hundred and two patients completed the three months follow-up and of those 17% fulfilled the criteria for PCD. According to our definition 25 (28%) patients had objective signs of reduced cognitive functioning. Repressors constituted the largest group of the participating patients (44%), and had a correspondingly number of PCD cases (41%). **Conclusion:** Our preliminary results does not show that a repressive coping style influence symptom reporting after mTBI.

PP4.

URINARY INCONTINENCE 3 MONTHS AFTER ACUTE STROKE

Illa Mihejeva, Anita Vetra DM

Riga Stradins University, Rehabilitation Center "Vaivari", Latvia

Urinary incontinence can affect 40–60% of stroke patients in an acute hospitalphase, with 25% still having problems at hospital discharge and remaining incontinent at one year. But the incidence and prevalence of different clinical types of urinary incontinence are still unclear, that makes it difficult to create guidelines for routine evaluation, treatment and prognosis. Objectives. To investigate the prevalence, incidence, clinical types of urinary incontinence in an acute stroke unit. **Materials and Methods:** Patients after stroke with urinary incontinence admitted to the Stroke unit of Clinical Hospital "Gailezers". They were assessed by a questionnaire about premorbid activities of daily living, men-

tal functioning, comorbidities, previous and actual micturition symptoms, stroke syndromes, medication, poststroke mobility (Rivermead Mobility Index), disability (Barthel Index), and cognition (MMSE), urin analysis (leucocytes and nitrit tests). *Results:* From the 137 patients after stroke (female/male 64/73) enrolled in the investigation 6.5% of the patients had pre-existing urinary incontinence (stress/urgency), 64% developed new symptoms. There were three types of urinary incontinences: urge, urinary incontinence with impaired awareness, mixed (urge and functional urinary incontinence). Ten patients had urinary retention and long-time catheterization (postvoiding residual was 150 ml and more). 46% of the patients had double incontinence (fecal and urinary incontinences). Stroke increased pre-existing urinary incontinence symptoms (frequency). Patients with low Barthel Index rate had higher incidence of urinary incontinence. Cognition disturbance had negative impact on urinary incontinence. Three months after stroke, urinary incontinence had decreased to 42%, double incontinence had decreased to 30%. Cognitive and motor functions were significantly related to urinary incontinence. *Conclusion:* The incidence of PSUI was significantly increased in patient older than 75 years. Age, functional and cognitive factors were related to incontinence.

PP5.

JOBREHAB – A VOCATIONAL PREVENTION AND REHABILITATION PROGRAMME: PHYSICIAN REPORTED OUTCOMES ON INTERFACE MANAGEMENT AND INTERDISCIPLINARY COLLABORATION

Monika Schwarze, Dr. Dipl.-Psych, N Teichler, J Beuker, C Korallus, Christoph Gutenbrunner

Hannover Medical School, Department of Rehabilitation Medicine, Coordination Centre for Applied Rehabilitation Research, Hannover, Germany

Background: The JobRehab programme was launched after the implementation of legal requirements in Germany. Workplace health promotion measures should be established as soon as possible and responsibility of the company concerning the workers' health was expanded. 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' facilities work together. The aim is to evaluate the quality of interface management from the perspective of the physicians conducting the vocational rehabilitation programme and treating the patients with work-related musculoskeletal disorders. *Method:* Occupational ($n=101$) and rehabilitation physicians ($n=107$) were asked to complete a questionnaire on time management, the quality of collaboration, and the relevance of information exchanged between the groups. *Findings:* Most of the rehabilitation physicians surveyed rated the workplace-related information received from occupational physicians as moderately relevant (44.9%) or highly relevant (32.7%) for rehabilitation therapy. Only 22.4% 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 at his current work-place as very important (14.7%), important (85.3%) or unimportant (0%). *Conclusions:* The findings show that the concept meets the expectations of occupational and rehabilitation physicians, especially the exchange of information and the focus on problems of the workplace seem to be successful. The results also demonstrate the need for continued training of the involved physicians in cross-sectional and interdisciplinary teamwork to reinforce vocational rehabilitation.

PP6.

FROM REHAB TO WORK IN NEUROLOGICAL REHABILITATION. INTEGRATING MEDICAL AND VOCATIONAL TRAINING INTO THE RETURN-TO-WORK PROCESS

H Kulke, W Schupp

Department of Neurology, Fachklinik Herzogenaurach, Hamburg, Germany

Return to work after brain injury or neurovascular disorders is often difficult. Normal help procedures (e.g. the so-called "step by step integration" in Germany) seem to be insufficient for the variety of problems that accompany brain damage, dealing only with the span of attention which is only one deficit area neurological patients can encounter. In many cases, patients need special adaptations of their workplace and time schedule as well as the work tasks themselves, requiring close and reciprocating interaction between patients, rehab professionals, and employers. Regarding those issues, the Herzogenaurach Rehab Centre has established a special programme in cooperation with a vocational training centre situated nearby to support neurological patients during the critical step between rehab hospital and return to work. The programme focuses on patients living and working a close distance to our hospital, thus enabling outpatient treatment and vocational training as well as close contact to the employing company. The therapy week is shared between medical rehab and vocational training. During the first six weeks vocational procedures are administered independently of the existing employment, so employers can look at the trainees only in a well pre-trained state. During the second six-week period vocational procedures are relocated to the real workplace, a procedure which is closely supervised by the rehab professionals. In cases where the relationship between patient and employer seems to be good enough to make pre-training dispensable we decide to start the programme altogether at the workplace, which is also the case if the job is too specialized (e.g. executives, engineers or IT specialists) to be trained at a vocational plant. Until now 15 patients of various professions have participated in the programme, 13 of which could be reintegrated (sometimes with a smaller volume of working hours per day or with somewhat modified tasks) despite severe neurological deficits. Only 2 trainees did not succeed, one because of depression, the other because of deficits in executive functions that couldn't be dealt with at the existing employment (a theatre). The concept itself and first results will be presented.

PP7.

SHORT-TERM OCCUPATIONAL THERAPY WITH THE PROFILAX® MODEL IN PSYCHOSOMATIC DISTURBANCES PROBLEMS WITH VOCATIONAL BACKGROUND

E Postl, W Schupp², B Held³

¹Occupational Therapy Practice, Hamburg²Department of Neurology, Fachklinik Herzogenaurach, Hamburg, ³A general practitioners' unit, Hamburg, Germany

Introduction: The profilax® model has been empirically developed by the first author to provide a basis for occupational therapy (OT) treatment programmes with an holistic approach. It is influenced by the ICF (WHO 2002) and interlinks elements from different psychotherapeutic and psychosomatic cognitive and behavioural methods. During the last 10 years the programme has been applied and further developed. Now a prospective evaluation pilot study is running since 2008. *Patients and Methods:* Patient with depressive disorders (ICD 10: F32–F34), with anxiety disorders and social phobias (ICD 10: F40–F41), with obsessive-

compulsive disorders (ICD 10: F42) and somatoform disorders (ICD 10: F45) are to be included, referred to ambulatory OT treatment for these diseases. From this ongoing study sample we could find some patients where the causes of their diseases seemed mainly to be in the job field or who needed interventions with inclusion of the job field. We only looked at patients being treated with the profilax® model and recorded the treatment course and effects (Zerssen Scale and self assessment questionnaire). *Results:* We could identify five patients meeting all the criteria above. All could be treated with success on respect to the outcome parameters in six to ten sessions prescribed by their doctors. The treatment effects maintained in a three-months follow-up. *Discussion and Conclusion:* Our first preliminary experiences from an ongoing study of the profilax® model show positive and encouraging signals on the value of this OT treatment method in job related psychic and psychosomatic disturbances. Profilax® seems to be suitable for short-term ambulatory OT interventions in this field of vocational oriented medical treatment and rehabilitation. Further studies are needed.

PP8.

INCREASED WORK ACTIVITY AND HEALTH - REHABILITATION OF PATIENTS WITH STRESS-RELATED SYMPTOMS

Rose-Marie Herlin, Aniella Besèr

University Department of Rehabilitation Medicine, Danderyd University Hospital, Stockholm, Sweden

Objective: In purpose to reduce stressrelated unhealth, StressRehab, Danderyds Hospital supplies assessment and treatment to enable a sustainable return to work. The aim of the study was to describe changes in self-rated symptoms and work activity following a multiprofessional rehabilitation programme of patients suffering from stress related symptoms. *Design:* Patients in group rehabilitation between 2007 and 2009 were included. They were divided in unemployed and employed at their first examination. Symptoms and work activity were registered before and after the rehabilitation. *Subjects:* The subjects were 35 unemployed and 75 employed patients. The majority was women and the mean age was 44 years. *Methods:* The subjects responded to questionnaires dealing with health, sick-leave and work before and after the rehabilitation period. Statistical inferences were performed on changes over the studied period. *Results:* The entire group ($n=110$) was on sick-leave at least half their working time before the rehabilitation. The part on sick-leave decreased to 69% ($p<0.05$) and 43% ($p<0.01$) for unemployed and employed subjects, respectively. The part working at least half-time increased from 0 to 27% ($p<0.01$) for the unemployed and from 32 to 76% for the employed subjects ($p<0.05$). All the subjects decreased in stress related symptoms, depression, anxiety and increased in a mental health index. *Conclusion:* The subjects increased their work activity after the rehabilitation programme. Additionally they decreased their stress related symptoms.

Key-words: rehabilitation, stress related symptoms, sick-leave, work activity

PP9.

MULTI-DISCIPLINARY REHABILITATION OF MYOCARDIAL INFARCTION

Piret Rebasoo, MSc

Keila Rehabilitation Center, Estonia

A short multi-disciplinary intervention targeted at working-age patients with myocardial infarction was developed. The aim of the 6-days-long rehabilitation program was to minimize the

psychosocial risk factors interfering with recovery and thereby to improve the quality of life of participants and to encourage them to continue their vocational and personal pursuits. The intervention consisted of group physiotherapy and psychoeducative group sessions about stress management, coping with illness, and conflict management. In addition, patients received individually combined psychotherapy sessions, ergotherapeutic counseling, nutrition counseling and career counseling, 3–6 hours altogether daily, plus family counseling on the 6th day. Before and after the program the working status of patients, emotional well-being (EEK-2) and their awareness about stress and conflict management (a short self-developed questionnaire) was measured. Patients also rated their satisfaction level. Motivation was measured through personal goal-setting ability and in a one-month follow-up, the fulfilment of those goals was rated on a 0–100% scale. Four of the total of six patients had returned to work by the time of the follow-up. There was an increase in patients' awareness and their emotional well-being. Patient satisfaction ratings were high. In a follow-up session one month later, 70–100% of the goals were fulfilled. Due to the small size of the sample, statistical significance of the changes could not be assessed. As the results of this pilot study are promising, hopefully further studies with more participants will confirm the need for development of this kind of rehabilitation programs.

PP10.

IMPLEMENTATION OF AN AMBULANT AFTER-CARE PROGRAMME FOR PATIENTS WITH CHRONIC PAIN AND MUSCULOSKELETAL DISORDERS AFTER IN-PATIENT REHABILITATION (NACHSORGE SCHMERZ - NASCH)

Julia Pönicke¹, Inge Ehlebracht-König^{1,2}, Monika Schwarze, Dr. Dipl.-Psych², Christoph Gutenbrunner, MD, PhD²

¹Rehabilitation Centre Bad Eilsen of the German Pension Insurance Brunswick-Hannover, ²Coordination Centre for Applied Rehabilitation Research, Dept of Rehabilitation Medicine, Hannover Medical School, Germany

Introduction: It is known that rehabilitation improves the health status for most people with chronic pain disorder (Ehlebracht-König & Bönnisch, 2005). But these effects last only for a short term (Hüppe & Raspe, 2005). Lack of social support can aggravate pain-related symptoms and the development of mental disorders is possible. The aim of this after-care programme is maintaining positive effects of in-patient rehabilitation measures. In addition it should support people to accept and manage their chronic pain and return to work and social life. *Methods:* Participants are patients with chronic pain (duration >6 months) and completed in-patient medical rehabilitation. The duration of the after-care program takes about five months with weekly appointments. During the implementation phase, 5–6 experimental and control groups (50 patients per group) are planned. An improved pain management and coping is supposed to be reached by psychological treatments and pain management strategies. The after-care program also contains social medical elements (experimental group). For comparison the control-group gets relaxation training. There are three measurement points (pre, post, follow-up). Socio-demographic, pain- and work-related data plus quality of life and pain-oriented behaviour are evaluated via patient-reported questionnaires. *Results:* Before starting the out-patient after-care programme two rehearsals were conducted during in-patient medical rehabilitation for evaluating acceptance. 72% of the participants rated this program as helpful and 57% would participate in this group if offered in an ambulant after-care setting. The first out-patient trial started in September 2009, the second in February 2010. Data-collection and -analysis of these trials are in process.

PP11.

ABNORMAL MOVEMENT STEREOTYPES IN MUSIC SCHOOL PUPILS*Zinaida Kasvande, Dr, Ieva Tropa**Center of Education of Health and Medical Rehabilitation, Riga, Latvia*

Under our supervision were 80 pupils, age 9 to 16, who have played accordion, violin, piano, Latvian national strummed instrument, saxophone and flute not less than 3 years. We have examined specifics of disorders of the locomotor system in 3 planes, joint movement amount, individuality of muscular imbalance, painful trigger zones, disorders of the deep stabilization system, postural balance, and coordination. We paid extra attention to study the character of the abnormal movements (of breathing, bending forward, turning of the body, gait). Great attention was paid to the role of dominant muscles at performing particular movement, which forms the muscular spirals which are also known as “locomotor patterns”. Bold asymmetry in the neck, chest, and shoulders was noticed in 80% of the pupils, who practiced violin, flute, saxophone and accordion, and out of them 30% of the pupils complained about headache, dizziness and pain between the shoulders. 70% of the pupils had asymmetry at the parts of waist and pelvis, which mainly appears as a great weakness of stage muscles and the lack of physical activities. The greatest part of the pupils did not follow the instructions about proper ergonomic position during their “professional activities”, given by their teachers. It was noticed, that long static load, and “professional” postures very soon caused disorders of the locomotor system, which were expressed as muscular imbalance, disorders of postural balance, abnormal movement stereotypes, that may cause variable disturbances in the regulation systems. Careful analysis of abnormal movement stereotypes gives a picture of the fundamental ergonomics and physical load of music school pupils and helps to work out specific physical rehabilitation measures.

PP12.

GAIT PARAMETERS IN PERSONS WITH TOTAL HIP ARTHROPLASTY*T. Ananjeva, Z. Pavare, Aivars Vetra**RSU Department of Rehabilitation, Riga, Latvia*

Methods and Materials: Thirty persons were included in the study (mean age 60±7). The patient group consisted of 15 persons with diagnosis unilateral coxarthrosis. *Control group:* 15 persons without affection in the musculo-skeletal system. The instrumental gait analysis was performed twice, before and after surgery. *Results:* There was increased double stance (28.67±5.92%) and stance phase in the healthy leg before surgery (66.9±4.1%) and these changes had positive correlation with pain intensity ($r=0.818$). After surgery the stance phase decreased, but double stance did not change ($p<0.05$). There was a statistically significant increase in hip range of motion during gait in the sagittal plane after surgery (24.2±6°; $p<0.001$), but there was no significant difference between the postoperative data and control group. Before and after surgical intervention it was increased pelvic tilt and knee flexion during stance phase, as a compensation of decreased hip extension in the terminal stance ($p<0.05$). Before surgery contralateral pelvic hike was observed in 8 (53%) patients, and after surgery this limping was observed in 5 (33%) patients. Asymmetric pelvic motion in the sagittal plane was detected in 14 (93%) participants before and after total hip arthroplasty ($p<0.01$). *Conclusion:* Two months after surgery there is an increase in the range of motion during gait in affected hip, decrease in pain intensity, improvement in affected leg muscle strength, but it remains a decreased vertical ground reaction force, increased double stance and compensation movements of pelvis and ipsilateral knee joint.

PP13.

EARLY MULTIMODAL INTERVENTION IN PATIENTS SUFFERING FROM ACUTE WAD*E Roeck-Hansen, M Hellman, M Andersson, J Brännval, K Moa, L Tate, Marie-Louise Schult**Department of Rehabilitation Medicine Stockholm, Danderyd University Hospital, The Karolinska Institute, Department of Clinical Sciences, Danderyd Hospital, Section of Rehabilitation Medicine, Stockholm, Sweden*

Approximately 10% of the patients develop chronic whiplash associated disorders (WAD) after trauma. The incidence was 1.0–3.2/1000/year in Swedish reports from 2006. The costs for the society and the individual are very high. The aim of the present study was to describe and follow patients with acute WAD before, after and 6 months after participation in interdisciplinary cognitive-behaviour-based interventions using parameters with implications of quality of life. During the period August 2008 to April 2009 thirty-four consecutive patients were enrolled in a 5-week rehabilitation program designed for early interventions after WAD. Standardized self-reported questionnaires were used from the “National quality registry for pain rehabilitation” (NRS), eg. Hospital anxiety and depression scale (HAD), EuroQol dimensions (EQ-5D) and the Short-Form Health Survey Questionnaire (SF-36). Thirty-three patients presented follow-up data after the program and 25 patients after 6 months. There was a tendency of significantly decreased anxiety in depression and anxiety (HAD), ($p=0.055$) after the program which sustained at six month follow-up. The health-related quality of life state, EQ-5D VAS was significantly improved ($p=0.04$) after the program as the EQ-5D index ($p=0.02$). Physical function (SF-36) showed a significant improvement ($p=0.003$) as decrease in bodily pain ($p=0.002$) after 6 month. The results suggest that early interventions are of importance in reducing pain, improving the patients’ abilities to perform physical activities and experiencing a better health/quality of life.

PP14.

PILOT STUDY ON MECHANISMS OF PAIN-DESCENDING MODULATION OF MASTICATION BEHAVIOUR IN RATS AT SUPRASPINAL LEVEL*Boya Nugraha¹, Henning Rahne¹, Heike Nave², Andreas Schmiede², Michael Fischer¹, Christoph Gutenbrunner¹**¹Department of Rehabilitation Medicine, Coordination Centre for Rehabilitation Research, Hannover Medical School, ²Department of Functional Anatomy, Hannover Medical School, Hannover, Germany*

Background: Mastication behaviour may activate endogenous pain inhibitory mechanisms. However, the mechanisms of its process need to be studied. The changes of c-Fos activity as a neuronal marker at supraspinal level were observed in inflammatory pain of a rat model. *Methods:* The study was conducted by using 2 groups ($n=6$) of adult Sprague-Dawley male rats that were injected with complete Freund’s adjuvant in a hind paw after 10 days feeding with soft or hard food. A control group was injected with saline. C-Fos activity from the brain stem was observed by immunohistochemistry at 1, 3, 6, and 12 h and 6.5 days after injection. The data were analyzed by using Kruskal-Wallis-Test. Additionally, nocifensive behaviour of rats was observed by tail-flick and hot-plate tests. *Results:* C-Fos was mainly observed in the raphe pallidus area. It showed significant difference between soft-to-soft and hard-to-hard group at 3 and 6 h after injection of CFA ($p=0.027$ and 0.022 , respectively). Animals being fed by hard food showed higher number of c-Fos positive cells compared to soft food. *Conclusion:* The results suggested that feeding behav-

our can activate endogenous activity in nucleus raphe pallidus in rats. Hard food consistency has stronger effects. Together with the already reported changes in pain behaviour these results may be interpreted as an inhibition of pain induced c-Fos activity at supraspinal level. The regional pain mechanisms in the caudal raphe nuclei need further clarification and the number of animals needs to be increased.

PP15.

PATIENTS REFERRED TO PAIN SPECIALTY CLINICS, THEIR CHARACTERISTICS AND DIFFERENCES AFTER ALLOCATION INTO REHABILITATION PROGRAMS, ACCORDING TO THE SWEDISH QUALITY REGISTRY: A DESCRIPTIVE PILOT STUDY

Graciela Rovner, RPT Psychol

Department of Clinical Neuroscience and Rehabilitation, Institute of Neuroscience and Physiology, Sahlgrenska Academy, University of Gothenburg, Sweden

Introduction: The flourishing scientific literature on bio-psychosocial methods for chronic pain have resulted in many effective rehabilitation programs being offered at the pain clinics, but the development of assessment and allocation models are not keeping pace with this advance. Most of the studies define their participants as “consecutively referred patients” or patients with “musculoskeletal/non-malignant pain” but the characteristics, evaluation, selection and allocation processes of patients while entering rehabilitation programs has been an ignored line of research. **Objectives:** This study investigated 1) patients’ characteristics when referred to a pain specialty clinic and 2) the distinctive aspects or characteristics emerging after selection of patients into the different rehabilitation programs (intensive, normal pace or home program). **Methods:** For this study, the patient selection process was done by the routinely clinical decision making, without taking into account the results of the instruments included at the Swedish National Quality Registry for Pain Rehabilitation plus a couple of other psychometrics, previously completed by the patients. The instrument studied were: the Chronic Pain Acceptance Questionnaire, West Haven and Yale Multidimensional Pain Inventory (MPI), Tampa Scale for Kinesophobia, Hospital Anxiety and Depression scale, Beck Anxiety and Depression Inventories, and three life quality and satisfaction measurements. After the allocating of the patients into different rehabilitation programs the instruments were studied with descriptive statistics, ANOVA and Principal Component Analysis. **Results:** The referred patients have had pain in average 10 years or more and 35% of them had widespread pain with a mean of 17 pain locations. Their health-related quality of life was lower compared to the Swedish reference population with significant differences in their vitality level, satisfaction with their activities level, family life and psychological health. Around 30% of all the patients referred suffered of severe depression and anxiety but no significant difference was found after allocating them into the different programs. Constructs that better could explain the differences between groups were their pain acceptance level activity engagement and functioning (divided in clusters referred as coping styles, according to MPI). Adaptive copers scored significantly higher acceptance of their pain and higher commitment to their valued activities. They were more often offered to participate in the intensive rehabilitation program, suffered of significantly less depression, anxiety and kinesophobia but showed no significant difference in pain intensity or reported activity level compared with dysfunctional copers and interpersonally distressed patients. **Conclusion:** This study indicates that the allocation was not influenced by diagnosis or symptoms severity but rather according to attitude, acceptance, functioning and coping styles, which seems consistent with a psychosocial pain paradigm.

PP16.

INFLUENCE OF BALDONE MUD THERAPY IN PATIENTS WITH CHRONIC KNEE OSTEOARTHRITIS

Tatjana Eglite¹, Dzintra Vavere¹, Ints Zeidlers²

¹Jugla Medical Center, ²Riga Stradins University, Riga, Latvia

Objectives: Knee osteoarthritis (OA) is a common chronic degenerative disorder. There are various treatment modalities. The objective of this study was to evaluate the effects and the tolerability of Baldone mud combined with ultrasound therapy in patients with knee OA. **Methods:** A total of 71 patients with knee OA (27 males, 44 females) were included. Their ages ranged between 45–84 years. The patients were separated into 2 groups. Group 1 ($n=46$) received Baldone mud phonophoresis, group 2 ($n=25$) – only ultrasound therapy. The therapies were applied locally and in lumbal paravertebral zones for 15 min duration, once a day and a total of 10 session. Patients were assessed according to pain, functional capacity and quality of life parameters. Pain was assessed by using Visual Analogue Scale (VAS), functional capacity was assessed by using goniometer, quality of life evaluated by self-administered questionnaire. Patients were evaluated before, after the treatment and after 12 weeks. **Results:** There was statistically significant reduction in clinical evaluation of OA. In group 1 the decrease in pain was 3.09 ± 0.41 points in VAS ($p < 0.01$), and the increase in amplitude in motion by goniometry was $3.96 \pm 0.30^\circ$ ($p < 0.01$). **Conclusions:** Baldone mud phonophoresis may influence the treatment of patients with knee osteoarthritis.

PP17.

MUSCLE PROPERTIES IN A PATIENT WITH LOW BACK PAIN AFTER THERAPEUTICAL EXERCISES. A CASE STUDY

Helena Gapeyeva, Tatjana Kums, Jaan Erelina, Mati Pääsuke

Institute of Exercise Biology and Physiotherapy, University of Tartu, Tartu, Estonia

The aim of the study was to compare characteristics of muscles and viscoelastic properties before and after one month of therapeutical exercises (TE) in a 21-year old female athlete with idiopathic low back pain. Natural oscillation frequency (characterising “tone”), logarithmic decrement of oscillations (characterising elasticity) and stiffness (characterising muscle’s ability to resist the changes of its shape caused by external force) of nine muscles were recorded bilaterally in lying relaxed position by myometer Myoton-3 (MultiScan mode, 5 times in one point of muscle) (Müomeetria Ltd, Estonia). Values representing “tone” of right Tibialis anterior was significantly ($p < 0.05$) higher (both tests). In Gastrocnemius medial head (GM) changes of characteristics had different tendencies for right and left body side. In Rectus femoris (RF) “tone” and stiffness were increased and elasticity worsened (decrement increased) as compared to pre-TE ($p < 0.05$). In Biceps femoris stiffness decreased as compared to pre-TE. In Trapezius upper part (TrU) “tone”, stiffness and elasticity characteristics were higher for the right side in both measurements. Patient had an increase of stiffness in Trapezius middle part (TrM) for both body sides and decrease of “tone” as compared to pre-TE. Significant worsening of elasticity and increase of stiffness in Erector spinae (ErSp) for both body sides were noted. Increase of “tone” and stiffness of Gluteus medius and Gluteus maximus were found as compared to pre-TE. Therefore, based on these measurements, the accent of TE in this patient may be focused on the improvement of condition of the following measured muscles: GM (left), TrU (right), and bilaterally of RF, BF, TrM, ErSp.

PP18.**THE GERMAN VERSION OF THE HEALTH EDUCATION IMPACT QUESTIONNAIRE (HEIQ) FOR EVALUATION OF PATIENT EDUCATION – INTERIM RESULTS OF THE ADAPTION AND VALIDATION**

Roland Kirchoff¹, Gunda Musekamp², Michael Schuler², Inge Ehlebracht-König^{1,3}, Sandra Nolte⁴, Richard Osborne⁵, Christoph Gutenbrunner¹, Hermann Faller², Monika Schwarze¹

¹Coordination Centre for Applied Rehabilitation Research, Department of Rehabilitation Medicine, Hannover Medical School, ²Institute for Psychotherapy and Medical Psychology, Division of Rehabilitation Sciences, University of Würzburg, ³Rehabilitation Centre Bad Eilsen of the German Pension Insurance Braunschweig-Hannover, ⁴Association of Dermatological Prevention, Center of Dermatology Buxtehude, Germany, ⁵School of Health and Social Development, Deakin University, Australia

Background: Patient education programmes have been evaluated mainly based on long-term, distal target criteria. However, recent findings suggest the importance of using proximal factors like knowledge of disease, compliance and empowerment. Lack of sufficient German instruments capable to evaluate proximal criteria led to the translation of the generic “Health Education Impact Questionnaire” (heiQ). **Method:** After the translation of the heiQ according to international guidelines the psychometric quality of the questionnaire is being evaluated at seven study centers leading to a sample of nearly 1200 rehabilitation patients. In order to identify possible more fitting translation variants with better psychometric properties an interim analysis based on data from 229 patients was conducted to prove floor and ceiling effects, one-dimensionality of the scales and internal consistency. **Findings:** The German version of the heiQ turned out as an understandable and content-valid version, only small modification was needed. The interim analysis suggest good to excellent psychometric properties, and hardly any floor and ceiling effects of the German heiQ. Six of the eight scales can be mapped in a one-dimensional model (RMSEA <0.05) and Cronbachs Alphas of the scales were between 0.72 and 0.89. Alternative item formulations were developed for those scales whose properties were not entirely satisfactory. **Conclusion:** After completion of the data collection, it will be possible to determine whether the newly formulated items result in better model fit. We expect that all eight scales will show good psychometric characteristics. It is intended using the German heiQ version for quality assurance in the German patient education system.

PP19.**INFLUENCE OF PHYSIOTHERAPEUTICAL MEASUREMENTS ON RESPIRATORY SYSTEM FUNCTION OF SMOKERS AND NON-SMOKERS AMONG PATIENTS AFTER CORONARY ARTERY BYPASS GRAFTING**

Gaudenta Stasiūnienė, Jūratė Samėnienė

Department of Rehabilitation Kaunas University of Medicine, Lithuania

The purpose of the study was to assess the influence of physiotherapeutical devices on the respiratory system function of the smokers and non-smokers patients after the coronary artery bypass grafting (CABG). **Methods:** The 60 patients were distributed in two equal groups (non-smokers and smokers, who had small dependence of nicotine). In this study physiotherapists were employed and the means of FVC, FEV1, PEF and Hence sample were measured before operation and on the sixth postoperative day. Data on atelectasis and time of operation were taken from patient’s case-histories. **Results:** We found that smokers before CABG were statistically significantly more sick in II- and III degree arterial hypertension, they had I degree obesity and more frequent post-operative complications of the respiratory system – atelectasis – than non-smokers ($p < 0.05$). The values before CABG of the indicators of the respiratory function (means of the FVC, FEV1) in the second studied group were less than the values of the analogous indicators in the first group, but did not differ significantly between groups, except the means of the PEF and of the Hence sample. On the sixth day after operation the means of the FVC, FEV1, PEF and the Hence sample in the patients who smoked were statistically significantly less than in the patients who did not smoke ($p < 0.05$). We found that lower values of respiratory function indicators in patients who smoked influence negatively the effectiveness of the physiotherapy and the disappearance of the post-operative complications ($p < 0.05$).

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