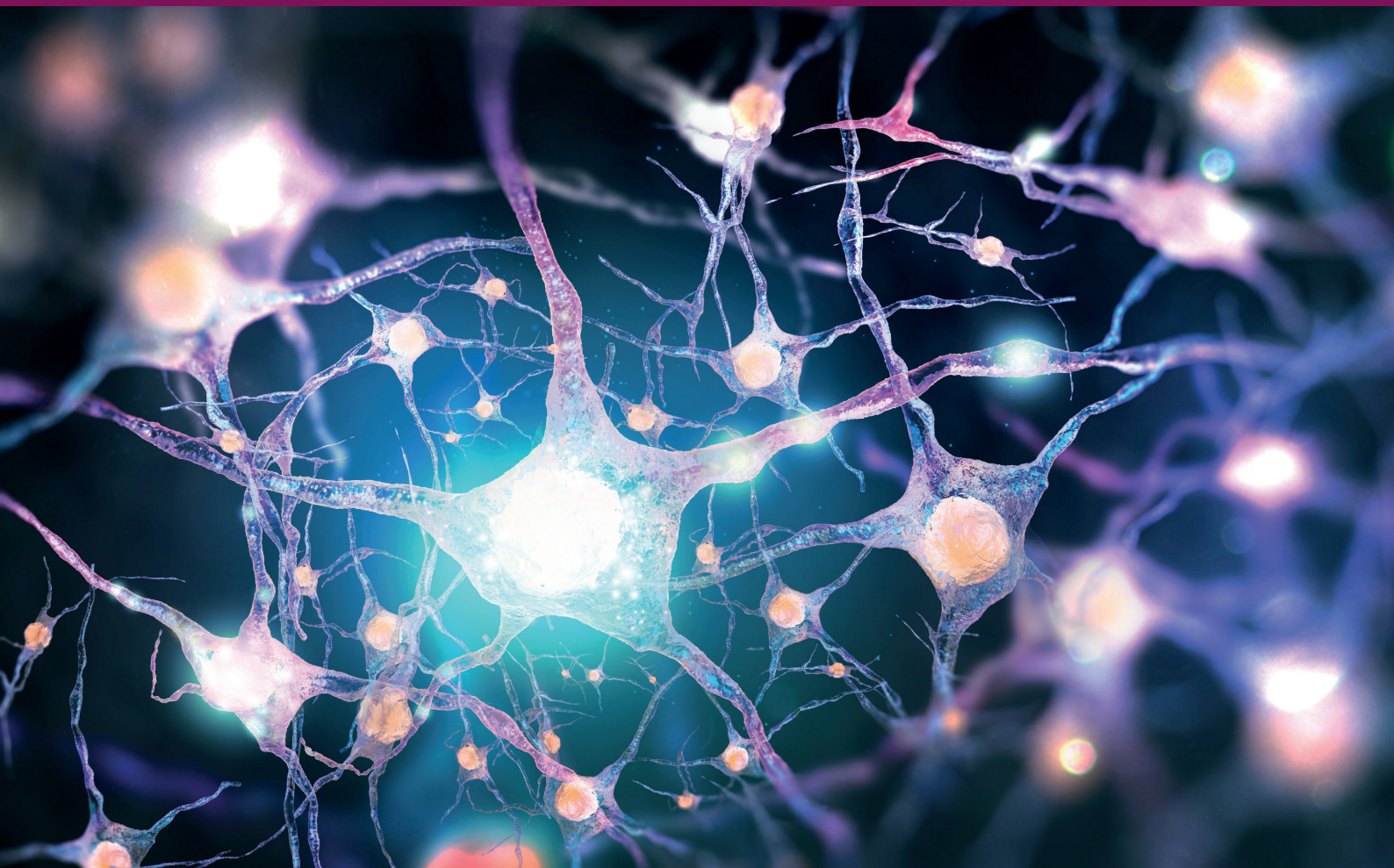# PAIN SCIENCE IN MOTION

International and Interdisciplinary Colloquium on Research Methods in Pain Sciences

March 24-25, 2017

Stockholm Sweden

PAIN IN MOTION

http://ki.se/en/nvs/pain-science-in-motion-2017

Karolinska Institutet

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I like to move it!

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Pain is indeed a moving field. The knowledge about pain has grown intensively during the last two decades. This new knowledge has led to revolutionary changes in pain management that has changed its focus from pain reduction to pain management. Comparable to the moving field of pain science in itself is a moving target as well. Research methodology has to keep up with the advancing body of knowledge about pain and should support the needs of the pain research agenda. To capture this scientific movement we need scientists who are creative, well trained in scientific methodology and great collaborators.

....

I find it especially interesting to invite you all to Stockholm, not only because it is called "beauty on water", but also because of its' symbolic link to the history of pain science. Descartes, the man who constructed the first fundaments of the specificity theory of pain, came to visit our queen at that time, Kristina. Already at that time great thinkers were ready to cross countries to come together and elaborate on their ideas. Descartes' influence on modern pain science is still tremendous, although heavily discussed. I'm sure that in quite a few discussions in this congress the shadow of this great thinker will be lurking in the background.

In contrast to Descartes' times, collaboration is the key to success in today's research. This conference therefore builds on several platforms to enable you to meet future collaborative partners and to listen to more experienced peers (meet the experts sessions) about their careers paths. As a PhD student you should also keep in mind that you have something to bring to the society – you have your thoughts and ideas and they are something to value highly. At this conference you as a PhD students will be given a lot of time and space to discuss your ideas.

Good ideas, however, are nothing if they not come into practice and are tested. Science is built on a rigorous methodology. Scientific methodology is the core of our results. If we do not use a good enough method, our results are useless, no matter how innovative the idea was. At this conference we will hence focus on the methodology of your science, and we will discuss it together.

So, what about Descartes link to Stockholm? When he came to visit our queen Kristina, he caught a pneumonia and died. I will promise, you that you will not die from cold, but instead we will do our best to create a warm atmosphere where we can move the pain science one step further.

Welcome to Karolinska Institutet and Stockholm,

Mari Lundberg
Chair Organizing Committee

Mari Lundberg, PT, Associate Professor
Research Group Leader for the Back in Motion Research Group
http://ki.se/en/people/malun

The 2ⁿᵈ Pain Science in Motion Colloquium at a glance

After the successful first edition of Pain Science in Motion (PSiM) in Brussels in March 2015, the most frequently posed question to the members of the organizing and scientific committee was by far 'When is the next edition?' Now, we are proud to welcome you at the second edition, hosted by Karolinska Institutet in Stockholm in March 24-25, 2017.

The goal of the colloquium is again to provide a unique platform for PhD researchers to present their work (in progress), with special focus on research methods in pain sciences from different fields, rather than focussing solely on research findings or (clinical) applications. Both junior PhD researchers in the early stage of preparing their first study as well as more experienced researchers in the final year of their PhD submitted their work. Even when the results were not available yet, various PhD researchers got the opportunity to present their research hypothesis and research design, possible risks and solutions and process evaluations and receive valuable input!

On top of this, attendees can learn from leaders in the field of pain science. Indeed, the 4 Keynotes will not only lecture about their specific research skills, they will also guide attendants in various topics during their 'Meet the Expert' workshops.

This highly interesting program has attracted around 60 PhD students, from all over the world, to submit their work. And also other junior and senior researchers, as well as clinicians have been attracted by the format and content of the colloquium. All together we will all contribute to the program by presenting, moderating, interacting and discussing. The program consists of 34 oral parallel presentations, over 30 interactive poster discussions, 2 parallel walk & talk sessions and a typical Swedish evening activity in a friendly atmosphere. So plenty of opportunities to network and to share experiences with other junior and senior researchers and clinicians about one common passion: pain science.

In this abstract book we will present the complete program and the abstracts. The oral abstracts can also be retrieved in PAIN reports, an open access journal published by the International Association for the Study of Pain. The prizes for the best poster and oral presentations will be awarded during the closing session!

More information about the present colloquium, the 2015 version and future editions can be found at the website of Pain in Motion: *http://www.paininmotion.be/*.

Thanks for attending the 2nd PSiM and let us all contribute to make the second edition of the colloquium succeed!

Enjoy, learn and share!

On behalf of the Scientific Committee

Prof. Dr. Mira Meeus

(UAntwerp & UGhent – Department of Physical Therapy and Rehabilitation; Pain in Motion)
Chair of the Scientific Committee

TIME	ACTIVITY
08.30	Registration
09.00	Welcome (H3 Blå)

9.10 - 9.55 **Key-Note Lecture 1** (H3 Blå)
Physical activity and exercise for patients with rheumatic diseases – innovation, intervention and impementation. Prof. Christian Oparu, Karlinski Institute (Sweden)

10.00 - 11.00

Oral Parallel lecture 1 (Room 402) **Rehabilitation: LBP management**
1. Decreased pressure pain sensitivity following a modern neuroscience approach in patients with chronic spinal pain: a randomized controlled trial. Jeroen Kregel (Belgium)
2. Patient led goal setting is an effective treatment of chronic low back pain. Tania Gardner (Australia)
3. How feasible is the biopsychosocial primary care intervention 'Back on Track'? Reni van Erp (The Netherlands)
4. Effects of transdisciplinary pain neuroscience education on behaviour, illness perceptions and pain sensitivity. A single case study design. Robert van der Noord (The Netherlands)

Oral Parallel lecture 2 (Room 413) **Basic Science: Brain study**
5. Precise somatosensory fMRI-mapping of finger tips in CRPS-patients with upper limb affection. Sebastian Strauss (Germany)
6. Pain Neuroscience Education Effect on Pain Matrix Processing in an Individual with Complex Regional Pain Syndrome: A Single Subject Research Design. Korey Zimney (USA)
7. Modulation of corticomuscular coherence by stimulus intensity and predictability. Stephane Norton (Canada)
8. Decreased regional grey matter volume in chronic whiplash-associated disorders: relations with cognitive deficits, pain and central sensitization. Iris Coppieters (Belgium)

11.00 - 11.30 *"FIKA" (Coffee break)*

11.30 - 11.55 **Poster break: 3 parallel tours: 3 presenters 5 minutes each**
(3 min presentation, 2 min question) Room: Poster Hall

Poster Session 1: Brain MRI
P1. Is traumatic and non-traumatic neck pain associated with brain alterations? - a systematic review. Robby De Pauw (Belgium)
P2. Relations between brain alterations and clinical pain measures in chronic musculoskeletal pain: A systematic review. Iris Coppieters (Belgium)
P3. Does conservative treatment change the brain in patients with chronic musculoskeletal pain? A systematic review. Jeroen Kregel (Belgium)

Poster Session 2: Pain perceptions in professionals
P4. Surgeon's opinions about (post)operative management in patients undergoing spinal fusion surgery: A survey-based study in Sweden and the Netherlands. Reni van Erp (The Netherlands)
P5. Pain Curriculum: How are Brazilian Physical Therapy Schools? Felipe Reis (Brazil)
P6. Physician attitudes to pain assessment and management in critical care: The Pain Assessment in INTensive Care (PAINT) Study. Harriet Kemp (UK)

Poster Session 3: Low Back Pain
P7. Is there a relationship between structural muscle characteristics and pain in low back pain patients? Dorien Goubert (Belgium)
P8. Improvements of pain, disability and quality of life following chiropractic care for back pain – A prospective national study in Sweden. Filip Gedin (Sweden)
P9. Risk and Resilience factors related to chronic pain interference (and disability). Melvin Donaldson (USA)

12.0 0 - 12.45 **Key-Note Lecture 2** (H3 Blå)
Pain management in athletics, Karin Grävare Silbernagel, assistent professor, University of Delaware (USA)

12.45 - 13.45 *Lunch + arranged Walk and talk*

13.45 - 14.10 **Poster break: 3 parallel tours: 3 presenters 5 minutes each**
(3 min presentation, 2 min question) Room: Poster Hall

Poster Session 4: Chronic shoulder pain
P10. Sensory processing and central pain modulation in patients with chronic shoulder pain: a case control study. Kevin Kuppens (Belgium)
P11. The influence of psychological factors on the prognosis of chronic shoulder pain: protocol for a prospective cohort study. Javier Martínez-Calderon (Spain)
P12. Which factors influence mobility, pain and functioning in patients with adhesive capsulitis of the shoulder: a prospective study. Santiago Navarro-Ledesma (Spain)

Poster Session 5: Patient perceptions
P13. Correlation of Trust and Outcomes following Physical Therapy for Chronic Low Back Pain. Kory Zimney (USA)
P14. Placebo, Nocebo and Contextual Effect in Physiotherapy: Do We Need to Rethink Clinical Practice? Giacomo Rossettini (Italy)
P15. Illness perceptions and Health Literacy skills of patients with chronic pain- a qualitative study. Janke Oosterhaven (The Netherlands)

Poster Session 6: Therapy predictors
P16. Differences in the course of Italian- and German-speaking patients' outcome after interdisciplinary pain program. Thomas Benz (Switzerland)
P17. What are the predictive factors for central sensitisation in chronic musculoskeletal pain populations? A systematic review. Jacqui Clark (New-Zealand)
P18. Return to work among patients with chronic non-cancer pain and long-term opioid treatment: a randomised controlled trial. Hedvig Zetterberg (Sweden)

TIME	ACTIVITY	
14.15 –15.00	**Oral Parallel lecture 3** (Room 402) **Rehabilitation: Shoulder** 9. Surface EMG activity of the upper trapezius before and after a single dry needling session in female office workers with trapezius myalgia. Kayleigh De Meulemeester (Belgium) 10. Expanded distribution of pain as a sign of central sensitization in individuals with adhesive capsulitis. Enrique Lluch (Spain) 11. Does subacromial space influence in rotator cuff tendinopathy? Santiago Navarro-Ledesma (Spain)	**Oral Parallel lecture 4** (Room 413) **Psychology** 12. Perceived injustice and external attribution in patients with chronic pain. Rinske Bults (The Netherlands) 13. Facial recognition and Theory of Mind in Musculoskeletal Chronic Pain Patients. Felipe Reis (Brazil) 14. The (dis)illusion of a painful body: the relationship with the body, pain disability and comorbidities in chronic pain patients. Inês Agostinho Matos de Oliveira (Portugal)
15.00 -15.30	*"FIKA" (Coffee break)*	
15.30 -16.15	**Meet the expert 1** (Room 402): Things to consider when to apply for funding. Professor Christina Opava, Karolinska Institutet (Sweden)	**Meet the expert 2** (Room 413): How to get published? Karin Grävare Silbernagel, University of Delaware (USA)
16.20 -17.05	**Oral Parallel lecture 5** (Room 402) **Rehabilitation: assessment of predictive factors** 15. Determining predictive outcome factors for a multimodal treatment program in low back pain patients: a retrospective cohort study. Rahmat adnan (Belgium) 16. Trajectories of health care utilization associated with musculoskeletal pain in the general population. A 12-year follow-up. Christina Emilson (Sweden) 17. Prognostic factors of drop out in multidisciplinary chronic pain management programs: a systematic review. Janke Oosterhaven (The Netherlands)	**Oral Parallel lecture 5** (Room 402) **Assessment** 18. In Patients with Carpal Tunnel Syndrome (CTS) is Conditioned Pain Modulation Associated with Surgical Outcome and Persistent Post-surgical Pain? Donna Kennedy (UK) 19. The quality of measurement properties of physical capacity tasks designed to assess functioning in persons with low back pain: a systematic review. Max Jakobsson (Sweden) 20. Individual quality of life in people with Amyotrophic lateral sclerosis/motor neuron diseases, with and without pain. Ylva Åkerblom (Sweden)
17.05	*End of the scientific program*	
17.05	*Come together – Food and Drinks and Surprises*	

TIME	ACTIVITY
9.00	Welcome (Room H3 Blå)

9.10 - 9.55   **Key-Note Lecture 3** (H3 Blå)
Psychological and social impact on pain – a state of the art
Professor Geert Crombez, Ghent University (Belgium)

10.00 - 11.00

Oral Parallel lecture 7 (Room 402) **Prognosis: miscellaneous**
21. Cross-cultural adaptation and validation of the Fear Avoidance Beliefs Questionnaire (FABQ) among survivors of torture. Jepkemoi J Kibet (South-Africa)
22. Validity and reliability of the Dutch modified Perceived Deficits Questionnaire to examine cognitive symptoms in patients with chronic neck pain. Dorine Lenoir (Belgium)
23. The influence of self-efficacy on the prognosis of rheumatoid arthritis: a systematic review and meta-analysis. Javier Martínez-Calderon (Spain)
24. Chronic opioid therapy in chronic non-cancer pain: benefits versus risks. Hanna Ljungvall (Sweden)

Oral Parallel lecture 8 (Room 413) **Basic Science: exercise-induced analgesia**
25. Influence of morphine and naloxone on pain modulation in Rheumatoid Arthritis, Chronic Fatigue Syndrome/Fibromyalgia and controls. Linda Hermans (Belgium)
26. Cerebral blood flow and heart rate variability in response to exercise and emotional stress are not altered in Chronic Fatigue Syndrome. Anneleen Malfliet (Belgium)
27. Elevations in pressure pain threshold by exercise are reduced by blood flow occlusion to that limb in healthy adults. Matthew Jones (Australia)
28. The influence of physical activity and fatigue on the nociceptive flexion reflex in healthy subjects: a randomized cross-over study. Evy Dhondt (Belgium)

| 11.00 - 11.30 | *"FIKA" (Coffee break)* |

11.30 - 11.55   **Poster break: 3 parallel tours: 3 presenters 5 minutes each**
(3 min presentation, 2 min question) Room: Poster Hall

Poster Session 7: Multimodal rehabilitation
P19. Preoperative pain neuroscience education combined with knee joint mobilization for knee osteoarthritis: a randomized controlled trial. Enrique Lluch (Spain)
P20. Effectiveness of the blended PARASOL intervention for patients with moderate medically unexplained physical symptoms: study protocol. Els van Westrienen (The Netherlands)
P21. Evidence for central sensitization in children with chronic pain: a systematic literature review. Roselien Pas (Belgium)

Poster Session 8: Effectiveness of rehabilitation
P22. Protocol: Predictors of multidisciplinary rehabilitation outcome in patients with chronic musculoskeletal pain: systematic review and meta-analysis. Elena Tseli (Sweden)
P23. How to prevent relapse after successful pain rehabilitation: Evaluating co-design methodology in the development of a complex intervention. Stefan Elbers (The Netherlands)
P24. Cost-effectiveness of a primary care multidisciplinary treatment for patients with chronic pain. Rinske Bults (The Netherlands)

Poster Session 9: Assessment
P25. The reliability of gait analysis between patients with unilateral hip osteoarthritis, unilateral hip prosthesis and healthy controls. Roland Zügner (Sweden)
P26. Measuring the physical activity level and pattern in daily life in persons with chronic fatigue syndrome: a systematic review. Kuni Vergauwen (Belgium)
P27. Evaluating knee function in patients undergoing ambulatory knee arthroscopies using a modified assessment tool based on ICF – A longitudinal study. Linda Nilsson (Sweden)
P28. Risk factors of pain in breast cancer survivors: a systematic review and meta-analysis. Laurence Leysen (Belgium)

12.00 - 12.45   **Key-Note Lecture 4** (H3 Blå)
Pathophysiology, diagnosis and management of neuropathic pain.
Professor Michel Coppieters, FreeUniversity of Amsterdam (The Netherlands)

| 12.45 - 13.45 | *Lunch + arranged Walk and talk* |

13.45 - 14.10   **Poster break: 3 parallel tours: 3 presenters 5 minutes each**
(3 min presentation, 2 min question) Room: Poster Hall

Poster Session 10: Sensorimotor approach
P29. Virtual Restorative Environment Therapy as an adjunct to conventional analgesia for procedure related pain in burns patients: a feasibility study. Charlotte Small (UK)
P30. Sensorimotor incongruence in people with chronic and acute non-specific low back pain. Sanneke Don (The Netherlands)
P31. Psychomotor Therapy program based on dual task paradigm for fibromyalgia syndrome. Janete Maximiano (Portugal)

Poster Session 11: Exercise and Pain
P32. Exercise induced hypoalgesia in response to morphine in patients with rheumatoid arthritis and chronic fatigue syndrome/fibromyalgia. Linda Hermans (Belgium)
P33. Does education about exercise-induced hypoalgesia influence pain responses to exercise in people with chronic pain and healthy adults? Study protocol. Matthew Jones (Australia)
P34. Development and course of shoulder pain in swimmers: a prospective cohort study beyond muscles and joints. Kevin Kuppens (Belgium)
P35. Immune-pain interaction following exercise in chronic fatigue syndrome: associations between exercise-induced hyperalgesia and complement system. Andrea Polli (Belgium)

TIME	ACTIVITY	
14.15 - 15.00	**Oral Parallel lecture 9** (Room 402) **Rehabilitation: role of fear** 29. Trait sensory processing and anxiety profiles in people with central sensitisation in a chronic low back pain population – a mixed methods study. Jacqui Clark (New-Zealand) 30. An interdisciplinary study on the relation between fear, attention and sensorimotor control in back pain chronicity: movement-related factors. Stijn Schouppe (Belgium) 31. Influencing pain free neck range of motion with virtual reality: Unravelling the role of fear in relation to associative learning. Maaike Kragting (The Netherlands)	**Oral Parallel lecture 10** (Room 413) **Rehabilitation: background of LBP** 32. Pain mechanisms in low based pain. Hester den Bandt (The Netherlands) 33. The pain experience and energetic efficiency of transport among older adults with chronic low back and radicular leg pain. Peter C. Coyle (USA) 34. Levels of physical activity and sedentary behaviour among patients with degenerative disc disease who are to undergo spinal fusion surgery. Hanna Lotzke (Sweden)
15.05 -15.50	**Meet the expert 3** (Room 402): How to become a professor? Professor Michel Coppieters, FreeUniversity of Amsterdam (The Netherlands)	**Meet the expert 4** (Room 413): Being a scientist: from basic to applied science. Professor Geert Crombez, UGhent (Belgium)
16.00	*Summary and Awards (Best Oral and Poster presentation)* *PSiM 2019 announcement*	
16.30	*"FIKA" (Coffee break) and end of the congress*	

Decreased Pressure Pain Sensitivity following a Modern Neuroscience Approach in Patients with Chronic Spinal Pain: a Randomized Controlled Trial

Kregel Jeroen[1]; Malfliet Anneleen[2]; Coppieters Iris[1]; Dolphens Mieke[1]; Roussel Nathalie[3]; Danneels Lieven[1]; Nijs Jo[2]; Meeus Mira[1,3]; Cagnie Barbara[1]

[1] REVAKI UGent, Belgium; [2] KIMA VUB, Belgium; [3] REVAKI UAntwerpen, Belgium

Introduction: The present study evaluated the effects of a modern neuroscience approach versus usual care physiotherapy on pain measurements in patients with CSP.

Methods: 115 patients with chronic low back and neck pain were randomized into the experimental or control therapy. Before and after, patients underwent pressure pain thresholds (PPT). Endogenous pain modulation was measured with a cold pressor test.

Results: Patients exhibited increased primary PPTs after therapy in both therapy groups (p<.001), but the increase was larger for the experimental therapy (p=.005). Similar effects were found for the secondary PPTs, with an increase for both groups (p<.001) and a larger increase for the experimental therapy (p=.035). Endogenous pain inhibition did not significantly improve (p>.05).

Discussion: The results showed that PPTs increased after therapy for both therapies, with larger increases for the experimental group.

Process evaluation: Several patients were not able to complete the cold pressor test due to increased sensitivity.

PATIENT LED GOAL SETTING IS AN EFFECTIVE TREATMENT OF CHRONIC LOW BACK PAIN

Gardner T [1], Refshauge K[2], McAuley J[3], Goodall S[4], Hübscher M[3], Smith L[1]

[1] Faculty of Pharmacy, University of Sydney, Australia [2] Faculty of Health Sciences, University of Sydney, Australia, [3] NEURA Australia, [4] University of Technology Sydney, Australia

Introduction: The aim of this study was to establish the difference in clinical effectiveness and costs of a patient led goal setting intervention compared with usual care in CLBP.

Methods: Assessor-blinded randomized controlled trial with 2 arms (1) patient led goal setting (2) usual care.

Process evaluation: Recruitment of participants was difficult and initial high drop-out rate with usual care participants was experienced. Protocol was amended to maximise usual care retainment with good effect. One investigator conducted the intervention group which supports a consistent method however limits the generalizability for the intervention across multiple clinicians. Questionnaire data collection was lengthy and time consuming. Future studies should consider improved formatting and an online platform to collect data.

Discussion: Our findings confirm that a patient led goal-setting intervention is an effective intervention for the management of chronic low back pain. Several study design components should be considered in future research.

How feasible is the biopsychosocial primary care intervention 'Back on Track'?

Van Erp, MSc[a].; Huijnen, Dr[a, b]; Verbunt, Prof, Dra,[b, c]; Köke, Dra,[b, d]; Smeets, Prof, Dr[a, e]

[a]   Department of Rehabilitation Medicine, CAPHRI, Maastricht University, Maastricht,
      the Netherlands
[b]   Adelante, Centre of Expertise in Rehabilitation and Audiology, Hoensbroek, the Netherlands
[c]   Department of Rehabilitation Medicine, Maastricht UMC+, Maastricht, the Netherlands
[d]   Department Physical Therapy, Zuyd University of Applied Sciences, Heerlen, the Netherlands
[e]   Libra Rehabilitation and Audiology location Eindhoven and Weert, the Netherlands

Introduction: When a new therapeutic intervention is developed, it is of upmost importance to sys-
                     temically evaluate its feasibility, whether the intervention is provided as intended, and
                     found health effects are attributable to the intervention. The purpose of this study is
                     to perform a process-evaluation of a new biopsychosocial physiotherapist-led primary
                     care intervention (Back on Track) for a subgroup of patients with non-specific chronic
                     low back pain.

Methods: Process evaluation will be conducted in patients (n=18), primary care physiotherapists
                     (n=4), and physiatrists to (n=4) either receiving-, providing- or referring to the Back
                     on Track program. Qualitative and quantitative analysis will be performed in terms
                     of treatment expectations and credibility (Credibility and Expectancy Questionnaire),
                     treatment fidelity and dose delivered (audio recordings of therapy sessions), reach (at-
                     tendance lists), dose received (i.e. exposure and satisfaction; evaluative questionnaire
                     for patients, focus groups for physiotherapists and physiatrists).

Results: Data collection is ongoing as patients still receive therapy.

Discussion: If the primary care intervention seems feasible for this subgroup of patients, findings
                     will be used to optimize and implement the intervention.

Process evaluation: Each measurement has its practical (time-consuming) procedures with specific exper-
                     tise needed to perform adequate evaluations. The process evaluation will be executed
                     in upcoming months.

Effects of transdisciplinary pain neuroscience education on behavior, illness perceptions and pain sensibility. A single case study design.

Wijma, Amarins,[1,2,3] PT, MSc, van der Noord, Robert,[1,4] PT, MSc, van Wilgen, Paul,[1,2,3] PT, PhD

[1]   Transcare, Transdisciplinary pain management center, Groningen, The Netherlands
[2]   Departments of Human Physiology and Physiotherapy, Faculty of Physical Education & Physiotherapy, Vrije Universiteit, Brussels, Belgium
[3]   "Pain in Motion" international research group, www.paininmotion.be
[4]   Inter-fysio, Physical therapy practice, Groningen, The Netherlands

Introduction: Effects of PNE are underlined in meta-analyses, unknown however remains which parts of the process of PNE are important. The aim of this multiple case study is to evaluate the changes regarding central sensitisation, perceptions, catastrophizing, pain sensitivity and functioning following the process of transdisciplinary PNE.

Methods: Ten adult patients with chronic neck-shoulder pain will be included at a transdisciplinary pain management centre in the Netherlands. Digital questionnaires will measure aspects of central sensitization, perceptions, catastrophizing and daily functioning. Furthermore, pressure pain thresholds (PPT) and mechanical pain thresholds (MPT) will be tested. Data will be collected four times prior to the intake, prior to first PNE session, prior to the second PNE session, a week and four weeks after this PNE session.

Discussion: By this approach the individual process of PNE is evaluated giving insight in possible effects or non-effects during this process. This will give insight in patients profiles, effects and the therapeutical process.

Process evaluation: There is no process evaluation yet, possible limitations are the duration and repetition of questionnaires and selection bias.

Precise somatosensory fMRI-mapping of finger tips in CRPS-patients with upper limb affection

Strauss S; Pfannmöller J.P, Dr.; Lotze M, Prof.
Functional Imaging Unit, University of Greifswald, Greifswald, Germany

Introduction: Impaired somatosensory perception is a typical clinical finding in patients with complex regional pain syndrome (CRPS). Interrelation between hands representation size in the somatosensory cortex (S1) and sensory deficits are suspected, but studies using new high spatial resolution fMRI to measure hand representation in S1 are rare.

Methods: 10 patients participated in this study. FMRI measurements were carried out on a 3 Tesla MRI-scanner. Pneumatic stimulus fingertips were used to deliver tactile stimuli to the finger tips. Data analysis was performed using an automated analysis protocol. Two-Point-Discrimination-threshold (TPD) was tested with a wheel discriminator.

Results: Patients showed a negative correlation on d1-d5 distance and TPD ($r = -0.70$; $p = 0.01$). Discussion: Using high spatial resolution fMRI and our analysis protocol it is possible to display the exact position of each finger in S1. This may be an interesting tool for further studies dealing with neuropathological changes due chronic pain.

Process evaluation: Increased statistical power with more patients will be necessary to detect further associations between behavioural and imaging parameters in these patients.

Pain Neuroscience Education Effect on Pain Matrix Processing in an Individual with Complex Regional Pain Syndrome: A Single Subject Research Design

Fercho, PhD[1,2]; Baugh, PhD[1,2]; Louw, PT, PhD[4]; Zimney, PT, DPT[2,3]

[1]   Basic Biomedical Sciences, University of South Dakota, 414 E Clark St, Vermillion, SD 57069, USA.

[2]   Center for Brain and Behavior Research, University of South Dakota, 414 E Clark St, Vermillion, SD 57069, USA.

[3]   Physical Therapy, University of South Dakota, 414 E Clark St, Vermillion, SD 57069, USA.

[4]   International Spine and Pain Institute, PO Box 232, Story City, IA 50248, USA.

Introduction: Functional magnetic resonance imaging (fMRI) data were obtained from a participant with CRPS while completing hand grasping movements with her CRPS-affected and un-affected hands, both before and after a session of pain neuroscience education (PNE) and a control condition session of exercise education (CEE).

Methods: Voxelwise analysis was conducted using a single General Linear Model in which each scan was coded as belonging to either the CRPS-affected hand or unaffected hand for each of the following conditions: pre-CEE, post-CEE, pre-PNE, post-PNE. Fixed-effects analyses contrasted activity across hands and conditions. Subjective pain rating scales were administered before and after each session.

Results: Pain ratings were not influenced by either intervention. Both PNE and CEE reduced activity during affected hand movements in areas outside the classic 'pain matrix' that modulate with perceived pain. PNE increased activity in perceptive-attention regions of the brain. Nociceptive regions also increased in activity following PNE.

Discussion: Changes across 'pain matrix' regions were found post-PNE. The increased nociceptive and perceptive-attention regions suggest that a single session of PNE may be able to influence activity in nociceptive brain regions, perhaps through a top-down influence centered on decreased threat perception.

Process Evaluation: Limitation in analysis of single-subject design.

Modulation of corticomuscular coherence by stimulus intensity and predictability

Stephane Northon

Université du Québec à Trois-Rivières, département de chiropratiqu

Introduction:
Pain may capture attention and induce avoidance behaviors through cerebral processes that are influenced, for example, by stimulus predictability and intensity. These conscious motor behaviors rely on the activation of corticospinal pathways and associated muscles that can be assessed with corticomuscular coherence (CMC), a cross-correlation frequency analysis of electroencephalographic (EEG) and electromyographic (EMG) activity. Previous work has shown that phasic pain increases beta range coherence. It remains unknown if a similar effect can be observed with tonic pain and whether the effect may be modulated by stimulus predictability and intensity. We thus set out to measure how modulating cutaneous heat pain intensity and predictability affects CMC. As pain may affect motoneuronal excitability, we will test the H-reflex. We expect interactions between stimulus intensity, predictability, and CMC.

Methods:
We wish to recruit 20 healthy adults, who will fill questionnaires regarding fear-avoidance, anxiety, and footedness. A 64-electrodes cap with nose reference will be used for EEG. EMG will be measured with two electrodes on the soleus muscle. We plan to evoke soleus H-reflex with a cathode above the patella and an anode on the tibial nerve below the popliteal fossa. The maximal voluntary isometric contraction (MVIC) will be averaged from three maximal ankle plantar flexion. Pain threshold will be defined with the method of limits using a thermode on the calf with an initial temperature of 35°C. Three intensities will be set using pain threshold -3°C, +1°C, and +3°C: innocuous, low, and high. Participants will sit and fixate a monitor. A white cross lasting 10s will serve as a signal for the isometric ankle plantar flexion. We plan to use EMG feedback to maintain a 25% MVIC. Six seconds will be allotted to rate pain and anxiety (0-100 VAS). As a baseline, we intend to have 15 trials without pain. For Block 1 & 2 (predictable & unpredictable pain), the temperature will rise randomly after 4 to 6s to one of the three set intensities. The H-reflex is planned after the temperature rise. We intend to have 15 trials per intensity (45/block). In the predictable block, the white cross will be replaced by colored crosses: green (innocuous), yellow (low) and red (high) that warn of the upcoming intensity. In the unpredictable block, the white cross will be kept. A one minute pause will be set between blocks, and orders will be counter-balanced.centered on decreased threat perception.

Decreased regional grey matter volume in women with chronic whiplash-associated disorders: relationships with cognitive deficits and disturbed pain processing

Coppieters Iris[1]; De Pauw Robby[1]; Caeyenberghs Karen[2]; Danneels Lieven[1]; Meeus Mira[1]; Cagnie Barbara[1]

[1]Ghent University, Belgium; [2]Australian Catholic University, Australia

Introduction: This study examined alterations in grey matter volume (GMV) in patients with chron-
                     ic whiplash-associated disorders (CWAD) compared to chronic idiopathic neck pain
                     (CINP) and healthy controls (HC). Additionally, relationships between GMV, and meas-
                     ures of cognition and pain were assessed.

Methods: Ninety-three women (28 HC, 34 CINP, 31 CWAD) were enrolled. First, T1-weighted
                     Magnetic Resonance Images (MRI) were acquired to examine GMV alterations in brain
                     regions involved in processing of cognition and pain. Next, cognitive deficits, maladap-
                     tive pain cognitions, CS symptoms, and hyperalgesia were assessed.

Results: GMV of the lateral orbitofrontal, supramarginal, and posterior cingulate cortex was
                     decreased in CWAD compared to HC. Additionally, GMV of the superior parietal and
                     posterior cingulate cortex was decreased in CWAD compared to CINP. Lower regional
                     GMV correlated with higher cognitive deficits, maladaptive pain cognitions, CS symp-
                     toms, and hyperalgesia in CWAD (rs= -0.515 to -0.657). Lower regional GMV correlated
                     with higher cognitive deficits in CINP (rs= -0.499 to -0.619).

Discussion: No conclusions can be drawn on the causality of the observed relationships.

Process evaluation: Poor MRI data quality was revealed in 12 participants. Accordingly, these data were
                     excluded.

Surface EMG activity of the upper trapezius before and after asingle dry needling session in female office workers with trapezius myalgia.

De Meulemeester Kayleigh[1] (MSc, PT), Calders Patrick [1] (PhD), Dewitte Vincent[1] (MSc, PT), Barbe Tom[1] (MSc, PT), Danneels Lieven[1] (PhD, PT), Cagnie, Barbara[1] (PhD, PT)

[1] REVAKI, Ghent University, Belgium

Introduction: Dry needling (DN) is a common myofascial treament technique. However, the working mechanisms and importance of local twitch responses (LTRs) remain unclear.

Methods: Twenty-four women with work-related trapezius myalgia were asked to perform two typing tasks, which were respectively followed by a resting pause and DN treatment. Electromyographic (EMG) activity was measured before and after each typing task and intervention.

Results: The increase in EMG activity was significantly smaller 10 minutes after DN, compared to rest. These differences were independent of eliciting LTRs.

Discussion: Due to the physiological effects of DN, the muscle may recover more quickly after the typing task, compared to rest. Eliciting LTRs may be associated with the degree of irritability of the MTrP.

Process evaluation: Due to the electrodes it was not possible to palpate the MTrP during DN. However, a thorough palpation and marking of the MTrP before electrode placement minimised this problem.

Expanded distribution of pain as a sign of central sensitization in individuals with adhesive capsulitis

Lluch E[1,2,3]; Dueñas L[1]; Aguilar M1; Navarro S[4,5]; Barbero M6; Meeus M[3,5,]7; Struyf F[5]

[1]   Department of Physical Therapy, University of Valencia, Valencia, Spain
[2]   Departments of Human Physiology and Rehabilitation Sciences, Faculty of Physical Education
      & Physiotherapy, Vrije Universiteit Brussel, Belgium
[3]   Pain in Motion International Research Group, http://www.paininmotion.be
[4]   Department of Physical Therapy, University of Málaga, Málaga, Spain
[5]   MovAnt, Department of Rehabilitation Sciences and Physiotherapy, Faculty of Medicine and
      Health Sciences, University of Antwerp, Belgium
[6]   University of Applied Sciences and Arts of Southern Switzerland
      Department of Business Economics, Health and Social Care
      Rehabilitation Research Laboratory, Switzerland
[7]   Department of Rehabilitation Sciences and Physiotherapy, Faculty of Medicine and Health
      Sciences, Ghent University, Ghent, Belgium

Introduction: The role of central sensitization (CS) in adhesive capsulitis (AC) is unknown. Expanded
                  distribution of pain is a sign CS and pain drawings might be useful to identify pain
                  distribution in AC. The primary aim is to quantify the distribution of pain with pain
                  drawings and evaluate its test-retest reliability in AC. The association between pain
                  drawings and clinical symptoms and measures of CS will be explored.

Methods: Subjects with primary AC will be included. All participants will complete pain drawings,
                  questionnaires and quantitative sensory testing. Spearman's correlation coefficients
                  between the pain area of and clinical symptoms and CS measures will be calculated.

Discussion: Pain drawings might constitute an easy way for early identification of CS in AC since
                  costly laboratory equipment is usually necessary for diagnosis of CS.

Process evaluation: The study design is cross-sectional, so firm conclusions about the predictive role of
                      pain drawings on AC will not be drawn.

Which factors influence mobility, pain and functioning in patients with adhesive capsulitis of the shoulder: a prospective study.

Navarro-Ledesma S, PT[a,c]; Luch-Girbés E, PT, PhD[b,e]; Dueñas-Moscardó L, PT, PhD[b];
Aguilar-Rodríguez M, PT, PhD[b]; Noten S, MSc[c]; Luque-Suárez A, PT, PhD[a]; Struyf F, PT, PhD[c];
Meeus M, PT, PhD[c,d,e].

[a]   Department of Physiotherapy, University of Málaga, Málaga, Spain.
[b]   Departent of Physiotherapy, University of Valencia, Valencia, Spain.
[c]   Department of Rehabilitation Sciences and Physiotherapy, University of Antwerp, Antwerp,
      Belgium.
[d]   Department of Rehabilitation Sciences and Physiotherapy, University of Ghent, Ghent, Belgium.
[e]   Pain in Motion International Research Group.

Introduction: People who are to undergo spinal surgery are assumed to be less physically active (PA)
                   than individuals without pain.

Objective: To describe levels of PA and sedentary behaviour among patients who are to undergo
                   lumbar fusion surgery.

Design: A cross-sectional study.

Method: PA and sedentary behaviour were assessed with GT3X+ accelerometers for 66 pa-
                   tients. Data were compared to the WHO's recommendations on PA for health.

Results: On average the patients spent 186 minutes on moderate-intensity and 6 minutes on
                   vigorous-intensity PA level per week. Patients averaged 542 minutes of sedentary
                   behaviour per day.

Discussion: Nearly half of the study population did not reach the WHO's recommendation for
                   moderate-intensity PA per week and two third of the patients did not spend any time
                   in vigorous-intensity PA. To increase PA must be considered when designing prehabili-
                   tation protocols for this patient group.

Perceived injustice and external attribution in chronic pain

Bults, MSc[1], Wijma, PT, MSc & van Wilgen, PT, PhD

[1.] Transcare-pijn Groningen

Introduction:
Perceived injustice (PI) is linked to greater pain intensity, mental health problems and poor recovery outcomes in treatment. External attribution (EA) might be a possible mediator, as EA may lead to increased feelings of distress, helplessness and more pain. This study aims to investigate the link between PI and EA.

Methods:
The link between PI and EA is investigated by a correlational study including 124 chronic pain patients. The following outcomes are used in this study: intensity/extensiveness of pain, perceived injustice (IEQ) and the perceived causes for the pain given by the patients (IPQ-R). The causes are classified into categories (e.g. internal/external/psychological/somatic) and Pearson's correlations are calculated.

Discussion:
A possible limitation of this study is the fact that patients often provide short and crude answers when asked for the causes of their pain, leaving these answers open for interpretation by the researcher. Therefore, two independent researchers will classify the causes and discuss the differences.

Process evaluation:
Currently, all data has been collected and entered into SPSS Statistics and the classifying of the causes will commence soon.

Facial recognition and Theory of Mind in Musculoskeletal Chronic Pain Patients.

CHAVES ANNA CAROLINA DA SILVA[1], PT; LACERDA LARIANE[1], PM; REIS FELIPE J.J., PT, MsC, PhD[1,2]; SANCHEZ THIAGO ARRUDA PM, MsC, PhD[1].

1. Laboratory of Neuroimaging – Federal University of Rio de Janeiro – UFRJ (Rio de Janeiro, Brazil)
2. Federal Institute of Rio de Janeiro – IFRJ (Rio de Janeiro, Brazil)

Patients with persistent pain show different brain activity in "emotional" areas. We investigated the explicit recognition of facial expressions and Theory of Mind in persistent pain.

METHODS: This study consisted by 10 patients with persistent musculoskeletal pain and 10 healthy participants, matched by gender and age. To evaluate explicit emotional processing, we used the Ekman database (happiness, anger, sadness, disgust and fear). The Reading the Mind in the Eyes (RMET) was used to evaluate the recognition of mental states. We acquired accuracy and response time.

RESULTS: In explicit emotional processing, the incorrect responses was 30% in the patient group and 16.5% in the control group. The patient group had more difficulty in recognize faces of anger, sadness and disgust. The average response time was 1776.19 (milliseconds) in the patient group and 1400.1 in the control group. In the RMET, the incorrect response was 51.9% in the patient group and 41.6% in the control group. The average response time was 7239.40 (milliseconds) in the patient group and the 7974.76 in the control group.

DISCUSSION: The results showed that patients with persistent pain might have impairments in recognition of other's emotions, as well as in representing other people's affective mental states.

The (dis)illusion of a painful body: the relationship with the body, pain disability and comorbidities in chronic pain patients

Inês Agostinho Matos de Oliveira

ISCTE - IUL (Lisbon University Institute)

Generally, this project aims to contribute to the development of new therapeutic tools for CP, improving patients' quality of life. Based on the Fear-Avoidance Model (FAM) (Vlaeyen & Linton, 2000), we defined as objectives to investigate (1) the influence of patients' relation with their own bodies (BI and IA) in the associated pain disability and respective comorbidities (anxiety/depression) and (2) the affective (kinesiophobia) and behavioral (avoidance of movement) mediating processes of that relation. Specifically, it is our objective to understand the impact of the relation that CP patients establish with their own bodies in pain disability, depression and anxiety; and to study how the affective and behavioral components of FAM mediate this relation.

We developed a conceptual model to be tested through two different methodologies, with adults suffering from chronic low back pain.

1.Longitudinal study: with 3 evaluation periods, in which we will explore how BI and IA (predictor variables) influence the kinesiophobia and the avoidance of movement (mediator variables). We will also investigate the effect of the mediator variables on the relation between predictor variables and pain disability, depression and anxiety (criterion variables).

2.Experimental study: to investigate the effect of BI and IA in pain disability, depression and anxiety. This comprises 3 levels: Group 1: BI intervention; Group 2: IA intervention; Group 3: Control group – Treatment as usual.

We anticipate problems with sample size, since we would like to recruit our participants in a hospital setting. We are also struggling with the choice of BI and IA manipulations, considering that it is our goal to improve these variables in patients.

In the last year, we have been conducting a scoping review, in order to map the literature and get an overview of the research made so far. Our research question is: "How is the relationship with the body explored in patients with pain: which concepts/dimensions have been studied, how they have been operationalized and what results were found?"

DETERMINING PREDICTIVE OUTCOME FACTORS FOR A MULTIMODAL TREATMENT PROGRAM IN LOW BACK PAIN PATIENTS: A RETROSPECTIVE COHORT STUDY

Adnan Rahmat, MSc[1,2]; Van Oosterwijck Jessica, PhD, PT[1,3,4]; Cagnie Barbara, PT, PhD[1]; Dhondt Evy, PT, MSc[1]; Schouppe Stijn, PT, MSc[1]; Van Akeleyen Jens, MD[5]; Logghe Tine, MD[5]; Danneels Lieven, PT, PhD[1]

1   Department of Rehabilitation Sciences and Physiotherapy, Ghent University, Belgium;
2   Faculty of Sports Sciences and Recreation, Universiti Teknologi MARA, Malaysia;
3   Research Foundation-Flanders (FWO), Belgium;
4   Pain in Motion international research group,
5   Department of Physical and Rehabilitation Medicine, General Hospital St-Dimpna, Belgium

Introduction: Multimodal treatment programs are widely recommended for rehabilitation of low back pain (LBP), but no studies have adequately explored the factors that predict treatment outcome.

Methods: Predictive outcome factors were identified in 153 acute and 412 chronic LBP patients who participated in a multimodal treatment program.

Results: Acute LBP patients with kinesiophobia and elderly chronic LBP patients with high levels of depression, back pain intensity and disability were at risk for poor treatment outcome.

Discussion: These specific LBP patients may need different or adapted treatment approaches to improve their chances on favorable treatment outcome.

Process evaluation: Baseline variables were selected based on previous reports and may not be the most relevant.

Trajectories of health care utilization associated with musculoskeletal pain in the general population. A 12-year follow-up.

Emilson C[1], PT, MSc; Åsenlöf P[1], PT, PhD; Demmelmaier I[1], PT, PhD; Bergman S[2], MD, PhD

1. Department of Neuroscience, Uppsala University, UPPSALA, Sweden
2. Department of Public Health, and Community Medicine, University of Gothenburg, GOTHENBURG, Sweden

Introduction: Introduction: Individuals with musculoskeletal pain have an increased health care utilization (HCU) but longitudinal data on the association between HCU and pain are limited. The aim of this study was to investigate HCU associated with musculoskeletal pain in a 21-year follow-up.

Methods: A sample of 3928 subjects, age 20-74 years, was selected in 1995 (response rate 62 %). Surveys were sent out after 3, 8 ,12 and 21 years, included chronic pain prevalence, HCU and general health. Logistic regression analysis was used to calculate odds ratio (95 % CI) for baseline variables associated with HCU.

Results: Predictors for high HCU; chronic pain, female gender and increasing age. Defined trajectories for HCU; stable low, stable high, increasing- and decreasing over time.

Discussion: The results will be discussed in the light of the course of musculoskeletal pain, trajectories for HCU, and clinical implications.

Process evaluation: Challenges and demands for follow-ups?

Prognostic factors of drop out in multidisciplinary chronic pain management programs: a systematic review.

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Janke Oosterhaven, University of applied Sciences Utrecht/ University of Amsterdam
Centre for Innovation for Healthcare, research group Lifestyle and Health

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Introduction: Drop out from chronic musculoskeletal pain management programs is associated with poor treatment outcomes. Despite this, patient drop out continues to be a neglected topic. This is remarkable, because with the complexity of chronic pain management programs and the focus on self-care behavior, drop out is inevitable. The objective of this systematic review was to identify prognostic factors for drop out of patients during multidisciplinary pain programs.

Methods: A systematic literature search was performed in PubMed, PsycINFO, CINAHL, Embase and SPORTDiscus. Selection criteria included; age over 18, chronic musculoskeletal pain; multidisciplinary pain management programs, cohort studies on drop out during treatment containing multivariate analyses; language; English, Dutch, French or German. The methodological quality of the studies was assessed with the Quips. A qualitative best evidence synthesis was performed to identify multivariate associations between prognostic factors and drop out.

Results: Seven studies with a low methodological quality were included in this review. The qualitative best evidence synthesis demonstrated that there is limited/ conflicting evidence for 22 prognostic factors that are associated with drop out.

Discussion: This review can be seen as a starting point in the research on prognostic factors of patient drop out in chronic pain management programs. It would be too premature to draw firm conclusions from the literature provided in this review. But the data in this review suggests future directions for research in drop out in chronic pain rehabilitation.

In Patients with Carpal Tunnel Syndrome (CTS) is Conditioned Pain Modulation Associated with Surgical Outcome and Persistent Post-surgical Pain?

Donna Kennedy[1] OT MSc, Harriet Kemp[1] MA MSc FRCA, Andrew SC Rice[1] MD FRCP FRCA FFPMRCA

[1.] Imperial College London

Introduction: Carpal tunnel release is the most commonly performed hand surgery however up to 25% of patients are unimproved. CPM is a risk factor for chronic post-surgical pain but has not been investigated in CTS.

Methods: A CPM paradigm was developed following a systematic review; normative data generated from a control study. CPM was tested pre and post-surgery in 25 patients using pressure pain threshold as test stimulus and heat pain at 46.5C as conditioning stimulus. Additional measures included the patient-completed Boston Carpal Tunnel Questionnaire (BCTQ), numerical pain scales, Neuropathic Pain Symptom Inventory (NPSI) and global rating of change. Analysis will include CPM effect and correlation of CPM effect with pain, NPSI and BCTQ scores and surgical outcome.

Results: Pending

Discussion: Prior to surgery CTS patients have long standing pain; endogenous pain modulation may be depleted. CPM has not been previously investigated in CTS; efficiency of CPM may be associated with surgical outcome and persistent pain.

Process: Evaluation Defining an appropriate CPM paradigm in CTS was challenging.

The quality of measurement properties of physical capacity tasks designed to assess functioning in persons with low back pain: a systematic review using the COSMIN checklist/standards

Max Jakobsson[1,2], PT, BSc; Annelie Gutke[3], PT, PhD; Lidwine Mokkink[4], PhD; Rob Smeets[5,6], MD, Prof.; Mari Lundberg[1,7], PT, Assoc. Prof.

[1] Department of Orthopaedics, Institute of Clinical Science, Sahlgrenska Academy, University of Gothenburg, Gothenburg, Sweden.
[2] District Department North, Division of Rehabilitation, Borås Stad, Borås, Sweden.
[3] Division of Physiotherapy, Department of Health and Rehabilitation, Institute of Neuroscience and Physiology, University of Gothenburg, Gothenburg, Sweden.
[4] Department of Epidemiology and Biostatistics and EMGO Institute for Health and Care Research, VU University Medical Center, Amsterdam, the Netherlands.
[5] Department of Rehabilitation Medicine, Maastricht University, Maastricht, The Netherlands.
[6] Libra Rehabilitation and Audiology, Eindhoven/Weert, The Netherlands.
[7] Division of Physiotherapy, Department of Neurobiology, Care Sciences and Sociology, Karolinska Institutet, Stockholm, Sweden.

Introduction: To compensate for the shortcomings of outcome measures traditionally used in research of low back pain (LBP), researchers have recommended the complementary use of physical capacity tasks. In physical capacity tasks, functioning is assessed by letting the patient perform a standardised activity that is evaluated by using predefined criteria such as timing or counting repetitions of the activity. To the authors' best knowledge, no systematic review has been published to summarise previous research of the measurement properties of physical capacity tasks.

Aim: To systematically appraise and summarise the quality of measurement properties of physical capacity tasks that assess functioning in persons with LBP.

Methods: Electronic searches were performed in 6 databases. Two reviewers independently screened abstracts and full-text articles and hand searched reference lists. At a later stage, two reviewers will independently rate the methodological quality of the articles using the Consensus-based Standards for the selection of health Measurement Instruments (COSMIN) checklist. A best evidence synthesis will then be made based on the methodological quality of the articles, the rating and consistency of the measurement property results and sample size.

Discussion: The results may help clinicians and researchers to choose physical capacity tasks with measurement properties of high quality.

Individual quality of life in people with Amyotrophic lateral sclerosis/motor neuron diseases, with and without pain

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Åkerblom Ylva PT, MSc[1]; Zetterberg Lena PT, PhD[1]; Jakobsson Larsson Birgitta RN, PhD[1]; Nyholm Dag MD, Associate Professor[1]; Nygren Ingela MD, PhD[1]; Åsenlöf Pernilla PT, PhD, Professor[1].

[1] Department of Neuroscience, Uppsala University Sweden

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Introduction: Amyotrophic lateral sclerosis (ALS) is a motor neuron disease (MND) and affected people usually die within 3-5 years. Except for the typical neurological symptoms, pain is common, although sparsely scientifically documented in terms of suffering and association with quality of life (QoL). This study aims to explore important areas for QoL for people with ALS/MND with and without pain and if there are any differences in the quantitative experiences between the two groups.

Methods: Fifty participants with MND-diagnose were selected from specialist teams in Sweden during one year. At their ordinary visit to the specialist team, participants were interviewed once in accordance with The Schedule for the Evaluation of Quality of Life-Direct Weighting (SEIQoL-DW). The Brief Pain Inventory – Short Form (BPI-SF) were completed by the patient after the visit. The analyses include both qualitative and quantitative analyses.

Discussion: SEIQoL-DW with the mixed method design contributes with valuable knowledge, because it involves both the individual perspective of QoL, but also quantitative calculations.

Process evaluation or foreseen risks and solutions

One challenge when several research assistants are involved in data collection is the inter-rater reliability of the interview procedure. Another challenge is to reach credibility of the qualitative analyses.

Cross-cultural adaptation and validation of the Fear Avoidance Beliefs Questionnaire (FABQ) among survivors of torture.

Jepkemoi Kibet, PT, MSc; Julie Phillips, PT, PhD
Department of Physiotherapy, University of the Western Cape, South Africa

Background: Background: Pain-related fear, avoidance behaviour and hyper vigilance are all concerns that affect the refugee that has been tortured, and can lead to disuse and disability.

Methods: Two physiotherapists, two occupational therapists working with refugees/survivors of torture and 10 English speaking refugees attending Center for Victims of Torture were invited to assist in the cross-cultural adaptation of the original FABQ. A professional Swahili translator and native Swahili speaking health professional were consulted for the forward and back translation process.

Results: Swahili FABQ showed good face and content validity. It also showed excellent internal consistency (with Cronbach's alpha = 0.741 as a whole). The ICC's (95% CIs) to establish test-retest reliability for the subsections of the FABQ (physical activity subscale and work subscale) were as follows: physical activity: 0.741 (0.598 – 0.842); work: 0.779 (0.673 – 0.861).

Conclusions: The Swahili version of the FABQ can be recommended as a simple, valid and reliable tool for use among Swahili-speaking survivors of torture with chronic pain.

Validity and reliability of the Dutch modified Perceived Deficits Questionnaire to examine cognitive symptoms in patients with chronic neck pain.

Lenoir D. MSc, PT[1]; De Pauw R. MSc, PT, MT[1]; Ickmans K. PhD, PT[2]; Schumacher C. MSc, PT[1]; Kregel J. Msc[1,2] ; Coppieters I. MSc, PT[1, 2]

[1]Department of Rehabilitation Sciences and Physiotherapy, Faculty of Medicine and Health Sciences, Ghent University, Belgium; [2]Pain in Motion international research group

Introduction: The Perceived Deficit Questionnaire (PDQ) investigates self-perceived cognitive problems on 4 subdomains. Its validity and reliability were investigated by Takasaki et al., resulting in a modified PDQ (mPDQ).

Objective: Drawing up a valid and reliable Dutch version of the mPDQ for chronic neck pain patients.

Method: Forward translation, committee approach and backward translation were combined. A two way random ICC evaluated test-retest reliability. Internal consistency, discriminative power and correlations between mPDQ and objective cognitive tests, were evaluated.

Process: The application of a bilingual phase contained the possibility of a recall bias and was replaced by the Cronbach's alpha.

Discussion: The research by Takasaki et al. was not repeated on a Dutch version of the PDQ. A pre-test phase on a pilot group was not performed.

THE INFLUENCE OF SELF-EFFICACY ON THE PROGNOSIS OF RHEUMATOID ARTHRITIS: A SYSTEMATIC REVIEW AND META-ANALYSIS

Javier Martinez-Calderon[1], PT; Filip Struyf [2], PT, PhD; Mira Meeus [2,3,4], PT, PhD, Alejandro Luque-Suarez[1], PT, PhD

[1] Department of Physiotherapy, University of Malaga, Malaga, Spain. [2] Rehabilitation Sciences and Physiotherapy Department, University of Antwerp, Antwerp, Belgium. [3] Rehabilitation Sciences and Physiotherapy Department, Ghent University, Ghent, Belgium; [4] Pain in Motion International Research Group, www.paininmotion.be

Introduction: Self-efficacy has been suggested as a factor of poorer outcome in rheumatoid arthritis. The aim of this study was to evaluate the role of self-efficacy on the prognosis of rheumatoid arthritis.

Methods: A systematic review with meta-analysis (Prospero registration CRD42016046432) was carried out, using electronic databases. Observational studies investigating the effect of self-efficacy on the prognosis of rheumatoid arthritis were included.

Results: Twenty-three studies were included. Higher levels of self-efficacy were associated with better quality of life and lower pain, disability, disease severity, fatigue and psychological measures.

Discussion: The findings of this study may contribute to understand the role of self-efficacy on the prognosis of rheumatoid arthritis, permitting a better understanding of this pathology and elicit a large amount of information to establish new treatment strategies.

Process Evaluation: N/A

CHRONIC OPIOID THERAPY IN CHRONIC NON-CANCER PAIN: BENEFITS VERSUS RISKS

Hanna Ljungvall

Uppsala University Neuroscience, Physiotherapy and Psychiatry

Introduction: Despite low evidence, adverse effects and risks of addiction[1]opioids are used in treatment of chronic pain. The aim of this project is to identify those with chronic non cancer pain and chronic opioid therapy (COT) who either benefit from opioid treatment, or is at risk of problematic opioid use. A clinical cohort with a minimum of 1000 patients will be followed prospectively. Potential predictors are grouped as: (1) Individual factors and demographic variables (2) Pain characteristics (3) Psychiatric co-morbidity (3) Cognitive-behavioural variables (4) Physical functioning. The objective is to identify the most salient predictors from each group and combine them into a final model.

Methods: Main studies include (1) a cross-sectional study of baseline characteristics and (2) a prospective cohort study over 5 years for prediction of risks and benefits with COT, endpoints measured every 12 months.
Patients> 18 years, referred to the Pain Centre at Uppsala University Hospital are eligible. Internet based questionnaires, structured interviews and physical performance tests are methods for data collection. Key outcomes are severity of opioid use disorder [2], work ability, activity interference and pain. Opioid use will be compared between users and non-users regarding key outcomes at baseline by use of t-tests and chi-square tests. The dependent variables will be regressed towards hypothetic predictors for a final model including the most salient predictors from each group of variables.

Discussion: The large variation in individual´s reaction on opioid treatment, e.g. pain relief, side-effects, tolerance and addiction is well known. This prospective longitudinal design allows us to investigate if variation in personality, psychiatric co-morbidity, psycho-social factors, physical function and biology are determinants on individual responses to opioid treatment in terms of benefits and risks.

Process evaluation: Problems regarding power due to attrition or too few participants with opioid use disorder at follow up can affect the validity of the results. Collection of data will start in October 2016.

Influence of morphine and naloxone on pain modulation in Rheumatoid Arthritis, Chronic Fatigue Syndrome/Fibro-myalgia and controls

Hermans Linda PT[1,2], Nijs Jo PhD, PT2,[3,4], Calders Patrick PhD[1], De Clerck Luc PhD, MD[5], Moorkens Greta PhD, MD[6], Hans Guy PhD, MD[7], Grosemans Sofie FN[7], Roman De Mettelinge Tine PhD, PT[1], Meeus Mira PhD, PT[1,2,8]

Introduction: The exact effects of frequently prescribed opioids on central pain modulation in patients with central sensitization pain are still unknown.

Methods: A randomized, double-blind, placebo-controlled cross-over trial was set. Ten CFS/FM patients, 11 RA patients and 20 controls were randomly allocated to the experimental (10 mg morphine or 0.2 mg/ml Naloxone) or placebo (2 ml Aqua) group. Pressure Pain Thresholds and temporal summation were assessed by algometry. Conditioned Pain Modulation efficacy and Deep Tissue Pain pressure were assessed by adding ischemic occlusion at the opposite upper arm.

Discussion: This study revealed anti-hyperalgesia effects of morphine and placebo in CFS/FM and RA patients. Nonetheless, the opioid system seems not dominant in (enhanced) bottom-up sensitization (temporal summation) or (impaired) endogenous pain inhibition (CPM) in patients with CFS/FM or RA.

Process evaluation: The sample size of the patient groups are small. However, the strict inclusion criteria strengthened the methodological quality.

Cerebral blood flow andheart vate variability in response to exercise and emotional stress are not altered in Chronic Fatigue Syndrome

Malfliet Anneleen[1-3,4], Pas Roselien[1,2], Brouns Raf[3], DeWin Joris[2], Hatem Samar[2], Meeus Mira[1,4], Ickmans Kelly[1-3,] vanHooff Robbert-Jan3, Nijs Jo[1-3]

[1] Pain In Motion International Research Group [2] Vrije Universiteit Brussel, Belgium; [3] University Hospital Brussels, Belgium [4] Ghent University, Belgium

Introduction: Background: Evidence suggests an association between pain modulatory and cardio-vascular systems. Therefore, it is possible that alterations in cerebral blood flow (CBF) and heart rate variability (HRV) during physical activity can explain pain and post-exertional malaise in Chronic Fatigue Syndrome (CFS) patients.

Methods: A randomized cross-over experiment including 20 CFS and 20 healthy subjects was used to examine the change in temporal summation of pressure pain (pain modulation), CBF and HRV during physical and emotional stress (to control for potential bias), as well as their association mutually as with post-exertional malaise.

Results: Results indicate that CFS patients do not show altered CBF/HRV during physical exercise or emotional stress and that there is no association with dysfunctional endogenous hypoalgesia or post-exertional malaise.

Discussion: These results refute the suggested alterations of CBF or HRV in previous research and do not provide evidence for their role in explaining pain (increases) during and following exercise in these patients.

Elevations in pressure pain threshold by exercise are reduced by blood flow occlusion to that limb in healthy adults

Matthew D. Jones, BExPhys, MSc[1,2]; Janet L. Taylor, PhD[2,1]; Benjamin K. Barry, PhD[1,2]

[1.]   School of Medical Sciences, The University of New South Wales, Sydney, Australia
[2.]   Neuroscience Research Australia, Syndye, Australia

Introduction: The mechanisms underlying exercise-induced hypoalgesia (EIH) are incompletely understood.

Methods: Pressure pain thresholds (PPTs) were assessed over the quadriceps of one leg and the first dorsal interosseous of both arms in 36 healthy adults before and after 5 min of leg cycling exercise and rest. During the 5-min period, blood flow to one arm was occluded by a cuff. Pain ratings during occlusion were also measured.

Results: Pain ratings increased over time similarly between exercise and rest ($p > 0.40$). PPTs at all sites were similar before and after rest ($p > 0.51$), but, consistent with EIH, increased significantly after exercise at the leg and arms (all $p < 0.02$). However, the increase in PPT in the occluded arm was significantly smaller (-14.4%, $p < 0.001$) than in the non-occluded arm.

Discussion: Blocking blood flow to a limb during exercise attenuated EIH in that limb, suggesting that peripheral factors contribute to EIH.

Process evaluation: Short duration exercise was used to minimise the time participants spent with their arm occluded, but it was unknown whether it would be sufficient to elicit EIH. It was also unclear whether blood flow occlusion would influence PPT through a conditioned pain modulation effect.

The influence of physical activity and fatigue on the Nociceptive Flexion Reflex in healthy subjects: a randomized cross-over study

Dhondt Evy, MSc, PT[1]; Danneels Lieven, PhD, PT[1]; Van Oosterwijck Jessica, PhD, PT[1,2]

[1]   Department of Rehabilitation Sciences and Physiotherapy, Ghent University, Ghent, Belgium;
[2]   Research Foundation - Flanders (FWO), Brussels, Belgium

Introduction: The nociceptive flexion reflex (NFR) is a polysynaptic reflex induced by painful stimuli resulting in a withdrawal response. This study aims to examine whether physical activity and fatigue influence the NFR.

Methods: To detect the NFR threshold, electrocutaneous stimulation is applied over the sural nerve and the stimulation intensity which elicits an involuntary contraction of the hamstrings is recorded using electromyography. Fifty healthy people their NFR threshold will be measured prior and following a rest period and two fatiguing tasks (physical and cognitive). In order to evaluate the influence of physical activity, subjects will wear an accelerometer.

Discussion: It is hypothesized that fatigue leads to reduced NFR thresholds, whereas a more active lifestyle causes increased NFR thresholds.

Process evaluation: It was challenging to select the type and duration of the cognitive task. In order to exclude any effect due to repetitiveness of the NFR measurement, a rest protocol was added.

Trait sensory processing and anxiety profiles in people with central sensitisation in a chronic low back pain population – a mixed methods study.

Jacqui Clark

Introduction: This study investigates whether an individual's trait sensory sensitivity may have predisposed them to CS. The aim, across a non-specific chronic low back pain (NSCLBP) population, is to 1) identify the range of CS, trait anxiety and sensory profiles, and any relationships between them; and 2) explore the context in which CS develops.

Methods: This is a mixed methods study using a quantitative (QUAN) theoretical driver and a concurrent nested qualitative (QUAL) design. Adults (N=200) with NSCLBP and CS are recruited from physiotherapy clinics in New Zealand, England and Ireland. Outcome measures: Central Sensitisation Inventory; Adult Adolescent Sensory Profile; State-Trait Anxiety Inventory; Marlowe Crowne Social Desirability questionnaires. Descriptive and correlation statistics will identify the sensory processing and anxiety profiles, and their inter-relationships. The QUAL semi-structured interviews will be analysed using thematic analysis.

Discussion: The use of a nested QUAL exploration enhances the depth of understanding of context, and may highlight further research areas.

Process evaluation: The philosophical challenges of mixed methods research can be solved using the nested design following the same theoretical driver (QUANT) in both components.

An interdisciplinary study on the relation between fear, attention and sensorimotor control in back pain chronicity: movement-related factors.

Schouppe Stijn, PT, MSc[1]; Clauwaert Amanda, MSc.[2]; Van Oosterwijck Jessica, PT, PhD [1,3,4]; Van Damme Stefaan, PhD [2]: Danneels Lieven, PhD [1]

[1]   Department of Rehabilitation Sciences and Physiotherapy, Ghent University, Ghent, Belgium
[2]   Department of Experimental-Clinical and Health Psychology, Ghent University, Ghent, Belgium
[3]   Research Foundation - Flanders (FWO), Brussels, Belgium
[4]   Pain in Motion international research group, www.paininmotion.be

Introduction: Persistent low back pain (LBP) is studied across several research domains, and is often associated with the presence of disturbed sensorimotor control of the trunk muscles, and maladaptive psychological factors (e.g. fear, hypervigilance). The goal of this interdisciplinary study is to combine the knowledge of two research domains, i.e. Psychology and Rehabilitation Sciences, in order to investigate connections between the abovementioned factors and differences across several LBP populations.

Methods: Four groups of subjects –chronic LBP, recurrent LBP during a pain flare, recurrent LBP in a pain free period and healthy volunteers- will be examined with a rapid arm task paradigm. Feedforward activation of the trunk muscles will be measured with surface electromyography. Furthermore, fear for movement will be induced through an electrical nociceptive stimulus to the back and sensory processing will be evaluated with electroencephalography.

Discussion: The type of LBP and amount of fear are hypothesized to influence feedforward and sensory processing. Additionally, sensorimotor control, sensory processing and fear of pain are expected to be related to each other.

Process evaluation: The biggest challenge during the set-up of the study design was the necessity to combine several evaluation techniques, which each have their limitations.

Influencing pain free neck range of motion with virtual reality: Unravelling the role of fear.

Kragting Maaike[1,2], Voogt Lennard[1,3], Pool-Goudzwaard Annelies[2], Coppieters Michel[2]

1   Rotterdam University of Applied Sciences, Netherlands
2   Free University Amsterdam, Netherlands
3   Pain in Motion International Research Group, Belgium

Introduction: Harvie (2015) revealed that altering visual feedback in a virtual reality (VR) environment influences pain-free ROM in patients with neck pain. The relatively large variability between participants in this study suggests that some patients are more prone to this manipulation than others. This study aims to identify whether patient characteristics, such as fear of movement or the duration of pain, are associated with the amount of change in pain-free ROM in a VR environment.

Methods: Patient characteristics are assessed using the Tampa scale, PFActS-C, FABQ, NDI and NPRS. Patients wear VR glasses and rotate their head until the onset of pain. Visual feedback about the amount of movement is either equal, 20% less or 20% greater than the actual rotation. Regression analyses are used to determine which characteristics are associated with changes in pain-free ROM.

Discussion: Based on associative learning theories, we hypothesize that individuals who report their pain to be threatening will be more prone for this illusion.

Pain mechanisms in patients with non-specific low back pain

Bandt den H.L.,[1,2]; Paulis W., PhD[1]; Ickmans K., PhD[2-4]; Nijs J., PhD[2-4] Voogt L.P., PhD[1-3].

[1]   Rotterdam University of Applied Sciences, Netherlands

[2]   Pain in Motion International Research Group

[3]   Department of Physiotherapy, Human Physiology and Anatomy, Faculty of Physical Education
     & Physiotherapy (KIMA), Vrije Universiteit Brussel

[4]   Department of Physical Medicine and Physiotherapy, University Hospital Brussels, Belgium

Introduction: Neuropathic, nociceptive and central pain mechanisms can play a role with low back
                   pain. Diagnosing these pain mechanisms in clinical practice is important. For this
                   means, a classification scheme is proposed. Clinimetric features of this scheme are,
                   however, to be determined.

Method: 100 participants with chronic nonspecific low back pain will be included. Data regard-
                   ing signs, symptoms (e.g. pain intensity, provocations and bodily location), functional
                   and psychosocial characteristics will be gathered. These data will be interpreted by
                   two clinical experts in order to determine the interreliability of the scheme. Besides
                   QST-measurements (thermal and mechanical pain thresholds) will be taken to deter-
                   mine the validation of the scheme. QST will be assessed at local and remote sites: L4,
                   Achilles tendon and wrist.

The energetic efficiency of walking in geriatric low back and radicular leg pain

Coyle[1], PT, DPT; Schrack[2], PhD; Hicks1, PT, PhD

[1]University of Delaware, Newark, Delaware USA

[2]Johns Hopkins Bloomberg School of Public Health, Baltimore, MD USA

Introduction: Age-related mobility decline may be driven by energetic inefficiency; this may be augmented directly or indirectly by painful conditions. We hypothesize that among older adults with low back and radicular leg pain that is directly provoked with walking: 1) efficiency will worsen with pain onset and 2) condition presence will be related to inefficiency in pain-unprovoked states.

Methods: In a comparative study of older adults with and without this condition, metabolic gas analysis will be used to measure the energy cost of walking (walking economy) on a standard walking course. Pain intensity will be measured at each lap. Walking economy will be measured for early (pain-unprovoked) and late (pain-provoked) states of walking.

Discussion: Preliminary data support our hypotheses. Walking economy worsens with pain onset, but remains unchanged in the controls; condition presence is linked to inefficiency in pain-unprovoked states. However, more data is needed.

Process evaluation: Sample size estimates and recruitment are challenging, but collaborations with statisticians and MDs are proving fruitful.

Levels of physical activity and sedentary behaviour among patients with degenerative disc disease who are to undergo spinal fusion surgery

Hanna Lotzke, Max Jakobsson, Helena Brisby, Rob Smeets, Maria Hagströmer, Annelie Gutke, Olle Hägg, Mari Lundberg

Department of Orthopaedics, Institute of Clinical Science, Sahlgrenska Academy, University of Gothenburg, Sweden
Division of Physiotherapy, Department of Neurobiology, Care Sciences and Sociology, Karolinska Institutet, Stockholm, Sweden

Introduction: People who are to undergo spinal surgery are assumed to be less physically active (PA) than individuals without pain.

Objective: To describe levels of PA and sedentary behaviour among patients who are to undergo lumbar fusion surgery.

Design: A cross-sectional study.

Method: PA and sedentary behaviour were assessed with GT3X+ accelerometers for 66 patients. Data were compared to the WHO's recommendations on PA for health.

Results: On average the patients spent 186 minutes on moderate-intensity and 6 minutes on vigorous-intensity PA level per week. Patients averaged 542 minutes of sedentary behaviour per day.

Discussion: To describe levels of PA and sedentary behaviour among patients who are to undergo lumbar fusion surgery.

Objective: Nearly half of the study population did not reach the WHO's recommendation for moderate-intensity PA per week and two third of the patients did not spend any time in vigorous-intensity PA. To increase PA must be considered when designing prehabilitation protocols for this patient group.