Pain, Mind & Movement:

Applying science to the clinic

Satellite Meeting 17th World Congress on Pain

Boston, Massachusetts, USA. September 11, 2018

Book of Abstracts

Pain, Mind and Movement

IASP

International Association for the Study of Pain

Welcome message

The special interest group (SIG) on Pain, Mind & Movement is proud to present a satellite meeting on applying basic and clinical research on how mind and movement affect disabling pain. This will be an inspiring multidisciplinary event to facilitate the translation of evidence into clinical practice and to mediate the implementation of new diagnostics and treatments. In addition, the multidisciplinary forum will foster communication between researchers, clinicians and patients to drive research and stimulate international studies. The unique format allows a focus on presentations from our members, including short oral presentations and clinical workshops with a clear clinical focus within an evidence based perspective, but with little lecturing and the emphasis on skills training, case studies, demonstrations, etc. Two world-experts will present keynote lectures, one on pain mechanisms and one on pain treatment.

The objectives of the meeting are:

- Encourage basic and clinical research on how mind and movement affect disabling pain.
- Facilitate the translation of evidence into clinical practice and to mediate the implementation of new diagnostics and treatments.
- Foster communication between researchers, clinicians and patients to drive research and stimulate international study.

The SIG on Pain, Mind & Movement has organized this satellite meeting for several reasons. First, 2018 is the IASP year on pain education. Second, our members demand sessions and events that allow them to apply pain science in clinical practice. Also, many IASP members are keen to present their work at the World Congress, but will not make it into the final program or will present a poster only (and hence will not make it onto stage). Therefore, the proposed format provides a unique opportunity for our members to present their work on pain, mind and movement to a targeted audience. Third, with the World Congress' focus on basic pain science, this pre-congress event focusing on applying science in clinical practice can become the perfect match. Finally, our SIG's focused symposium at the Yokohama World Congress was a big success, with a packed audience and lots of positive comments.

We hope you will enjoy the meeting!

Scientific committee

Romy Parker (South Africa)
Tory Madden (South Africa)
Christine Lin (Australia)
Laura Simons (USA)
Enrique Lluch-Girbès (Spain)
Jo Nijs (Belgium)
Ivan Huijnen (Netherlands)

Program

11:00	Welcome and Introduction	Romy Parker, Chair (South Africa)
	Morning session chair: Romy Parker (South Africa)	
11:10	Imaging neuroinflammation in human pain disorders **Keynote lecture**	Marco M. Loggia (USA)
12:00	The practicalities of educating children about pain **Clinical workshop**	Laura Simons - Joshua Pate - Felipe Reis - Lauren Heathcote (USA – Australia - Brazil)
13:00	**8 X 5 session**	
	Movement adaptations during a functional reach task in children with chronic pain, before and after treatment, and the influence of pain, fear, and avoidance	Justin Beebe (USA)
	How can we better integrate Pain, Mind and Movement within the entry-level training of PT students? Developing a national strategic plan for advancing pain education and management in Canada	Tim Wideman (Canada)
	Identification and initial validation of low back pain nervous system processing subgroups using performance-based measures	Katie Butera (USA)
	The role of central sensitization and brain-derived neurotrophic factor (BDNF) in patients with chronic widespread pain and chronic fatigue syndrome: an explorative study	Andrea Polli (Italy/Belgium)
	Differences between women with traumatic and idiopathic chronic neck pain and healthy women: Interrelationships among cognitive deficits, central sensitization, and brain alterations	Iris Coppieters (Belgium)
	The effectiveness of graded motor imagery for reducing phantom limb pain and disability in upper and lower limb amputees	Katleho Limakatso (South Africa)
	Is there evidence to support "text neck" as an epidemic of the modern era of cell phones?	Ney Meziat-Fiho (Brazil)
	The effect of social threat on pain-report, pain expression, aggression and empathy	Kai Karos (the Netherlands/Belgium)
13:40	Lunch break	
	Afternoon session chair: Felipe Reis (Brazil) & Victoria J Madden (South Africa)	
14:40	**8 X 5 session**	
	Modulating pain thresholds through classical conditioning	Juliane Traxler (Belgium)
	Relative intensity judgements: A novel paradigm for investigating classically conditioned bias	Victoria J Madden (South Africa)
	Sensory and psychological factors contribute to motor outcomes in a high-risk subgroup experiencing exercise-induced muscle injury	Katie A. Butera (USA)
	Pain neuroscience education plus cognition-targeted exercise therapy can improve pain, disability, functioning and pain cognitions in people with chronic spinal pain: a multicenter randomized controlled trial	Anneleen Malfliet (Belgium)
	Non-pharmacological management of pain in HIV/AIDS: a bridge too far if you are a poor, depressed South African?	Romy Parker (South Africa)
	The role of pain cognitions in healthcare utilization in patients undergoing surgery for lumbar radiculopathy: design and preliminary results of a multicentre randomized controlled trial	Eva Huysmans (Belgium)
	Explaining pain to teenagers; getting their head around pain	Anne Marie van Es (UK)
	Morphological differences in the upper trapezius muscle between female office workers with and without trapezius myalgia: facts or fiction?	Kayleigh De Meulemeester (Belgium)
15:20	Pain neuroscience education in clinical practice: state of the art and future avenues **Keynote lecture**	Adriaan Louw (USA)
16:10	Mindfulness and pain: relearning how to move with awareness **Clinical workshop**	Carolyn McManus (USA)
17:10	Coffee break	
17:30	Graded exposure combined with a lifestyle approach for patients with chronic spinal pain: the steps to follow. A practical workshop **Clinical workshop**	Iris Coppieters – Anneleen Malfliet – Paul C. van Wilgen (Belgium – the Netherlands)
18:30	What kind of cognitive functional therapy (CFT) exercise has been performed during two randomized clinical trials carried on in Brazil? **Clinical workshop**	Ney Meziat-Filho - Jessica Fernandez - Julia Castro (Brazil)
19:30	Closing remarks	Jo Nijs, Scientific Chair (Belgium)

Keynote lectures

11:10	Imaging neuroinflammation in human pain disorders **Keynote lecture**	Marco M. Loggia (USA)
15:20	Pain neuroscience education in clinical practice: state of the art and future avenues **Keynote lecture**	Adriaan Louw (USA)

Clinical workshops

12:00	The practicalities of educating children about pain **Clinical workshop**	Laura Simons - Joshua Pate - Felipe Reis - Lauren Heathcote (USA – Australia - Brazil)
16:10	Mindfulness and pain: relearning how to move with awareness **Clinical workshop**	Carolyn McManus (USA)
17:30	Graded exposure combined with a lifestyle approach for patients with chronic spinal pain: the steps to follow. A practical workshop **Clinical workshop**	Iris Coppieters – Anneleen Malfliet – Paul C. van Wilgen (Belgium – the Netherlands)
18:30	What kind of cognitive functional therapy (CFT) exercise has been performed during two randomized clinical trials carried on in Brazil? **Clinical workshop**	Ney Meziat-Filho - Jessica Fernandez - Julia Castro (Brazil)

Clinical workshop 1: The practicalities of educating children about pain

Laura Simons - Joshua Pate - Felipe Reis - Lauren Heathcote (USA – Australia - Brazil)

Abstract: Chronic pain is a significant problem in the pediatric population affecting 20% to 35% of children and adolescents around the world [1]. Considering the multifaceted nature of chronic pain, early management of pain and associated disability is crucial. Pain neuroscience education has proven to be a very effective way of improving outcomes in adult chronic pain patients, more specifically in terms of pain reduction, increased function, improved pain beliefs and pain control [2,3]. However, research on pain neuroscience education in pediatrics is still lacking in the current literature [4]. In this workshop we will brie y present the state-of-the science on pain neuroscience education for children and adolescents, then providing a practical overview of available resources that can enhance clinicians' practice in this area. Joshua Pate will explore a child's broader 'concept of pain', de ned as how someone understands what pain is, why pain exists, and how pain is experienced [5]. He will discuss the targeting of individualized education using qualitative interviews based on a recent expert survey [5]. The outcomes of the survey and recent qualitative interviews will be explored. The terminology that children use, children's understanding of neuroanatomy, and domains that experts think need to be covered in an educational program, will be discussed. Current research suggests that educational strategies for children with persistent pain should be individualised based on needs and capacities [6], therefore there will be a specific focus on using appropriate language and terminology for children when interviewing them about pain. Prof. Reis will discuss the development of a pain neuroscience education comic book for children, highlighting the contents and the validation process. In addition, a need exists to expand the availability of pain information and self-management for the public. To meet this need, 'E-pain technology' (Internet-based or mobile-based) can help with access to pain management in adult and child populations. Emerging evidence demonstrates that, similar to face-to-face therapies, Internet-based and remote therapies also produce beneficial effects on pain, anxiety, depression and promoted signifcant improvements in disability [7,8]. Dr. Heathcote will present findings of a recent systematic review of YouTube videos on pain neuroscience education. She will give an overview of the number and types of YouTube videos that are freely available and that describe the neuroscience of pain. In particular, she will focus on videos are particularly relevant for children and parents, and she will show some of the best videos. The symposium team includes clinicians and researchers with an extensive background in pediatric pain and will combine multidisciplinary pain perspectives and expertise. Presentations will focus on the translation of up-to-date evidence into clinical practice. Case-based learning will be integrated to enable delegates to advance their knowledge and practical skills in pain neuroscience education for children. Workshop attendees will gain a good understanding of what pain neuroscience education is, what science is out there to support its efficacy in chronic pain treatment, and what resources are available for use in clinical practice.

References: 1. King et al. Pain. 2011;152(12):2729–38. 2. Meeus et al. Clin Rheumatol. 2012;31(6):921–9. 3. Sullivan et al. Clin J Pain. 2001;17(1):52–64. 4. Robins et al. Children. 2016;3(4):43. 5. Moseley et al. J Pain. 2015;16(9):807-13. 6. Pate et al. Children. 2018;5(1):12. 7. Eccleston et al. Cochrane Database Syst Rev. 2012;2. 8. Reis et al. Brazilian J Phys Ther. 2017;21(5):305.

Presentations:

1. Investigating a child's concept of pain using qualitative interviews – Joshua Pate

2. The Development of a children's pain neuroscience education book and free internet-based tools for clinicians in Brazil – Felipe Reis
3. Pain neuroscience education videos on YouTube: Which are appropriate for children? - Lauren Heathcote

Educational objectives of session:

1. Integrate cutting-edge knowledge about biopsychosocial approaches to pediatric pain neuroscience education.
2. Utilise multidisciplinary evidence-based pain neuroscience education resources in the clinical setting.
3. Explore the potential of Internet-based interventions to spread pain knowledge overcoming major socioeconomic and geographical barriers.

Strategies to be used to obtain the education objectives:
Skills training:
- How to interview children about their concept of pain
- Using books for pain neuroscience education
- Using internet-based tools for pain neuroscience education
- Discerning appropriate YouTube videos
Case studies:
- In each station, one or more case studies will be presented to apply the skills training listed above
Demonstrations:
- Using drawings and technology to interview children about their concept of pain
- Accessing internet-based tools and YouTube videos

Moderator: Laura Simons is an Associate Professor in the Department of Anesthesiology, Perioperative, and Pain Medicine at Stanford University School of Medicine. She has an active program of research directing the Stanford Biobehavioral Pediatric Pain (BPP) Lab and works in the clinic evaluating and treating children and adolescents who present with chronic pain. Her research spans assessment scale development, treatment intervention, and experimental and neuroimaging methods to gain a mechanistic understanding of altered psychological processes in children with chronic pain.

Presenters:

1. Joshua Pate is a PhD Candidate at Macquarie University. His research is an investigation into a child's concept of pain; how a child understands what pain is, why it exis1. ts, and how it is made. Joshua's clinical work as a Senior Physiotherapist at Westmead Hospital Pain Management Centre motivates him to want to better equip clinicians to target pain neuroscience education to children. The goal of his PhD is to develop an assessment tool for a child's concept of pain. To achieve this, he has surveyed experts and interviewed children and he is currently developing and testing the new tool. Joshua is now in the 2nd year of his PhD and is collaborating with leading experts from around the world to investigate a child's concept of pain.
2. Dr. Felipe Reis is professor at the Instituto Federal do Rio de Janeiro, Brazil.
3. Lauren Heathcote is a postdoctoral research fellow at Stanford University School of Medicine. She is an Experimental Psychologist by training, and her research focuses on cognitive and affective mechanisms in children's chronic and cancer-related pain. She is particularly interested in understanding what happens when young people interpret pain as indicating an extreme threat and danger to their bodies. Her research lies at the interface of experimental and clinical psychological science, integrating qualitative methods with patient groups, lab-based experimental and psycho-physiological studies, and clinical implementation. Her long-term goal is to improve the lives of young people living with pain through conducting innovative research, developing evidence-based psychological interventions, and contributing to best clinical practice guidelines for long-term follow-up after pediatric illness such as cancer.

Clinical workshop 2: Mindfulness and Pain: Relearning How to Move with Awareness

Carolyn McManus (USA)

Abstract: Highly stressed and fearful patients with pain conditions present a challenge to even the most experienced clinician. As pain is a complex process of perception that includes the interaction of sensory information, cognition and emotion, patients with heightened psychological distress need practical skills to help them get beyond the maladaptive reactions to pain and movement that prevent their progress. This workshop provides participants with an introduction to mindfulness and yoga for the treatment of pain and their role in self-regulating the stress reaction, facing fear and enabling patients in pain to move with greater ease and confidence. How mindfulness training may attenuate pain and improve function by promoting acceptance, building body awareness, enhancing cognitive flexibility, improving emotional regulation and helping patients detach from automatic personalization will be presented. The evidence to suggest mindfulness and yoga change the brain and nervous system activity and contribute to improving pain treatment outcomes will be highlighted. Participants will be introduced to

mindful attitudes of acceptance, openness, kindness and curiosity and experiment with their application to breathing, body awareness and movement instruction. They will explore how to help patients adopt a new, non-threatening relationship to the body and movement through mindfulness principles and practices. Participants will be introduced to yoga fundamentals and learn how yoga combines mindfulness with movement to enhance patient outcomes. Participants will practice breath awareness, movement and systematic relaxation skills that can be integrated into patient care. They will gain direct experience applying mindful attitudes to breathing, body awareness and movement to gain insight into how mindfulness can contribute to self-regulating the stress reaction, managing fear and building confidence to move and return to activity.

References: Anheyer et al. Ann Intern Med. 2017;166(11):799-807. Bishop et al. Clinical Psychology: Science and Practice 2004;11(3):230–241. Brown et al. Pain 2010;150(3):428-38. Burch et al. Flatiron Books. 2015 Cherkin et al. JAMA. 2016;315(12):1240-9. Cotton et al. Psychosom Med. 2018 doi: 10.1097/PSY.0000000000000587. Cramer et al. Clin Rehabil. 2017;31(11):1457-1465. Curtis et al. J of Pain Res 2011;4:189-201. Doran. Qual Health Res 2014;24(6):749-760. Garland et al. J Behav Med. 2015;38(2):327-36. Groessl et al. Am J Prev Med. 2017;53(%):599-608. Helgadottir et al. Prev Med. 2016;91:123-31. Hilton et al.. Ann Behav Med. 2017;51(2):199-213. Hofmann et al. Psychiatr Clin North Am. 2017:40(4):739-749. Holzel et al. Psychiatry Res. 2011;191(1):36-43. Holzel et al. Perspect Psychol Science. 2011;6: 537–559. Holzel et al. Soc Cogn Affect Neurosci. 2010;5(1):11–17. Kabat Zinn J. 2013. New York: Del Publishing Co. Kim. J Phys Ther Sci. 2016 Jul;28(7):2171-4. La Cour et al. J Behav Med. 2014;3:134. Lutz et al. Soc Cogn Affect Neurosci. 2014 Jun;9(6):776-85 Nakata et al. Front Psychol. 2014;5:1489. Ostrovsky DA. Explore (NY). 2017 Nov - Dec;13(6):424-426. Saper et al. Ann Intern Med. 2017 Jul 18;167(2):85-94. Schutze et al. Front Psychol. 2014 Aug 4;5:839. Stein et al. J Yoga Phys Ther. 2014 Jan 11;4(1):151. Tang et al. Nat Rev Neurosci. 2015 Apr;16(4):213-25. Taren et al. Soc Cog Affect Neurosci. 2015;10(12):1758-68. Tul Y et al. Scand J Caring Sci. 2011;25(3):435-443. Van Gordon et al. 2017;22(1):186-206. Ward et al. MusculoskeletalCare. 2013;11(4):203-17. Whitehead et al. Explore (NY). 2017 Jul - Aug;13(4):281-284. Zeidan et al. J Neurosci. 2011;31(14):5540-8. Zeidan et al. Ann N Y Acad Sci. 2016 Jun;1373(1):114-27.

Presentations: Mindfulness Training for the Treatment of Pain

Educational objectives of session:

1. Identify mindfulness and yoga principles and practices and discuss their application to pain treatment and movement.
2. Describe how mindfulness and yoga help patients self-regulate the stress reaction, manage fear and build confidence to move.
3. Understand how to integrate present moment awareness instruction and mindful attitudes when teaching patients diaphragmatic breathing, body awareness and movement.

Strategies to be used to obtain the education objectives: Key concepts and research will be briefly highlighted. Through guided experiential exercises, participants will practice bringing the attitudes of mindfulness, including acceptance, friendliness and curiosity, to the body, breathing and movement.

Moderator and presenter: Carolyn McManus, MSPT, MA has specialized in the treatment of patients with persistent pain throughout her over 30-year career. From 1998 through 2017, she taught Mindfulness-Based Stress Reduction for patients with persistent pain and stress-related illness in the Rehabilitation Department at Swedish Medical Center in Seattle, WA. In 2009 she was invited to join and continues to serve on a research team at the VA Puget Sound Healthcare System in Seattle examining mindfulness meditation training in the care of Veterans with a range of medical conditions, including persistent pain, PTSD, Gulf War Syndrome, fatigue and cognitive impairment. Ms. McManus provides physical therapy continuing education courses throughout the United States and is a regular presenter at state and national conferences. She is President of the American Physical Therapy Association's Pain Management Special Interest Group. She holds Master's degrees in physical therapy from Duke University and in psychology from Antioch University.

Clinical workshop 3: Graded exposure combined with a lifestyle approach for patients with chronic spinal pain: the steps to follow. A practical workshop.

Iris Coppieters – Anneleen Malfliet – Paul C. van Wilgen (Belgium – the Netherlands)

Abstract: The key element of this interactive workshop will comprise an extensive case description and analyses of a person with chronic spinal pain, as encountered by the authors in clinical practice. All assessment and treatment principles will be discussed using this case. Chronic spinal pain remains difficult to treat, and many healthcare providers encounter difficulties and barriers to effectively implement a biopsychosocial model and improve symptoms in these patients. The influence of central neuroplastic changes on symptoms invrelation to, behavioral, emotional, social and cognitive factors have been broadly accepted and described in the occurrence and persistence of chronic musculoskeletal pain [1,2,3].Graded exposure and lifestyle approaches activity have been suggested effective approaches to deal with chronic musculoskeletal pain [4–6]. Yet, when taking into account emotional and cognitive factors like fear of movement or pain catastrophizing into account, graded exposure cannot be the first step when dealing with people with chronic musculoskeletal pain. First, healthcare providers should make a sound biopsychosocial pain assessment and pain analyses. After that pain neuroscience education will be necessary to decrease the threat value of pain, to reconceptualize pain, and to tackle barriers for an active rehabilitation program [7]. To allow an individualized patient-centered approach, which is a requirement for effectiveness of pain neuroscience education a thorough clinical biopsychosocial assessment is needed [7]. Besides the specific treatment

interventions we will discuss implementation strategies to adopt new behavior in a patients' daily life. To help clinicians in the treatment of chronic musculoskeletal pain, this interactive workshop will focus on these three necessary and effective steps: (1) assessment, (2) pain
neuroscience education, and (3) graded exposure and lifestyle approach. All steps will be introduced in interactive sessions, discussing the case study of a person with chronic spinal pain. This interactive approach will enhance and optimize the transfer of knowledge and skills. The first step (i.e. biopsychosocial assessment) will entail the recognition of contributing and treatable aspects, including the classification of pain types, and the assessment of somatic, cognitive, emotional, behavioral, social and motivational factors. All these elements will be introduced using a 'pain analysis sheet'. The second step (i.e. pain neuroscience education) will be implemented in this workshop using a demonstration, including information on both mono- and multidisciplinary settings. The demonstration will be supported by material and interactive demonstrations including a powerpoint, metaphors, pain neuroscience education models also by skill trainings for the participant. In the third and last step, graded exposure and a lifestyle approach in vivo techniques will be introduced and discussed through the specific case study and an interactive discussion.

References: [1] Main. Pain Manag. 2013;3(6):455–66. [2] Wijma et al. Physiother Theory Pract. 2016;32(5):368-84. [3] Nijs et al., Expert Opin. Pharmacother. 2014;15(12):1671-83. [4] de Jong et al. Pain. 2005;116(3):264–75. [5] Vlaeyen et al. Clin. J. Pain. 2002;18(4):251–61. [6] Lopez-de-Uralde-Villanueva et al. Pain Med. 2015;17(1):172-88. [7] Nijs et al. 2016 http://www.paininmotion.be/blog/detail/five-requirements-effectivepain-neuroscience-education-physiotherapy-practice

Presentations:

1. Introduction of the workshop – Iris Coppieters
2. Discussion the case of a person with chronic spinal pain - Anneleen Malfliet & Paul van Wilgen
3. Step 1: recognition of important contributing and treatable aspects using a clinical biopsychosocial assessment model - Anneleen Malfliet
4. Step 2: Pain Neuroscience Education; which models can we use? - Paul van Wilgen & dra. Anneleen Malfliet

Educational objectives of session:

1. Upon completion of this session, attendees will be able to perform a clinical biopsychosocial physiotherapy assessment in patients with chronic spinal pain;
2. Upon completion of this session, attendees will understand how to apply pain neuroscience education into clinical practice;
3. Upon completion of this session, attendees will have basic insight into the principles of a graded exposure combined with a lifestyle approach in chronic spinal pain.

Strategies to be used to obtain the education objectives: Case study and demonstrations

Moderator: Iris Coppieters (°13/11/1989) holds a Master of Science degree in physiotherapy / rehabilitation sciences. She is a postdoctoral researcher at the Vrije Universiteit Brussel and a member of the Pain in Motion research group. In 2017, she obtained her PhD in health sciences. Her research and clinical interest goes out to chronic pain, pain rehabilitation, central sensitization and brain alterations. She received 3 presentation awards at national and international congresses. Brief summary of research and lecturing experience: 21 full papers (9 as first author and 2 as last author) published or accepted for publication in international peer-reviewed journals, like Human Brain Mapping, Physical Therapy, The Journal of Pain. 1 'letter to the editor' published in an international peer-reviewed journal, 14 oral or poster presentations at international conferences / meetings, 5 invited lectures at national meetings, and 4 national or international practical training courses for therapists.

Presenters:

1. Anneleen Malfliet (°22/01/1991) holds a master of science degree in physiotherapy / rehabilitation sciences. She is a PhD researcher at the Vrije Universiteit Brussel (Brussels, Belgium) and Ghent University (Ghent Belgium). She is member of the Pain in Motion research group and her research and clinical interest goes out to chronic 'unexplained' pain, with special emphasis on chronic spinal pain, the central nervous system and rehabilitation. Brief summary of research and lecturing experience: 22 full papers (9 as rst author) published or accepted for publication in international peer-reviewed journals, like JAMA Neurology, Physical Therapy Journal, etc. 2 'letters to the editor' or short papers published in international peer-reviewed journals, 12 oral presentations or invited lectures at international meetings / conference, 5 invited lectures at national meetings, 8 International practical training courses for physiotherapists.
2. Paul van Wilgen holds a Master in psychology and epidemiology and is a Physiotherapist. He has a PhD in medical sciences and is a visiting professor at the Vrije Universiteit Brussel. He is one of the founders of Pain in Motion. He is director and one of the founders of Transcare a transdisciplinary center for patients with persisting pain and fatigue. He published over 100 research papers, several book chapters and books about chronic pain and the management of chronic pain.

Clinical workshop 4: What kind of cognitive functional therapy (CFT) exercise has been performed during two randomized clinical trials carried on in Brazil?

Ney Meziat-Filho - Jessica Fernandez - Julia Castro (Brazil)

Abstract: Cognitive Functional Therapy (CFT) is a behavioral intervention directed to the multiple aspects of low back pain [1-3]. This approach focuses on changing the patient's beliefs, confronting their fears, educating them about pain mechanisms, increasing mental strength, and control of their body [4-5]. The exercise approach is based on functional tasks performed by patients training them to reduce excessive muscle activity in the trunk and generate behavioral changes related to pain, from postures and provocative movements [1,3]. To achieve this change, the PT needs to be able to tailor specific exercises for each patient. The session will aim to present the most common exercise approach applied during two CFT randomized clinical trials that have been conducted in Brazil. The moderator will present a summary of clinical trials methods. The two speakers are physiotherapists that have attended CFT workshops twice with two of the tutors of the method. They have completed 106 hours of training including workshops, patient examinations and a pilot study under the supervision of a physical therapist with more than four years of clinical experience in CFT. Also, the speakers have already treated more than 100 patients randomized to the CFT group in the two clinical trials. The study protocol of one of the trials has been accepted for publication in Journal of Physiotherapy [6]. The first speaker will present the way they prepared the patients to perform CFT exercises as well as the criteria to choose the exercise for each patient based on the individual functional maladaptive behaviors. The second one will be responsible for the detailed description of the most common exercises performed during the treatments from both two clinical trials, including the number of sets and repetitions as well as the exercise progression. Also, the second speaker will present the exercises prescribed to be performed at home and the strategy to help patients to engage in leisure physical activity.

References: 1. O'Keeffe M et al. BMJ Open. 2015;5(6):e007156. 2. Vibe Fersum K et al. Eur J Pain 2013;17(6):916-928. 3 Caneiro J et al. J Orthop Sport Phys Ther. 2017:1-38. 4. Meziat Filho N. Man Ther. 2016;21:303-306. 5. Meziat Filho N et al. Man Ther. 2016;25:104-108. 6. Belache et al. Journal of Physiotherapy 2018: accepted for publication.

Presentations:

1. Summary of the CFT clinical trials methods – Ney Meziat-Filho
2. How to choose the cognitive functional exercise? – Jessica Fernandez
3. Cognitive functional exercises put into practice - Julia Castro

Educational objectives of session:

1. Acquire knowledge regarding exercises performed during CFT treatments for chronic low back pain;
2. Understand the clinical reasoning process behind the selection of CFT exercises;
3. Learn how to integrate cognitions to functions.

Strategies to be used to obtain the education objectives:
Skill training, case series, demonstrations, videos, patients' stories, photographs.

Moderator: Ney Meziat-Filho is an Assistant Professor of the Postgraduate Program in Rehabilitation Sciences at Centro Universitário Augusto Motta (UNISUAM), Rio de Janeiro, Brazil. In addition to his teaching and research at UNISUAM, he works in clinical practice as a Musculoskeletal Physiotherapist. Ney's research interests include epidemiological and clinical aspects of low back and neck pain. He has been coordinating two clinical trials with the aim of investigating the efficacy of Cognitive Functional Therapy (CFT) for chronic low back pain. Ney has qualifications in Epidemiology and completed his PhD in 2014 at the Institute of Social Medicine of the Rio de Janeiro State University.

Presenters:

1. Jessica Fernandez is a physical therapist with more than 15 years of clinical experience. She is pursuing her masters' degree in Rehabilitation Sciences at Centro Universitário Augusto Motta (UNISUAM) with a randomized clinical trial comparing CFT to combined manual therapy and motor control exercise. She holds a bachelor degree in Physiotherapy from Universidade Federal do Rio de Janeiro. She is also a pain specialist from Hospital Israelita Albert Einstein and a specialist in Geriatrics from Universidade do Estado do Rio de Janeiro.
2. Julia Castro holds a bachelor degree in Physical Therapy from Pontifícia Universidade Católica of Campinas. She is pursuing her master's degree in Rehabilitation Sciences at Centro Universitário Augusto Motta (UNISUAM) with a randomized clinical trial comparing CFT to Core Training and Manual Therapy in chronic low back pain.

Oral presentations in 8 X 5 sessions

13:00	**8 X 5 session**	
	Movement adaptations during a functional reach task in children with chronic pain, before and after treatment, and the influence of pain, fear, and avoidance	Justin Beebe (USA)
	How can we better integrate Pain, Mind and Movement within the entry-level training of PT students? Developing a national strategic plan for advancing pain education and management in Canada	Tim Wideman (Canada)
	Identification and initial validation of low back pain nervous system processing subgroups using performance-based measures	Katie Butera (USA)
	The role of central sensitization and brain-derived neurotrophic factor (BDNF) in patients with chronic widespread pain and chronic fatigue syndrome: an explorative study	Andrea Polli (Italy/Belgium)
	Differences between women with traumatic and idiopathic chronic neck pain and healthy women: Interrelationships among cognitive deficits, central sensitization, and brain alterations	Iris Coppieters (Belgium)
	The effectiveness of graded motor imagery for reducing phantom limb pain and disability in upper and lower limb amputees	Katleho Limakatso (South Africa)
	Is there evidence to support "text neck" as an epidemic of the modern era of cell phones?	Ney Meziat-Filho (Brazil)
	The effect of social threat on pain-report, pain expression, aggression and empathy	Kai Karos (the Netherlands/Belgium)

Oral presentation 1: Movement adaptations during a functional reach task in children with chronic pain, before and after treatment, and the influence of pain, fear, and avoidance

Justin Beebe (USA)

Introduction: Children with chronic musculoskeletal pain conditions may demonstrate abnormal postures, decreased range of motion,[1] flexibility, strength, and employ altered movement strategies in order to complete functional tasks.[2] Few studies have investigated movement patterns associated with chronic pain in children,[3] or if these patterns change over time.
Purpose: In children with chronic pain, do movement adaptations exist during reaching tasks, and if fear, avoidance, and pain relate to these movements?
Methods: 6 subjects with bilateral or unilateral lower extremity diagnoses were selected from a larger sample after meeting inclusion criteria for the GET Living study. Subjects completed: a bilateral symmetrical reaching task at a self-selected and fast pace,[2] the Functional Disability Inventory (FDI),[4] Fear of Pain Questionnaire (FOPQ),[5] Numeric Pain Rating Scale (NPRS),[6] and a 6-Minute-Walk test (6-MWT)[7] at baseline and discharge following graded exposure treatment. Data for the reach task were collected using a 10-camera, 3D motion analysis system. Joint angle excursions were calculated in the sagittal plane for the hip, knee, and ankle.
Results: Due to technological malfunction, two subjects did not have baseline reach data. Therefore, movement data from 2 subjects with unilateral pain, and 2 with bilateral pain, were included in the results. All subjects demonstrated asymmetrical movement, calculated as the side-to-side joint excursion differences during task, at baseline. Subjects with unilateral pain moved more symmetrically after treatment. Subjects with bilateral pain demonstrated greater variability in movement patterns, some becoming more symmetrical, some less, between sides after treatment. Across all 6 subjects, the FDI, FOPQ-fear and -avoidance had 39.5%, 30.8%, and 50.2% reductions respectively, while the NPRS showed a 14% reduction in pain. Subjects also demonstrated a 37.9% improvement on the 6-MWT.
Discussion: The findings of this study suggest children with chronic pain employ compensatory movement patterns in the lower extremities in order to accomplish reaching tasks. These movement pattern changes, at least in those with unilateral pain, coincide with changes in disability, fear, avoidance, pain and endurance.
Conclusion: In our small sample, altered movement patterns do exist in children with chronic pain. While more research is indicated to understand from where these changes manifest, improvements can be made following treatment.
References: 1. Clinch J, Eccleston C. Rheumatology (Oxford). 2008;48(5):466-474. 2. Thomas J, France C. Spine. 2007;32:E460-E466. 3. Sil S, Thomas S, DiCesare C, et al. Arthritis Care Res (Hoboken). 2015;67(1):102-111. 4. Kashikar-Zuck S, Flowers S, Wilson A, et al. Pain. 2011;152:1600-1607. 5. Simons LE, Sieberg CB, Carpino E, Logan D, Berde C. J Pain. 2011;12(6):677-686. 6. von Baeyer CL, Spagrud LJ, McCormick JC, Choo E, Neville K, Connelly MA. Pain 2009;143(3):223-227. 7. Li AM, Yin J, Yu CCW, et al. Eur Respir J. 2005;25:1057-1060.

Oral presentation 2: How can we better integrate Pain, Mind and Movement within the entry-level training of PT students? Developing a national strategic plan for advancing pain education and management in Canada

Timothy H. Wideman (Canada)

Introduction: Over recent years there have been dramatic advances in research addressing how PTs can effectively manage pain[1-3]. These findings support expanding the scope of management from a traditional focus on tissue damage and biomechanics to a broader biopsychosocial perspective that integrates psychological and neurophysiological factors within movement and activity-based interventions[1;2;4-6]. Despite this progress, there are important gaps in how PTs understand and manage pain[7;8]. These gaps are influenced by the limited and inconsistent pain education within entry-level training programs[9;10]. Canada, like most countries around the world, currently lacks a strategy for how PT pain education can be effectively improved. This knowledge translation initiative aimed to develop a stakeholder endorsed strategic plan for advancing biopsychosocial pain education across Canadian PT programs.
Methods: A stakeholder workshop[11] and interviews helped determine barriers, facilitators, and strategies to advance pain education in Canadian PT programs. The following stakeholder groups participated in these activities: (1) People living with pain; (2) PT students and recent graduates; (3) Pain educators; (4) Program administrators; (5) PT regulators; and (6) Professional associations. Data was synthesized into a draft strategic plan for improving pain education, which was then vetted and refined with stakeholder input.
Results: The strategic plan focuses on the following strategies: Integrating established core competencies for pain education[12] within key national regulatory and governance guidelines; Supporting the integration of pain management competencies within individual physiotherapy programs; Partnering with people living with pain in curriculum design and implementation; Advocating for the importance of pain management as an essential PT role; Advancing pain education research.
Discussion: This national strategy has the potential to further integrate themes related to Pain, Mind and Movement within PT programs across Canada, thus reducing the knowledge-to-practice gap in pain management.
Conclusion: This work presents the first national strategy for advancing pain education within Canadian PT programs and provides a potentially useful framework for other countries.
References: [1] Moseley GL, et al. J Pain. 2015;16(9):807-813. [2] Nicholas MK, et al. PTJ. 2011;91(5):765-776. [3] Nijs J, et al. PTJ. 2014;94(5):730-738. [4] Louw A, et al. Physiotherapy theory and practice. 2016;32(5):332-355. [5] Hill JC, et al. PTJ. 2011. [6] Bowering KJ, et al. J Pain. 2013;14(1):3-13. [7] Overmeer T, et al. Physiotherapy. 2004;90:35-41. [8] Bishop A, et al. Spine. 2005;30(11):1316-1322. [9] Watt-Watson J, et al. Pain Research & Management. 2009;14(6):439. [10] Hoeger Bement MK, et al. J Pain. 2015;16(2):144-152. [11] Wideman TH, et al. Physiotherapy Canada. 2018;70(1):24-33. [12] Fishman SM, et al. Pain medicine. 2013;14(7):971-981.

Oral presentation 3: Sensory and Psychological Factors Contribute to Motor Outcomes in a High-risk Subgroup Experiencing Exercise-induced Muscle Injury

Katie A. Butera (USA)

Introduction: Prior research indicates individuals with a high pain sensitivity variant of the COMT (catechol-O-methyltransferase) gene (SNP rs6269) and higher pain catastrophizing are at risk for heightened pain responses and poor clinical outcomes [1,2,3]. However, the process by which poor motor outcomes develop across this subgroup is unknown. Investigation of motor outcomes is critically needed as these may lead to persistent disability. This preliminary investigation examined how baseline sensory and psychological factors influence motor outcomes in a high-risk subgroup.
Methods: We enrolled a high-risk cohort (n=117) with the SNP rs6269 COMT gene and Pain Catastrophizing Scale scores >5 [4]. Following baseline testing we utilized an established shoulder fatigue protocol to induce muscle injury. Sensory tests included: A-delta and C- fiber mediated thermal sensitivity (1st and 5th pulse responses), temporal summation (change in response to 5-pulse train), conditioned pain modulation, and pressure pain threshold. Psychological measures included: self-reported depressive symptoms, fear of pain, and kinesiophobia. Post-injury motor outcomes included: pain intensity during a resisted shoulder muscle contraction and active shoulder motion (numeric pain rating scale 0-100), shoulder strength decline (% decline of maximum voluntary isometric shoulder contraction), and self-reported disability (QuickDASH scores). High and low motor outcome groups were created via median split and tested for group differences on baseline measures (α=0.05).
Results: Individuals demonstrating higher pain during resisted shoulder muscle contractions exhibited higher A-delta mediated thermal sensitivity and lower depressive symptoms ($p<0.05$). Individuals demonstrating higher pain during active shoulder motion were older and exhibited higher A-delta mediated thermal sensitivity, lower temporal summation, and higher fear of pain ($p<0.05$). Females demonstrated greater strength decline ($p<0.05$). Individuals reporting greater disability exhibited higher C-fiber mediated sensitivity ($p<0.05$).
Discussion: Additional information is needed to guide treatment planning for high-risk

individuals. Results suggest sensory and psychological factors in uence motor outcomes in this high-risk subgroup. Thus, evaluation of these factors may assist in optimizing clinical management of this subgroup.
Conclusions: This study provides preliminary evidence of how poor motor outcomes may develop in a high-risk subgroup. Replication of findings in high-risk clinical pain populations is necessary to develop personalized medicine strategies that will positively impact motor outcomes.
References: 1. George SZ et al. Med Sci Sports Exerc. 2014;46:1871–81. 2. George SZ et al. J Pain. 2014;15:68–80. 3. George SZ et al. Pain. 2015;156:148–56. 4. George SZ et al. Contemp Clin Trials. 2017;56:9-17.

Oral presentation 4: The role of central sensitization and brain-derived neurotrophic factor (BDNF) in patients with Chronic Widespread Pain and Chronic Fatigue Syndrome: an explorative study

Andrea Polli (Belgium)

Introduction: Chronic widespread pain (CWP) is often referred as the most disabling
symptom in patients with Chronic Fatigue Syndrome (CFS) (1). Research has been showing that many mechanisms can contribute to CWP, such as for instance central sensitization (CS) (2). The logical next step would be to further unravel these mechanisms, for instance examining factors known to increase the sensitivity of the central nervous system. One such factor is Brain-derived Neurotrophic Factor (BDNF) (3). BDNF is a protein produced by neurons and immune cells (3). Animal studies show BDNF to increase central sensitization (4). However, clinical research is lacking or is at its very preliminary phase, with only a few cross-sectional studies published (5). We aimed to explore the relation between BDNF and CS and its possible role in CWP.
Methods: Fifty-four women (28 people with CFS and CWP; 26 age-, sex, physical activitymatched healthy subjects, HSs) were enrolled. Participants were assessed twice within 5 days. Assessment included clinical questionnaires, assessment of thermal and mechanical pain thresholds; and analysis of BDNF protein levels in serum. Between assessments, subjects wore an accelerometer, so that we could control for physical activity levels.
Results: Patients and HSs were comparable on age, sex, body-mass index, and physical activity. All patients with CFS scored 40 or higher at the CS index, all healthy subjects scored less than 40. CSI was strongly associated to pain thresholds in both assessments (all r>.324 and p<.015). ICCs showed good stability of pain thresholds and BDNF levels (Cronbach's > 0.8). Stepwise regression analysis showed CS to be the best predictor for CWP (F=57.438; R2=.525; p< .000). RM ANOVA were performed for between-group analysis, controlling for time and within-group variability of the measures. BDNF was significantly higher in people with CFS in both assessments (F=11.013, p=.002). On average, BNDF concentration in serum was 17.23 (+/- 4.45) ng/ml in patients, and 14.03 (+/- 3.89) ng/ml in healthy subjects. Pain thresholds were significantly lower in people with CFS. BDNF levels correlated with CS inventory (r=.366, p=.007). Weak correlations were found between BDNF
levels and pain thresholds, but only in the second assessment and on two out of seven measures.
Discussion: BDNF protein concentration appears stable and higher in patients with CFS. It is associated with CS. CS is able to explain CWP and the decrease in pain thresholds.
Conclusion: BDNF appears relevant for central sensitisation and CWP. More research investigating its role is warranted, especially looking at those mechanisms implicated in BDNF release such as genetic and epigenetic mechanisms.
References: 1. Meeus M et al. Eur J Pain. 2007;11(4):377-386. 2. Meeus M and Nijs J. Clin Rheumatol. 2007;26(4):465-473. 3. Nijs J et al. Expert Opin Ther Targets. 2015;19(4):565-576. 4. Ren K and Dubner R. Mol Neurobiol. 2007 Jun;35(3):224-235. 5. Zanette SA et al. Mol Pain. 2014 Jul;10:46.

Oral presentation 5: Differences between women with traumatic and idiopathic chronic neck pain and healthy women: Interrelationships among cognitive deficits, central sensitization, and brain alterations

Iris Coppieters (Belgium)

Introduction: This study aimed to examine differences in cognitive deficits, central
sensitization (CS), and brain alterations between women with traumatic and idiopathic (nontraumatic) chronic neck pain and healthy women. In addition, interrelationships among these variables were investigated. It is hypothesized that the traumatic origin of neck pain in patients with chronic whiplash-associated disorders (CWAD) gives rise to more severe deficits compared to patients with chronic idiopathic neck pain (CINP). Furthermore, brain alterations are hypothesized to be present in individuals with CWAD compared to CINP and healthy controls.
Methods: Ninety-five women (28 healthy pain-free controls, 35 CINP and 32 CWAD patients) were enrolled in the study. Cognitive performance and CS encompassing distant hyperalgesia and conditioned pain modulation (CPM) efficacy were examined. In addition, T1-weighted and diffusion-weighted magnetic resonance (MR) images of the brain were acquired to investigate regional grey matter (GM) volume and cortical thickness, and white matter (WM) structure, respectively.

Results: Cognitive deficits were present in patients with CWAD and, to a significantly lesser extent, in patients with CINP compared to healthy women. Distant hyperalgesia and decreased CPM efficacy were shown only in women with CWAD; this result is indicative of the presence of CS. Furthermore, abnormalities in WM structure and decreased GM morphology in regions associated with pain and cognitive processing were demonstrated in women with CWAD compared to CINP and healthy women. In patients with CWAD, decreased regional GM volume was associated with more severe cognitive deficits and more signs of CS. In addition, evidence is provided for associations between dysfunctional CPM and the degree of regional WM deficits in CWAD.
Discussion: These results emphasize the presence of CS and structural brain alterations in women with CWAD but not in women with CINP. Accordingly, therapy approaches should take into account the role of central nervous system neuroplasticity in particular in CWAD for example with pain neuroscience education.
Conclusion: This innovative research revealed important differences between women with CWAD and CINP. Together, these findings indicate a possible negative mediating role of the trauma in patients with CWAD. The novel findings could contribute to more effective individually tailored therapy approaches.

Oral presentation 6: The Effectiveness of Graded Motor for Reducing Phantom Limb Pain and Disability in Upper and Lower Limb Amputees

Katleho Limakatso (South Africa)

Introduction: Phantom limb pain (PLP) is described as painful sensations felt in the missing portion of an amputated limb (Siddle, 2004). Graded motor imagery (GMI) is a cortical mechanisms based intervention which aims to reduce PLP using a graded sequence of strategies including laterality recognition, explicit motor imagery and mirror visual feedback (Moseley, 2006). The aim of this study was to investigate whether the GMI programme is effective for reducing PLP and disability in people who have undergone amputations.
Methods: A single blinded randomised controlled trial was conducted in Western Cape, South Africa. The experimental group underwent a 6-week GMI programme. The control group continued with routine care. The primary outcome measure was PLP severity with secondary outcomes of pain interference with function and Health-Related Quality of Life (HRQoL). A blinded outcome assessor collected data at baseline, 6-weeks and 6-months. The median difference (MD) of pain severity scores and Number Needed to Treat (NNT) were calculated to determine the efficacy of treatment. The Odds Ratios (OR) were calculated to determine a significant difference between groups.
Results: Clinically meaningful reductions in pain severity were seen only within the experimental group from baseline to 6-months follow up [experimental group MD 5, $p<0.001$; control group MD 1.37, $p=0.001$], with the NNT of 1.9 [95% CI: 1.1–6.5] and OR of 10.5 [95% CI:1.36–81.1, $p=0.02$]. The positive results were maintained at 6-months follow up (NNT: 1.9 [95% CI: 1.1-7.1]; OR: 15 [95% CI: 1.21-185; $p=0.03$]).
Clinically meaningful reductions in pain interference with function were seen only within the experimental group from baseline to 6-months follow up [experimental group MD 5.43, $p<0.001$; control group MD -0.92; $p=0.43$], with the NNT of 1.4 [95% CI: 1–1.8] and OR of 78 [95% CI: 3.3–1849, $p=0.007$]. The positive results were maintained at 6-months follow-up (NNT: 1.9 [95% CI: 0.9-2.1]; OR: 63 [95% CI: 3.3-1194.8; $p=0.006$]). For HRQoL, the experimental group had significantly fewer problems with mobility than the control group at 6-months ($\chi 2=9.8$; $p=0.04$).
Discussion: The results of the current study provide support for the use of GMI to treat PLP based on the proposition that PLP is driven by cortical mechanisms, and that GMI effectively targets these mechanisms.
Conclusion: Based on the significant pain reduction within the GMI group, the lack of serious adverse effects, and the ease of application, GMI may be a viable treatment for treating PLP in people who have undergone amputations.
References: Siddle, L. (2004). British Journal of Nursing, 13(11), 664-667. Moseley, G. L. (2006). Neurology, 67(12), 2129-2134.

Oral presentation 7: Is there evidence to support “text neck” as an epidemic of the modern era of cell phones?

Ney Meziat-Filho (Brazil)

Introduction: There has been a potentially harmful increased use of and addiction to mobile phones for texting, especially among young people, in recent years, combined with the growing prevalence of neck pain[1-2]. “Text neck” has frequently been referred to by health professionals as a public health issue[3-4]. However, the link between neck posture and neck pain is unclear. In a recent longitudinal study, Gustafsson et al.[5] found no association between the amount of time texting on a mobile phone and new episodes of neck pain. Nevertheless, that study did not assess the type of neck posture commonly adopted during mobile phone use. Therefore, our study investigated whether there is an association between text neck and neck pain[6].
Methods: Observational cross-sectional study with 150 18–21-year-old young adults from a public high school in the state of Rio de Janeiro was performed. In the self-report questionnaire, the participants answered questions on sociodemographic factors, anthropometric factors, time spent texting or playing on a mobile phone, visual impairments, and concern with the body

posture. The neck posture was assessed by participants' self-perception and physiotherapists' judgment during a mobile phone texting message task. The Young Spine Questionnaire was used to evaluate the neck pain. Four multivariate logistic regression models were fitted to investigate the association between neck posture during mobile phone texting and neck pain, considering potential confounding factors.
Results: There is no association between neck posture, assessed by self-perception, and neck pain (OR = 1.66, p = 0.29), nor between neck posture, assessed by physiotherapists' judgment, and neck pain (OR = 1.23, p = 0.61). There was also no association between neck posture, assessed by self-perception, and frequency of neck pain (OR = 2.19, p = 0.09), nor between neck posture, assessed by physiotherapists' judgment, and frequency of neck pain (OR = 1.17, p = 0.68).
Discussion: Our results conflict with the idea that the mechanical stress caused by poor posture due to mobile phone use is a threat to cervical spine integrity.
Conclusion: There is no evidence to support that "text neck" is an epidemic of the modern era of cell phones.
References: 1.Hoy et al. Ann Rheum Dis. 2014; 73:1309–1315. 2. IBGE. National Household Survey, PNAD. Brazilian Institute of Geography and Statistics.2016; https://www.ibge.gov.br/estatisticas -novoportal/sociais/trabalho/17270-pnadcontinua.html 3. Meziat-Filho et al. Spine J. 2018; In press. 4. Hansraj. Surg Technol Int. 2014; 25:277–279. 5. Gustafsson et al. Appl Ergon. 2017; 58:208–214. 6. Damasceno et al. Eur Spine J.2018; Jan 6. doi: 10.1007/s00586-017-5444-5

Oral presentation 8: The effect of social threat on pain-report, pain expression, aggression and empathy

Kai Karos (Belgium / the Netherlands)

Introduction: Social context has been shown to modulate several pain-relevant outcomes such as reported pain intensity or pain expression and might therefore be a valuable target for intervention. The present experiment investigated the effect of social threat (versus a control condition) on pain reports, painful facial expression and also added measures of interpersonal aggression and empathy. We hypothesized that the experience of social threat will lead to (1) reduced expression of painful facial expression, (2) increased self-report of pain, (3) increased aggression towards the confederate, and (4) reduced empathy for the confederate.
Methods: Female participants (N = 32) came to the lab with two confederates, whom they believed to be other participants. Based on a bogus randomization procedure, participants were selected to receive painful electrocutaneous stimuli administered by the confederates. Both confederates administered a total of 10 painful stimuli. However, the framing of these stimuli was manipulated: In the control condition they were led to believe that the confederate could choose between 10 to 20 pain stimuli, thus choosing the minimum of pain stimuli allowed. In the social threat condition they were led to believe that the confederate had a choice between 1 and 10 pain stimuli, thus choosing the maximum number of pain stimuli allowed. Participants had to report pain intensity, unpleasantness and threat value and their facial expression was recorded. In addition, the participants were asked how many painful stimuli they would administer back to the confederates (between 1-20, aggression) and how they would feel when the stimuli are administered (empathy).
Results: The confederate was rated as more threatening in the social threat condition. Moreover, participants expressed less painful facial expression in the social threat condition compared to the control condition. They also reported increased pain intensity, pain unpleasantness, and threat of pain in the social threat condition. Lastly, as expected, they demonstrated increased aggression and reduced empathy towards the confederate in the social threat condition.
Discussion / Conclusion: The current study provides further support for the detrimental consequences of social threat for the perception of pain and interpersonal relationships.

14:40	**8 X 5 session**	
	Modulating pain thresholds through classical conditioning	Juliane Traxler (Belgium)
	Relative intensity judgements: A novel paradigm for investigating classically conditioned bias	Victoria J Madden (South Africa)
	Sensory and psychological factors contribute to motor outcomes in a high-risk subgroup experiencing exercise-induced muscle injury	Katie A. Butera (USA)
	Pain neuroscience education plus cognition-targeted exercise therapy can improve pain, disability, functioning and pain cognitions in people with chronic spinal pain: a multicenter randomized controlled trial	Anneleen Malfliet (Belgium)
	Non-pharmacological management of pain in HIV/AIDS: a bridge too far if you are a poor, depressed South African?	Romy Parker (South Africa)
	The role of pain cognitions in healthcare utilization in patients undergoing surgery for lumbar radiculopathy: design and preliminary results of a multicentre randomized controlled trial	Eva Huysmans (Belgium)
	Explaining pain to teenagers; getting their head around pain	Anne Marie van Es (UK)
	Morphological differences in the upper trapezius muscle between female office workers with and without trapezius myalgia: facts or fiction?	Kayleigh De Meulemeester (Belgium)

Oral presentation 9: Modulating Pain Thresholds Through Classical Conditioning

Juliane Traxler (Belgium)

Introduction: Classical conditioning has frequently been shown to be capable of evoking fear of pain and avoidance behaviour in the context of chronic pain. However, whether pain itself can be conditioned and whether this process could be a mechanism in the transition from acute to chronic pain has rarely been investigated and remains a matter of debate.
Methods: In a simultaneous conditioning paradigm, 51 pain-free, healthy participants
underwent an acquisition phase in which one non-painful vibrotactile stimulus (CS+) was repeatedly paired with a painful electrocutaneous stimulus to the lower back, whereas a second vibrotactile stimulus of the same modality (CS-) was paired with a non-painful electrocutaneous stimulus. In the test phase, at-pain-threshold electrocutaneous stimuli were simultaneously delivered together with a CS+ or CS-, and intensity ratings for each trial as well as expectancy ratings after each block were obtained. The main outcome was the percentage of at-pain-threshold electrocutaneous stimuli that were rated as painful. Additionally, the effects of negative affect (PANAS), contingency awareness, and expectancy on the primary outcomes were explored.
Results: A significantly larger proportion ($Z = -3.033$ $p = .002$, $r = -.325$) of at-pain-threshold electrocutaneous stimuli was rated as painful when paired with the CS+ (81.5%; SD = 21.03) than when paired with the CS- (72.2%; SD = 24.69). Furthermore, at-pain-threshold stimuli were perceived as significantly more painful when presented with the CS+ compared to the CS-. These effects were not influenced by contingency awareness, nor by expectancies or mood states.
Discussion: In line with an earlier study, we found that pain thresholds can be experimentally modulated through classical conditioning The results illustrate that the at-pain-threshold electrocutaneous stimuli co-occurring with CS+ vibrotactile stimuli were rated as painful significantly more often, and were also rated as more painful than when presented together with CS- stimuli, which clearly confirms our hypothesis. Interestingly, the majority of CStrials paired with at-threshold-stimuli were also perceived as painful.
Conclusion: The findings of this study support the notion that pain thresholds can be influenced by classical conditioning, and corroborate the possible role of associative learning in the development and maintenance of chronic pain.

Oral presentation 10: Relative Intensity Judgements: A Novel Paradigm For Investigating Classically Conditioned Bias

Victoria J Madden (South Africa)

Introduction: Classical conditioning is a learning process that is known to bias perception of stimuli that lie close to the pain threshold (Madden, Bellan et al. 2016). We developed and piloted a novel paradigm to test the extent and limits of classically conditioned bias using relative judgements.
Methods: Pain-free adults received pairs of stimulation events and judged which event in a pair was the more intense - a 'Relative Intensity Judgement' (RIJ). Stimuli were delivered to the back. Each event included a vibrotactile stimulus from one of two locations (as conditioning stimuli, CS+ and CS-) and an electrical stimulus from a single location (as unconditioned stimulus, US). In an acquisition phase, the CS+/US event was usually more intense than the CS-/US event for the experimental group, but the two event types were equivalent overall for the control group. The proportion of test phase trials for which participants judged the CS+ event as more intense than the CS- event was computed for each participant at each ratio, and plotted. A loess curve was used to compare curves between groups and across individuals. Model fitting was performed using a mixed logistic regression approach, allowing for fixed (event intensity ratio, group) and random effects (participants, event intensity ratio).

Results: Ten adults participated (8 male; median [range] age = 25 [20 - 48]). Four of 5 experimental group participants showed differential learning on expectancy ratings, but only 3 reported the contingency after the procedure. Three of 5 control group participants showed differential learning on expectancy ratings, but none reported the contingency after the procedure. All participants remained blinded throughout. In the full mixed logistic regression model, event intensity ratio predicted the proportion of test phase trials for which participants judged that the CS+ event was more intense than the CS- event (b = 1.22, SE = -.20, p < 0.001), but the effects of group and individual were not significant.
Conclusion: This paradigm shows promise for testing the extent and limits of classically conditioned perceptual bias regarding somatosensory stimuli.

Oral presentation 11: Identification and initial validation of low back pain nervous system processing subgroups using performance-based measures

Katie Butera, USA

Introduction: Low back pain is a prevalent, costly condition [1]. Multiple factors are associated with low back pain—pain sensitivity, psychological distress, altered muscle activation—indicating nervous system involvement [2,3,4,5]. Individuals with low back pain also demonstrate movement impairments and disability. However, nervous system factors and functional outcomes are often studied in isolation; thus, the collective impact of these factors on movement and functional performance among individuals with low back pain is not established [6]. Therefore, the purpose of this study is to identify low back pain subgroups based on sensory, psychological, and motor factors and then initially validate these subgroups using performance-based measures of walking and movement-evoked pain.
Methods: In this ongoing study, we will test 100 participants with low back pain (adults ages 18-75 with no history of psychiatric disorders, recent trauma/surgery, or neurologic conditions). To identify low back pain subgroups, participants will undergo sensory (pain tests), psychological (questionnaires), and motor (electromyography) testing. A cluster analysis will be used to derive low back pain subgroups based on these tests. To initially validate these subgroups, participants will also complete performance-based measures (walking assessments and movement-evoked pain tests). ANOVAs will be used to test subgroup differences across these measures and to establish initial construct validity of subgroup classification.
Results: Example data from this ongoing study will display nervous system testing and yielded subgrouping variables. We will also show examples of walking assessment outcomes and movement-evoked pain reports.
Discussion: Study findings will be used to identify key nervous system processing factors that may negatively impact function in individuals with low back pain. Study results will be critical for improving clinical management of this clinical population and for optimizing functional outcomes in this clinical population.
Conclusions: This study will initiate an innovative line of research to study pain as a multifactorial, nervous system disease and its impact on movement and function [6]. Further, study findings will guide future studies aimed at developing personalized interventions to optimize movement and prevent disability among individuals with low back pain.
References: 1. Institute of Medicine. National Academies Press (US). 2011. 2. Correa et al. Exp Brain Res. 2016;233(8):2391-99. 3. George et al. Clin J Pain 2011;27(2):108-115. 4. Picavet et al. Am J Epidemiol. 2002;156(11):1028-34. 5. Van den Hoorn et al. J Biomech. 2015;48(15):4109-115. 6. Butera et al. Phys Ther. 2016;96(10):1503-07.

Oral presentation 12: Pain neuroscience education plus cognition-targeted exercise therapy can improve pain, disability, functioning and pain cognitions in people with chronic spinal pain: a multicentre randomized controlled trial

Anneleen Malfliet (Belgium)

Introduction: Currently, nonsurgical treatments for CSP do not comply with recent advances in chronic pain research and thus remain limited to small and moderate effect sizes.
Methods: 120 people with CSP were randomized and subjected to the modern neuroscience approach (i.e. pain neuroscience education plus cognition-targeted exercise therapy) or current best evidence physiotherapy. Outcome measures: pressure pain thresholds, numeric rating scale, central sensitization inventory, pain disability index, SF36, brain gray matter morphology and pain cognitions.
Results: No significant changes were found in brain gray matter morphology in response to treatment. Yet, the modern neuroscience approach improved 1) pain (small to medium effect sizes): higher pressure pain thresholds at the primary test site (.971, 95%CI -.028 to 1.970), and reduced central sensitization inventory scores (-5.684, 95%CI -10.589 to -.780); 2) function (small to medium effect sizes): significant and clinically relevant reduction of disability (-6.351, 95%CI -11.153 to -1.550), better mental health (36.496, 95%CI 7.998 to 64.995) and physical health (53.007, 95%CI 23.805 to 82.209); and 3) pain cognitions (medium to large effect sizes): reduced kinesiophobia, and reduced hypervigilance. Both interventions resulted

in an improvement of pain catastrophizing and numeric rating scale scores of pain (> 50% reduction in the modern neuroscience approach group).
Discussion and conclusion: The modern neuroscience approach improves pain, symptoms of central sensitization, disability, functioning, and pain cognitions in people with CSP (clinically important results, long-term benefits, medium to large effect sizes, and 50% improvement in self-reported pain). Significant clinical improvements without detectable brain-level changes question the relevance of brain gray matter alterations in this population. This study emphasizes the need for a shift toward a biopsychosocial focus rather than maintaining a purely biomedical focus for people with CSP.
References: Dolphens M, Nijs J, et al. BMC Musculoskelet Disord. 2014;15(1). doi:10.1186/1471-2474-15-149.

Oral presentation 13: Non-pharmacological management of pain in HIV/AIDS: a bridge too far if you are a poor, depressed South African?

Romy Parker (South Africa)

Introduction: Pain in people living with HIV/AIDS (PLWHA) continues to be a problem [1]. With HIV now being regarded as a chronic illness rather than a life-limiting one, it is a priority that treatments for the symptoms associated with HIV/AIDS be developed, tested and implemented. Most guidelines recommend patient-centred approaches in multimodal interventions for pain. We previously developed and tested a multimodal intervention for PLWHA, and found it reduced pain and depression, and improved quality of life in amaXhosa women with HIV and chronic pain[2]. Efficacy in males and other ethnic groups has not been determined.
Methods: We planned a pragmatic, multi-site, single-blind randomised controlled trial with 204 patients at four sites. The primary outcome was pain; secondary outcomes were depression, health-related quality of life, and self-efficacy. Outcome measures were the Brief Pain Inventory, Beck Depression Inventory, EQ-5D, self-efficacy for chronic disease 6-item measure. Patients were randomised to either participate in a six-week, peer-led multimodal intervention or receive only the empathetic attention of the research assistant at each data collection point.
Results: We recruited 183 PLWHA with pain to the study. At baseline data collection, only 160 participants returned. Participants were predominantly female (n=97), aged 35 (18-58); with low levels of education. They had moderate pain severity (5.03; SD 2.14) and pain interference (5.12; SD 2.58), minimal-mild depression (13.22; SD 6.93), reported low quality of life (60.01; SD 21.02), and good self-efficacy (6.93; SD 2.25).
Discussion: We were unable to assess efficacy of the intervention due to a 51% loss to follow up (LTFU). We found that neither sex, education, employment status nor financial stability associated with LTFU. We found that the greater the severity of depressive symptoms, the more likely participants were to be LTFU (p=0.01).
Conclusions: In South Africans living with HIV/AIDS who are depressed and poor, nonpharmacological pain management approaches cannot be considered in isolation. The lack of association between sex, education, employment status or financial stability with LTFU may be because participants struggle to survive no matter their sociodemographic status. Non-pharmacological pain management for PLWHA should consider the multiple effects of poverty, including depression.
References: 1. Parker et al. J Int AIDS Soc, 2014. 17: p. 18719. 2. Parker et al. Journal of Nervous and Mental Disease, 2016.

Oral presentation 14: The role of pain cognitions in healthcare utilization in patients undergoing surgery for lumbar radiculopathy: design and preliminary results of a multicentre randomized controlled trial

Eva Huysmans (Belgium)

Introduction: Chronic pain following lumbar surgery leads to high healthcare utilization (HCU)[1]. Unraveling the mechanism behind HCU, will make it possible to implement targeted interventions keeping HCU at an appropriate level. Based on literature in other populations, pain cognitions might play a role in HCU[2-5]. Therefore our aim is to examine the (causal) relationship between pain cognitions and HCU in patients with lumbar radiculopathy. Additionally, treatment effects on HCU and pain cognitions are investigated.
Methods: Patients undergoing surgery for lumbar radiculopathy (n=120) are randomized into a perioperative pain neuroscience education (targeting pain cognitions) group or a back school (biomedically focused) group. HCU and pain cognitions (Tampa Scale for Kinesiophobia (TSK), Pain Catastrophizing Scale (PCS) and Pain Vigilance and Awareness Questionnaire (PVAQ)) are assessed at baseline and follow-up moments until 2 years postoperatively. At baseline, associations between pain cognitions and HCU are explored using univariate analyses. Repeated measures AN(C)OVA analyses are performed to determine the therapy effects on pain cognitions and HCU. Causal interactions between pain cognitions and HCU are examined using multivariate regression analyses.
Results: Preliminary baseline analyses are available for 40 patients. TSK, PCS and PVAQ scores are, respectively, 43/68, 25/52 and 40/90. Presence of kinesiophobia was associated with type (p=.008) and amount (p=.034) of pain medication used.

Patients having many consultations with the general practitioner scored higher on the PCS (p=.056). Those taking NSAID's show higher scores on the PCS (p=.036). By the time of the congress further results on these relationships and therapy effects will be presented.
Discussion: Preliminary baseline findings underscore the hypothesis that there might be an association between pain cognitions and HCU in patients scheduled for surgery for lumbar radiculopathy. Further analyses will provide more insight in the clinical relevance of these relationships and possible causal interactions between pain cognitions and HCU. Furthermore, therapy effects of perioperative pain neuroscience education compared to biomedically focused back school will be revealed.
Conclusion: This study will reveal the influence of pain cognitions on HCU in patients undergoing surgery for lumbar radiculopathy. Cross-sectional baseline analyses indicate that there might be a relationship between these two outcome measures.
References: [1] Taylor RS et al. British Journal of Pain 2012;6(4):174-181. [2] Abbott AD et al. Spine. 2010;35(8):848-857. [3] Haugen AJ et al. BMC Musculoskelet Disord. 2012;13:183. [4] Svensson GL et al. Acta orthopaedica. 2011;82(6):732-736. [5] Monticone M et al. Eur Spine J. 2014;23(1):87-95.

Oral presentation 15: Explaining Pain to Teenagers; getting their head around pain

Anne Marie van Es (United Kingdom)

How do we help patients with chronic pain? This talk, which is based on my experience as part of the paediatric chronic pain management team at Oxford, sets out to answer this question. Our practice at Oxford is based on understanding the function of pain in a normal healthy body. From that basis, patients can start to explore what happens when pain goes wrong. Once patients have an understanding, we also work with them to develop strategies for pain management. These including sleep hygiene; paced return to daily activities; psychological support; and analysis of stress in the patient's environment. My talk falls into three parts. Part I, which is the most substantial, is about is about explaining pain to patients. Our pain education class is fundamental to all the care pathways that we offer. Firstly, patients need to understand the role of pain as a warning system, but beyond this we also consider what other factors can trigger or strengthen a pain response. Those factors include stress, association, anticipation, and expectation. Patients learn that in chronic pain the signals we receive are a false message: it is important not to focus on them. From a basis of knowledge, the Oxford pain management team have a programme that offers new routines for our patients. In Part II of my talk I will briefly outline the sorts of activity that form part of our bespoke programmes. We set out goals in consultation with our patients, for example for a staged return to school. As part of our two-week residential, we also provide activities such as physiotherapy, psychology, outings in the local community, karate and yoga. After the residential period we continue to monitor and support our patients and work with them towards re-establishing functional family lives. The Oxford programme has had a considerable success rate. We now have extensive data on our patient outcomes. In Part III of my talk I will review the statistics we have gathered on the efficacy of our approach.
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Oral presentation 16: Morphological differences in the upper trapezius muscle between female office workers with and without trapezius myalgia: facts or fiction?

Kayleigh De Meulemeester (Belgium)

Introduction: Office workers frequently report work-related neck pain, which is often associated with myofascial dysfunction of the upper trapezius muscle, called trapezius myalgia. It is hypothesized that prolonged low-level muscle activity, during office work, may lead to morphological changes in the muscle tissue, causing muscle pain and fatigue. The aim of the present study was to investigate morphological differences in a muscle sample of the upper trapezius, between female office workers with and without trapezius myalgia. (1-5)
Methods: Muscle biopsy samples were obtained from the upper trapezius muscle of female office workers with trapezius myalgia (n=17) and healthy controls (n=15). Myosin heavy chain immunohistochemistry stainings were performed to identify differences in fiber type proportion and fiber size. Histochemical stainings were executed to investigate differences in internal nuclear proportion and irregular fibers. Differences in mitochondrial and fat droplet volume density were investigated by means of electron microscopic imaging at the subsarcolemmal and intermyofibrillar level.
Results: The trapezius myalgia group showed significantly more type IIA and IIA/IIX fibers, and less type I and IIX fibers, compared to the control group ($P<0.001$ – $P=0.005$). No significant differences were found for Feret's diameter, internal nuclear proportion, and fat droplets ($P>0.05$). A significantly higher intermyofibrillar mitochondrial volume density was found in the patient group, compared to the control group ($P= 0,003$). Concerning irregular fibers, the patient group displayed more fibers with cytochrome c oxidase enzyme activity loss, compared to the control group ($P= 0.025$).

Discussion: It may be hypothesized that, due to muscular overload during office work, the local blood and oxygen supply is restricted, leading to an impaired aerobic energy metabolism. This may cause an increased reliance on the anaerobic energy metabolism, and a compensatory increase in mitochondria and a shift from the oxidative type I to the oxidative-glycolytic type IIA and IIA/IIX fibers (6,7).

Conclusions: In this study, several differences between female o□ce workers with and without trapezius myalgia were found, suggestive for an impaired anaerobic metabolism in the patient group. It is a challenge for further research to identify whether these differences are present by genetic disposition or are a consequence of the pain condition.

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