

Notice:

(The Scientific and Program Committee reserves the right to change the preliminary program without prior notice till the final program is edited)

PRELIMINARY PROGRAM

Monday, November 8, 2010

16.00 – 19.00 Pre-registration

Tuesday, November 9, 2010

07.00 Registration open

08.30 Official Opening

Andry Vleeming, & Colleen Fitzgerald

Movement Stability and Lumbopelvic Pain

Subtitle:

Moderators: Jaap van Dieën & Andry Vleeming

This session will focus at the coherence of the passive connective tissues and active muscular structures and the relevance of their mutual interactions in relation to low-back and pelvic pain.

Muscular forces are transmitted to the skeletal system through passive connective tissue structures such as tendons. The mechanical properties of this tissue thus co-determine the dynamic effects of muscle action. This is of importance as training and disuse have substantial effects on the properties of connective tissues.

Moments and reaction forces generated by muscles and by passive structures, such as ligaments, combine to provide equilibrium at the multiple kinematic degrees of freedom of the SI joints and lumbar intervertebral joints. The use of passive tissue contributions by allowing some movement at the joints until equilibrium is reached might greatly simplify control of this multi-joint system. However, this strategy would imply that muscle activation patterns need to be adjusted when changes in passive stiffness occur due to prolonged loading and injury.

The passive tissues interact with the muscular system in addition through their role as sensory organs, adding feedback to the control of the system. Again this function may be impaired through sustained loading or injury.

The above suggests that the use of the term passive to describe the non-muscular connective tissues may be inappropriate, which is underscored by their plasticity even at very short time-scales. Furthermore the close interactions of muscle and other connective tissue implies that a more integral view, in which surgical and conservative treatment options can be considered as parts of a continuum, is needed.

- 08.45 *Introduction:*
Jaap van Dieën
- 08.50 Frank Willard:
Anatomy of the trunk's connective tissue structures and the lumbar fascia in particular.
- 09.15 Moshe Solomonow:
Biomechanics, electromyography, stability and tissue biology of cumulative low back disorder
- 09.40 Andry Vleeming:
Dynamic stability of the pelvis and spine: New insights in force closure and the consequences for rehabilitation
- 10.05 Steven Brown:
Abdominal wall muscle force generation and force transfer: capability and functionality
- 10.30 **Break**
- 11.00 Jaap van Dieën:
The interaction of active and passive tissue around the spine in segmental control of spinal posture
- 11.25 Hanne Albert:
Pain distribution in patients with sciatica from a single level disc contribution
- 11.40 Nili Steinberg:
Scoliosis as risk factor for LBP in young female dancers
- 11.55 Paul Marshall:
Hip muscle strength, endurance and co-activation as predictors of low back pain during prolonged standing
- 12.10 Discussion
- 12.30 **Lunch break**
- 13.30 Pelvic Girdle Pain: Diagnostics, Risk Factors and Motor Control**
Colleen Fitzgerald and Britt Stuge

This session will focus on diagnostics, risk factors and motor control in patients with pelvic girdle pain (PGP). PGP is a global problem affecting many people worldwide and is speculated in many cases to be a differential diagnosis of LBP. The diagnostic criteria and source of pain is debated, and no gold standard for examination exists. There is, however, evidence for different sub-groups of PGP.

Altered motor control patterns could potentially create a mechanism for PGP by abnormally loading pain sensitive pelvic structures. Motor control patterns in subjects with PGP have been examined in recent studies and patterns of bracing through the abdominal wall and the

chest wall have been associated with increased intra-abdominal pressure and depression of the pelvic floor. The anatomy and the function of the pelvic floor muscles are complex and there is a need to study the role of the pelvis floor in PGP.

An understanding of the pathogenesis is necessary when designing and studying treatment programs. Of importance is also an understanding of risk factors associated with PGP. Several risk factors for PGP have been suggested but so far the evidence has been weak. New studies have however examined potential risk factors such as clinical, hormonal and psychosocial aspects.

13.30 *Introduction:*

Colleen Fitzgerald:

13.35 Britt Stuge:

Where are we in the field of pelvic girdle pain?

14.00 Darren Beales:

Motor control patterns during an active straight leg raise in chronic pelvic girdle pain subjects

14.25 James Ashton Miller:

Anatomy of the pelvic floor and its relation with pelvic girdle motion and pain

14.50 Per Kristiansson:

Diagnostic Treatment in Posterior PGP

15.15 **Break**

15.45 Tina Suopauki:

Association between rotational movement control dysfunction of the pelvis in one leg stance, positive scoring in active straight leg raise test and tenderness in the dorsal sacroiliac ligament

16.00 Colleen Fitzgerald:

Pubic symphysis diagnostics: ultrasound and injections

16.15 Hilde Stendal Robinson:

Pelvic girdle pain: risk factors for development during pregnancy and sustained disability and pain intensity postpartum

16.30 Christina Olsson:

Determinants for lumbopelvic pain six months postpartum

16.45 Elisabeth Bjelland:

Early age at menarche and pelvic girdle pain in pregnancy: the impact of parity

17.00 Discussion

17.20 Closure of the Day

Wednesday November 10, 2010

07.30 Registration open

08.00 **Cognitive aspects of treatment of lumbopelvic pain: Thinking about thoughts.**
Paul Watson & Paul Hodges

Over the past decade and a half there has been an explosion of research into how cognitive factors, attitudes and beliefs can influence movement, response to therapy and the development of chronic incapacity in people with musculoskeletal conditions. Although many factors have been identified, in particular catastrophising (fearing the worst outcome), fear avoidance and depressed mood have been repeatedly demonstrated to influence outcome from back pain, there is less clear cut evidence that this knowledge has resulted in better treatments.

One of the problems with addressing such factors in therapy has been the development of reliable and brief assessment instruments which are practical and sufficiently sensitive for use in clinical practice. The holy grail of matching treatments to specific patients accurately still eludes us in this field as it does in the identification of physical predictors of response to treatment. A more recent complication to add to the mix has been the recent attention to the interaction between the attitudes and beliefs of the practitioner and how these might influence, the behaviour of the patient and the eventual outcome from treatments interventions. Do our attitudes and beliefs about the cause of back pain influence the treatment decisions we make and how do these reflect in patient improvement, or lack of it?

This session will identify some of the recent developments in the development of screening measures to discriminate those who need a more psychologically orientated approach to treatment from those who do not. It will also discuss how treatments might be targeted more effectively in those who show risk for poor outcome. This will be set in the context of the current evidence for cognitive behavioural approaches to the management of chronic low back pain. The attitudes and beliefs of the practitioner and how these influence behaviour and treatment decisions will also be presented.

08.00 *Introduction:* Paul Watson

08.05 Paul J Watson:
Psychosocial factors in low back pain disability. What is important?

08.30 Jonathan Hill:
Psychosocial screening to target LBP treatments

08.55 Raymond Ostelo:
How effective is cognitive behavioural therapy for low back pain?

09.20 Discussion

09.30 **“Evidence-based practice for low back pain: challenges”**

Moderators: Maurits van Tulder & Peter O Sullivan

During the last decades, many randomized controlled trials have been conducted and published on treatments for non-specific low back pain. The results of these trials have been summarized in a large number of systematic reviews. Recently, the evidence from trials and reviews has formed the basis for clinical practice guidelines on the management of low back pain that have been developed in various countries around the world.

The results of trials and reviews are often disappointing for clinicians, because effects, if any, of commonly used treatments are small. Classification of low back pain patients into more homogeneous subgroups is considered one of the greatest challenges to improve patient outcomes.

This session will focus on the latest developments with regard to subclassification of patients from different perspectives.

09.30 *Introduction:*

Maurits van Tulder

09.35 Maurits van Tulder:

Evidence based medicine for back pain: strength and challenges

10.00 Julie Fritz:

Identifying subgroups of patients within physiotherapy

10.25 **Break**

11.00 Jonathan Hill:

Identifying subgroups of patients within general practice

11.25 Wim Dankaerts:

Identifying subgroups of patients from a biomechanical perspective

11.50 Eric Parent:

Development of a preliminary prediction rule to identify patients
With low back pain responding to extension exercises

12.05 Eric Gozna:

Sub-classification of patients and prediction of success in workers with
Low back pain

12.25 Discussion

12.45 **Lunch Break**

13.45 **Effective Diagnosis & Treatment of CLBP**

Moderators Peter O'Sullivan & Maurits van Tulder

This session will review the latest evidence for the management of LBP disorders utilizing exercise interventions.

13.45 *Introduction:* Peter O'Sullivan:

Exercise and back pain - what type, how and for whom?

14.10 Kjartan Fersum:

Cognitive functional therapy in the management of NSCLBP

14.35 Barry Donaldson:

Physiotherapy exercise intervention for post discectomy patients

15.00 Lieven Danneels

The lumbar multifidus:
from anatomy to rehabilitation

15.25 **Break**

15.55 Tom Petersen:

The effect of the McKenzie method as compared with that of manipulation, when used adjunctive to information and advice for patients with clinical signs of disc-related persistent low back pain. A randomized controlled trial

16.10 Monica Unsgaard Tondel:

Specific or general exercises for chronic non-specific low back pain. A randomized controlled trial with one year follow up

16.25 Discussion

16.45 **Grand Rounds Session: Review of Day 1 & 2.**

Evidence in the clinical setting. Can the evidence change your practice?

Moderators Diane Lee & Mel Cusi.

17.30 **Closure**

Thursday 11th of November

07.30 Registration open

08.00 Connective tissue matters: The role of fascia in the generation and treatment of low back pain.

Moderators: Robert Schleip / Leon Chaitow

While muscular envelopes and related soft connective tissues (fasciae) escaped medical interest for several decades as the ‘Cinderella of orthopedic research’, recent developments revealed their surprising significance in human biomechanics and neurophysiology. Rather than dissecting ligaments, tendons, joint capsules, retinaculae and muscular envelopes as functionally separate entities, this session attempts to understand the dynamics of all muscular connective tissues, the tensional properties of which contribute to low back stability. These fascial structures are part of a body wide network system, which adapts its morphology to local loading & movement demands.

The load bearing function of lumbodorsal fasciae has been shown to be particularly important during lumbar flexion. Increasing evidence suggests that micro injuries and related inflammatory effects of these tissues may be a common factor involved in at least some cases of low back pain.

This raises important questions that impact directly on therapeutic choices: How are these fascial tissues innervated? What role do they play in healthy proprioception? And how does the central nervous system (and/or autonomic nervous system) regulate stiffness, water content and sensory sensitivity of those fascial structures?

Recent advances in ultrasound imaging and immuno-histochemistry have already been helpful in the examination of these questions. They also promise to shed new light on the benefits and limits of manual modalities and tool assisted therapies, which aim at altering fascial function. An evidence oriented review of such therapies will be attempted, including complementary as well as surgical approaches which focus on the treatment of fascial structures involved in low back stability and pain.

08.00 Introduction: Robert Schleip

08.05 Siegfried Mense:

The thoracolumbar fascia as a source of low back pain

08.30 Robert Schleip & Werner Klingler:

Tearing and micro injuries of lumbar fasciae as potential pain generators

08.55 Helene Langevin:

Ultrasound imaging of connective tissue pathology associated with chronic low back pain

09.20 Jean Claude Guimberteau:

Journey under the skin to the muscles, lumbar fasciae and structural architectures

09.45 Break

- 10.15 Jay Shah:
Ultrasound techniques reveal objective abnormalities of myofascial trigger points and surrounding connective tissue
- 09.40 Leon Chaitow:
Fascia directed therapies for the treatment of low back pain: review and new directions
- 11.05 Discussion

**11.30 Surgery Tribute session to Prof. Dr. Mooney:
A tribute to the life and work of Vert Mooney**

On October 13th of 2009, the field of orthopedics lost one of its most innovative contributors and the co-founder of this congress. For most, the pathway from beginning to end is unremarkable - yet for some it is more than remarkable. Vert Mooney's life was surely the latter. In his life as a scholar his consistent characteristic was his deep and abiding curiosity for life and its workings. His work ethic was astounding-more than 225 peer-review articles, and his keen understanding of the importance of bridge building permitted him to genuinely see differing points of view and bring about satisfactory compromise. His presence and intellect will surely be missed, but more importantly so will his compassionate and gentle spirit."

11.30 *Introduction:*
Bengt Sturesson

11.35 Ted Dreisinger:
Vert Mooney, the passing of a giant

11.50 Jeffrey Wang:
Lumbar segmental mobility according to the grade of the disc, the facet joint, the muscle, and the ligament pathology, by using kinetic magnetic resonance imaging

12.15 Bengt Sturesson:
New insights in diagnostics and treatment of pelvic girdle pain

12.40 **Lunch break**

13.45 Anthony T Yeung:
Innovative techniques: Endoscopic treatment of painful degenerative conditions of the lumbar spine

14.10 Charles April:
Provocation/ analgesic testing in the diagnosis of lumbar and pelvic pain

14.35 Discussion

15.00 **Break**

15.30 Parallel session 1

(Due to available space and the total number of participants, it could be necessary to change the program and create three parallel sessions running at the same time, on the Thursday afternoon and Friday morning. The version presented below is the first option of the program committee but could be changed. Please be so kind to check the final program available on line the month before the congress starts).

Location: Main Ball Room

Motor Control: what causes control to change in low back & Pelvic Pain?

Moderators: Paul Hodges & Paul Watson

15.30 Introduction
Paul Hodges

15.35 David MacDonald:
Behavior of the lumbar multifidus during lower limb movements in people with recurrent low back pain during symptom remission

15.45 Duncan Critchley:
The effect of Pilates and conventional exercise programs on transversus abdominis and obliquus internus: abdominis thickness measured with real-time ultrasound scanning: A pilot randomized trial

15.55 Fahad Algarni:
Differences in abdominal muscle site activation and coordination during walking in chronic low back pain

16.05 Kieran O'Sullivan:
Identifying a neutral lumbar spine sitting posture

16.15 Nienke Willigenburg:
Precision control of trunk posture

16.25 Paul Marshall:
Acute effects of labile surfaces and bracing during core stability exercises in individuals with and without low back pain

16.35 Rafael Zambelli Pinto:
The effect of lumbar posture on transversus muscle recruitment during the abdominal draw-in maneuver

16.45 Veerle Stevens:
Electromyographic activity of trunk and hip muscles during abdominal exercises useful for physical assessment

16.55 Yun-Ju Lee:
Trunk stiffness around the longitudinal axis is increased to counteract unpredictable perturbations

17.05 Liba Sheeran:

Differences in a neutral-spine-posture task during sitting and standing in nonspecific chronic low back pain disorders when patients are subclassified

17.15 Martin Eriksson Crommert:

Transversus abdominus activation changes with postural demand and trunk moment

17.25 Discussion

17.45 **Closure**

15.30 Parallel session II

Location Room 2

Pelvic Girdle Pain: Diagnostics, Risk Factors and Motor Control

Moderators: Colleen Fitzgerald & Britt Stuge

15.30 Introduction Britt Stuge

15.35 Hans van der Wall, Mel Cusi:

SPECT-CT on patients with a clinical diagnosis of failure of load transfer of the SIJ

15.45 Thomas Torstensson:

Referred pain patterns released from ligamentous and bony structures of the pelvis among women with and without pelvic girdle pain

15.55 Anne Lindgren: Increased physical function after locally administered corticosteroid to the ischiadic spine. A randomized double blind controlled trial on women with persistent pregnancy-related pelvic girdle pain

16.05 Melanie Bussey:

The effect of ankylosing spondylitis on sacroiliac joint movement patterns

16.15 Patricia Fonstad:

Hip labral tears as a co-morbidity of low back and pelvic girdle pain following motor vehicle collisions: A case series

16.25 Afsaneh Azari:

Correlation of digital palpation and transabdominal ultrasound for assessment of pelvic floor muscle contraction

16.35 Mohammed Reza Nourbakhsh:

The relationship between hamstring length and gluteal muscle strength in individuals with SIJ dysfunction

16.45 Clayton Skaggs:

A multi-modal chiropractic intervention decreased pain and disability during pregnancy

16.55 Signe Nilsen Stafne:

Does exercise in pregnancy increase lumbopelvic pain?

17.05 Marit Horst Eggen:

Can tailored exercises in pregnancy prevent low back and pelvic girdle pain?

17.15 Stefan Malmqvist:

The cumulative prevalence of low back and pelvic girdle pain during pregnancy in western Norway

17.25 Jan Mens

The use of ultrasound imaging to check motor control in patients with PGP

17.35 Discussion

17.50 **Closure**

Friday 12th November

07.30 Registration open

Main ball room

Parallel session III

Current surgical challenges in the lumbo pelvic spine spine

Moderators: Bengt Stuesson & Jeff Wang

08.00 Bruce Mitchell

Sacroiliac joint pain- diagnostic control blocks and radiofrequency neurotomy

08.10 Mark Reiley

Simplifying sacroiliac joint arthrodesis using MIS fusion implants

08.20 Thomas Johan Kibsgaard

Surgery for pelvic girdle pain? Effectiveness studied as a single subject design

08.30 John Stark

Fusion of the sacroiliac joint: new technique and functional outcome

08.40 Bo Nyström (double lecture):

Anterior arthrodesis of the sacro-iliac joint and:

Sacro-iliac joint arthrodesis in patients with chronic pelvic pain and unspecific sciatica

09.05 Gaetano Scuderi

Functional outcome after lumbar epidural steroid injection is predicted by a novel complex of fibronectin and aggrecan

09.15 Discussion

09.30 **Break**

10.00 Parallel session IV.

Movement Stability and Lumbopelvic Pain: Clinical Anatomy and Biomechanics

Moderators: Andry Vleeming & Jaap van Dieen

10.00 Jani Takatalo:

Relationship of modic changes, Schmorl's nodes, spondylolisthesis/-lysis, high intensity zone (HIZ) lesions, disc herniations, and radial tears with low back symptom severity among young Finnish adults

- 10.10 Janan Abbas:
Degenerative lumbar spinal stenosis: Is it relevant to spine configuration?
- 10.20 Mohammed Taghipour-Darzi:
Construct validity of vertebral translation and rotation in differentiation of patients with signs and symptoms of lumbar segmental instability
- 10.30 Paolo Tozzi:
Evidence-based correlation between low back pain and reduction of renal mobility, assessed by Dynamic Ultrasound Topographic Anatomy Evaluation (D.U.S.T.A.-E.): local kidney manipulation improves kidney mobility and decreases pain perception
- 10.40 Rakesh Kumar:
The effect of lumbar stabilization exercises on cross sectional area of the multifidus muscle in chronic low back pain
- 10.50 Roberto Meroni:
Side bending movement patterns in two different populations, a novel model for trunk motion analysis
- 11.00 Shannon Hoffman:
Sex differences in the pattern of lumbopelvic and hip medial rotation movement in people with chronic low back pain
- 11.10 Thomas Maribo:
Postural stability in chronic low back pain patients: Validity of one leg stand test
- 11.20 Danny Nou:
Spatially resolved NIRS and EMG measurements of the lower back muscles to determine fatigue: Application to measure the effectiveness of back support devices
- 11.30 Adjo Zorn:
Walking with elastic fascia: saving energy by maintaining balance
- 11.40 Discussion
- 12.00 **Break**

08.00 **Friday 12th of November**

Room 2

Parallel session V

Evidenced based practice and sub-grouping I

Moderators: Peter O'Sullivan and Maurits van Tulder

08.00 *Introduction:* Peter O'Sullivan

- 08.00 John Carlson:
Quantification, effectiveness and sustainability of a high intensity isolated muscular strength therapy protocol on patients with chronic low back pain
- 08.10 Lisa Oestergaard:
The effect of early rehabilitation for lumbar spinal fusion patients
- 08.20 Meredith Perry:
Are people with chronic low back pain less active than people with acute low back pain?
- 08.30 Ottar Vasseljen: double lecture
Does onset in abdominal muscles change after specific or general exercise?
A randomized controlled study of subjects with chronic non specific low back pain
- 08.45 Sandra Curwin:
The effects of a group exercise and education program on physical function and health status in Canadian armed forces personnel with chronic low back pain
- 08.55 Discussion
- 09.10 **Evidenced based practice and sub-grouping II**
Moderators: Maurits van Tulder and Peter O' Sullivan
Introduction Maurits van Tulder
- 09.10 Jaana Suni:
Predictive validity of health-related fitness tests for future low back pain and functioning – a prospective study among working-aged population
- 09.20 Lone Donbaek Jensen
Positive results from a randomized controlled intervention study of vocational prognosis among low back patients. A low cost concept based on perceived concrete work place barriers and a simple scheme of physical activity
- 09.30 **Break**
- 10.00 Maria Larsson:
The management of musculoskeletal pain-whose responsibility?
- 10.10 Mariette Fourie:
Therapeutic education as an adjunct to exercise therapy in chronic pain patients
- 10.20 Markus Melloh
Predictors of chronic low back pain – What health practitioners should pay attention to
- 10.30 Mieke Dolphens
Classification of the pre-adolescent sagittal postural alignment in standing
- 10.40 Philip C. Gabel

A new full-spine outcome measure, the Spine Functional Index, demonstrates clinimetric properties and practicality that improve the Oswestry and Roland Morris Disability Questionnaires and the Functional Rating Index

- 10.50 Sayed Javad Mousavi:
The Burden of low back pain in Iran: A growing need to adapt and implement evidence-based practice in developing countries
- 11.00 Sylvia Henriques:
Back School: pain and functional performance of chronic back pain
- 11.10 Sean Gibbons (double lecture):
The development, reliability and construct validity of a motor control abilities Questionnaire, and:
Primitive reflex inhibition and sensory motor training improves cognitive learning function and outcomes in chronic disabling low back pain
- 11.25 Liba Sheeran:
The effect of classification-guided postural motor learning intervention and conventional physiotherapy posture advice, in non specific chronic low back pain patients with specific types of motor control impairments
- 11.35 Roseline d'Hooge:
Trunk muscle dysfunction during trunk extension in recurrent low back pain- evaluation with functional MRI
- 11.45 Discussion
- 12.00 **Lunch break**
- 13.00 **Plenary session main ball room**
Sports and Exercise Medicine
Low back pain in sport: all that glitters is not gold
Moderators: Mel Cusi and Diane Lee

The benefits of sport and exercise on general health are well documented. There is however an increased risk of injury with every episode of strenuous exercise, but the risks are generally outweighed by the benefits.

In the context of sporting competition, both at recreational and elite levels, low back pain accounts for 15-20% of all injuries across a variety of popular team sports.

As professionals involved in the prescription of exercise for therapeutic, well being and fitness purposes, it is necessary to be aware of the importance of the lumbo-pelvic region functional requirements to transfer load safely and effectively. In a sports team or occupational setting the prevention of injuries depends initially on epidemiological data and analysis of the possible causes of a particular type of injury. Only then specific strategies can be trialed for effectiveness.

This session will open with a provocative address by one of our invited speakers -Craig Liebenson- who will look into the dangers and pitfalls of indiscriminate exercise and training.

This will be followed by John Mayer, who worked with Vert Mooney in his last scientific study, on strength parameters of a professional group -firefighters- that requires both aerobic fitness and strength to ensure well being in a physically challenging work environment. The involvement of the hip joint in lumbo-pelvic patients has not had the profile it deserves. Heidi Prather's studies on hip range of motion in female soccer players will provide interesting data for a lively discussion; is the hip involvement important in all players, or only females are affected? Finally, Trish Wisbey-Roth, an experienced Australian sports physiotherapist will look at the integrated approach to the rehabilitation of injured athletes/patients with lumbo-pelvic dysfunction to normalize daily activities and eventually peak athletic performance.

13.00 *Introduction:* Mel Cusi

13.05 Craig Liebenson:
"The sacred cows of exercise"

13.25 John Mayer:
Back muscle strength, endurance, and flexibility characteristics of firefighters

13.45 Heidi Prather
The better you are, the greater the risk: Hip findings in female soccer players vary with level of experience

14.05 Trish Wisbey-Roth:
Retraining the virtual body: dynamic stability vs. stiffness

14.25 Discussion

14.45 **Break**

15.15 **Motor Control: Can motor control be rehabilitated.**
Moderators: Paul Hodges & Paul Watson

This session will provide a state-of-the-art view of spine control and its relationship to low back pain. Spine control is complex and involves consideration of a range of elements from sensation to strategies of muscle control. Many opinions on spinal control are developing around the world and there is increasing confusion, particularly amongst the clinical professions, regarding how different models diverge and converge. This confusion has the potential to compromise the development and application of such theories to the management of patients with spinal pain. A summit meeting was held in Australia (hosted by CCRE SPINE) to bring together world leaders in the field to discuss the complexity of the problem and the differing opinions. This session includes five experts from that meeting and will provide a summary of critical issues in the understanding of spine control and its relevance for low back pain. This session will identify the common themes amongst the different models of spinal control, discuss the areas of divergence of opinion, and the relevance of these for rehabilitation of low back pain.

15.15 *Introduction:* Paul Hodges

15.20 Simon Brumagne:

The complexity of sensory function in spinal control and low back pain

15.45 Jacek Cholewicki :

What models are needed to understand spine control?

16.10 Paul Hodges:

Strategies for motor control of the spine and changes in pain: the deep vs. superficial muscle debate

16.35 Jaap van Dieen :

Are motor control changes a cause or effect of low back pain

17.00 Linda van Dillen:

Subgrouping in back pain management

17.25 Discussion

1745. Congress Closure by Colleen Fitzgerald