INTERNATIONAL SPINE & PAIN INSTITUTE

January 2009

2009 Clinical Solutions Course Calendar

Don’t miss out on these exciting courses for 2009

CEUs  DATE  COURSE TITLE  PRESENTER/S
5  21 Feb Sat  PTA  Ethics= 5 CEUs compulsory  Dr Lucille Butow Dutot BSc PT, MSc PT, PhD, Dip TerEd, CertMedLaw
8  27 Feb Fri  19:00 – 21:00 01 March Sun  13:00-17:00  Advanced Dry Needling  Dr Dimitrios Kostopoulos, PT, PhD, DSc Internationally Renowned Presenter USA
13  28 Feb & 1 March Sat/Sun  Intensive Training on Myofascial Trigger Point and Proprioceptive Training PT-1  Dr Dimitrios Kostopoulos, PT, PhD, DSc Internationally Renowned Presenter USA
14  8/9 March Sun/Mon  Marketing Strategies for Private Practice  Dr Dimitrios Kostopoulos, PT, PhD, DSc Internationally Renowned Presenter USA
3  12 March Thurs  Neuropathic Pain Fibromyalgia- Evening Lecture  Prof. H Meyer
16  13/14 March Fri/Sat JHB  The Shoulder – Challenging Aspects of Assessment and Rehabilitation  Dr Jeremy Lewis PhD Internationally Renowned Presenter-UK World Expert in Shoulder Rehabilitation
7  28 March Sat  New Perspectives on The Management and Prevention of Low Back Pain  Annelie Basson Mphys T Research and Lynne Reyers Dip PT
7  4 April Sat  Pharmacology of Drugs used for Musculoskeletal Disorders  Dr George Muntingh B Pharm, PhD
7  18 April Sat  Whiplash Associated Disorders  Lorraine Jacobs MSc PT, MBA
17  10 May Sun  XLR8-Bronze www.xlr8-international.com  Dr Elsie Jordaan BA, MA, PhD Sports Science and Waldo van Heerden BA Bk Speed Power Sports International
15  16 May Sat & 23 May Sat One course  Management of Patellofemoral Pain Sporting and Non-sporting Population  Arie Michaeli MSc PT & Jo-Dee Pryce BEd, BSc PT
12  29/30 May Fri/Sat  Joint Mobilisation with Active Movement  Dr Ina Diener PhD PT
16  Fri/Sat 19/20 June –JHB or 6/7 Nov Fri/Sat-PTA  Active Isolated Stretching for Orthopedics and Sports conditions  Hans de Wit Sport Scientist & Arie Michaeli MSc PT
7  5 July Sun  Pilates Exercises for the Upper Quarter  Theo van der Riet BEd, International BASI Pilates Instructor & Trainer
16  15/16 Aug Sat/Sun  Spinal Manipulation  Adriaan Louw MApp.Sc(Physio) GCRM (Aust) CSMT-Inter, Presenter-USA
8  29 Aug Sat  Sports Injuries of the Lower Quarter – From Research to Clinical Practice  Sam Nupen BSc, PT
2  09 Sep Wed  Cyclists Specific style approach to injuries assessment and rehabilitation  Dr Philda de Jager Sports Physician
16  3/4 Oct Sat/Sun  Ultimate Taping Techniques-McConnell, Sports & Kinesio Approaches  Arie Michaeli MSc PT & Clare Anne Kilroe BSc PT & Evan Speechly BSc PT
17  18 Oct Sun  XLR8-Silver www.xlr8-international.com  Dr Elsie Jordaan BA, MA, PhD Sports Science and Waldo van Heerden BA Bk Speed Power Sports International
5  22 Oct Thurs Evening Workshop  Headaches and Upper Cervical Spine  Toby Hall MSc PT Internationally Renowned Presenter Australia His 6th successful tour to SA
16  23/24 Oct Fri/ Sat  Neural Tissue Pain Disorders  Toby Hall MSc PT Internationally Renowned Presenter Australia His 6th successful tour to S.A
12  13/14 Nov Fri/Sat  Sacro-iliac Joint Dysfunction  Dr Ina Diener PhD PT

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In patients with non-specific arm pain (NSAP; also known as repetitive strain injury), there are clinical signs of altered median nerve sliding. It is possible that a restriction along the nerve course will lead to abnormal increases in local strain during limb movements, possibly contributing to symptoms. The present study uses ultrasound imaging to examine median nerve sliding through the proximal and distal nerve segments in 18 NSAP patients. Longitudinal nerve sliding was measured during metacarpophalangeal, wrist and elbow movements. During elbow movements, the angle of elbow extension at which the nerve begins to move was determined, since this was expected to decrease with a restriction through the shoulder. The results from this study were compared with previously reported data. Nerve movements ranged from 1.26 to 4.73 mm in patients compared with 1.43–5.57 mm in controls. There was no significant difference in nerve sliding ($p>0.05$) or in the angle of elbow extension at which the nerve began to move (mean=53.4° in patients, 52.0° in controls; $p>0.05$). In summary, restriction of median nerve sliding is unlikely to play a major role in NSAP. Therefore, painful responses during limb movements which tension the nerve are unlikely to result from abnormal increases in nerve sliding.

The influence of age, gender, lifestyle factors and sub-clinical neck pain on the cervical flexion–rotation test and cervical range of motion

The flexion–rotation test (FRT) is commonly used when assessing cervicogenic headache. Additionally, active range of motion (AROM) is frequently used to evaluate impairment in neck pain. No studies have investigated the interaction of the FRT and AROM with age, gender, pain and lifestyle factors. The purpose of this study was to determine the influence of these factors on the FRT and cervical AROM. A group of 66 participants (aged 20–78) were studied, 28 experienced sub-clinical neck pain (recurrent neck pain or discomfort which has not received treatment from a healthcare professional) while 38 did not. Age, gender, lifestyle factors and sub-clinical neck pain were assessed using a questionnaire. Measurement of AROM was performed by two examiners blind to the results of the questionnaire. Multiple linear regression analysis found that 59% of the variance in the FRT was explained by the presence of sub-clinical pain and cervical lateral flexion measures. Secondly, 58–72% of the variance in active cervical ROM measures was influenced by factors including the FRT, gender and movements of the neck in other planes. This study found that lifestyle factors do not influence the cervical FRT and AROM.

The Pathogenesis of Adolescent Idiopathic Scoliosis: Review of the Literature

The pathogenesis of AIS, a condition exclusive to humans, has been the subject of many studies. Over the years, practically every structure of the body has been mentioned in the pathogenesis of AIS; however, the cause of this spinal deformity remains little understood. The pathogenesis of this condition is termed multifactorial.

Methods: PubMed and Google Scholar electronic databases were searched focused on parameters concerning the pathogenesis of adolescent idiopathic scoliosis. The search was limited to the English language.

Results: No single causative factor for the development of idiopathic scoliosis has been identified, it is thus termed multifactorial. AIS is a complex genetic disorder. The fully erect posture, which is unique to humans, seems to be a prerequisite for the development of AIS.

Conclusion: Although any or all of the mentioned factors in this review may play a certain role in the initiation and progression of AIS at a certain stage, the presented material suggests that in the observed deformation, genetics, and the unique mechanics of the fully upright human spine play a decisive role.
Measuring the posteroanterior stiffness of the cervical spine

Manual Therapy; 13 (6); December 2008; 520-528

An essential part of improving manual therapy treatment for cervical spine disorders is the identification of the mechanical effects of manual techniques. The aims of this research were to develop a reliable and safe instrument for measuring cervical spine stiffness, and to document stiffness in a group of asymptomatic individuals.

A device for measuring cervical spine stiffness was designed and tested. The stiffness of the cervical spine of 67 asymptomatic individuals was measured at C2 and C7 on one or more occasions. Stiffness was defined as the slope of the linear region of the force–displacement curve (coefficient $K$). For C2, the linear region of the force–displacement curve was from 7 to 40 N, and for C7, 20–70 N. The mean stiffness (coefficient $K$) on the first measurement occasion at C2 was 4.58 N/mm, and at C7 was 7.03 N/mm. ICC (2,1) for repeated measurements was 0.84 (95% CI 0.74–0.90).

Stiffness measurements in the cervical spine were generally lower than those previously reported for the lumbar spine. Age was positively associated with C2 stiffness ($p=0.01$). Males were stiffer at C7 than females ($p<0.001$). This research provides a basis for future studies investigating the effects of manual techniques on cervical spine stiffness, potentially leading to improved outcomes for patients treated by manual therapy.

Training the cervical muscles with prescribed motor tasks does not change muscle activation during a functional activity

Manual Therapy; 13 (6); December 2008; 507-512

Both low-load and high-load training of the cervical muscles have been shown to reduce neck pain and change parameters of muscle function directly related to the exercise performed. The purpose of this study was to investigate whether either training regime changes muscle activation during a functional task which is known to be affected in people with neck pain and is not directly related to either exercise protocol. Fifty-eight female patients with chronic neck pain were randomised into one of two 6-week exercise intervention groups: an endurance-strength training regime for the cervical flexor muscles or low-load training of the cranio-cervical flexor muscles. The primary outcome was a change in electromyographic (EMG) amplitude of the sternocleidomastoid (SCM) muscle during a functional, repetitive upper limb task.

At the 7th week follow-up assessment both intervention groups demonstrated a reduction in their average intensity of pain ($P<0.05$). However, neither training group demonstrated a change in SCM EMG amplitude during the functional task ($P>0.05$). The results demonstrate that training the cervical muscles with a prescribed motor task may not automatically result in improved muscle activation during a functional activity, despite a reduction in neck pain.

Age- and Pathology-Specific Measures of Disc Degeneration

Spine; 1 December 2008 - Volume 33 - Issue 25 - pp 2781-2788

Knowledge of the etiopathogenesis of disc degeneration and pathology is fundamental to advancements in common spinal disorders. The quality of measures of disc degeneration is currently limited progress in this area.

**Methods:** Subjects were 519 twins, 35 to 70 years old, from a population-based cohort. Lumbar structures were traced and image software measured selected disc areas and T2 signal parameters of sagittal and axial images of lumbar spine with 1.5 Tesla MRI scanners. All signal measures were adjusted by adjacent cerebrospinal fluid signal. The mean adjusted disc signal, its standard deviation, and an irregularity measure were used to estimate the overall desiccation stage and signal variation across the disc. Associations with risk factors were examined to support or refute measurement validity.

**Results:** The signal-based measures introduced were highly reproducible. Age explained more of the signal-based disc measures than did the qualitative measures of disc degeneration in common use in L1-L4 discs, supporting the validity of the new measures. The signal-based measures were also more highly associated with physical loading and familial aggregation, further supporting their validity. Age and physical loading had higher associations with the sagittal than the axial measures and with upper rather than lower lumbar discs. Adjustment of signal-based measures by cerebrospinal fluid is critical and increased the associations between age and the measures by 2- to 10-fold.

**Conclusion:** The new signal-based measures show promise in their potential to better capture and perhaps distinguish aspects of disc degeneration than current assessment methods using standard MRI. Their use may enhance research on potential determinants of disc degeneration.

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Changed muscle recruitment in patients has an important impact on the etiology and recurrence of low back pain. The mechanisms of these changes in muscle activity are still poorly understood. An experimental study investigating the cause-effect relationship of muscle pain on muscle recruitment patterns can help to clarify these mechanisms.

**Methods:** In 15 healthy subjects, the muscle activity of the lumbar multifidus, lumbar erector spinae, and psoas muscles was investigated with muscle functional magnetic resonance imaging. Measurements at rest and after trunk extension exercise at 40% of repetition maximum were performed without and with induced pain.

**Results:** The lumbar multifidus and lumbar erector spinae were significantly active during the trunk extension exercise, whereas the psoas showed no significant activity. The activity of the lumbar multifidus, lumbar erector spinae, and psoas muscles, was reduced bilaterally and multilevel during the exercise with unilateral low back muscle pain.

**Conclusion:** These data demonstrate that unilateral muscle pain can cause hypoactivity of muscles during trunk extension at 40% of the repetition maximum. The changes were not limited to the side and level of pain. Moreover, the inhibition was not limited to the multifidus muscle; also the lumbar erector spinae and psoas muscles showed decreased activity during the pain condition. Further research has to assess possible compensation mechanisms for this reduced activity in other muscles.

The few and limited studies of disc have largely been part of biochemical studies having a major focus on disc nutrition. Excluding the cartilage end plate, the density of healthy cells in the disc is much lower than that of most body tissues.

**Method:** The nucleus zone and 18 annulus zones were demarcated by inking the coverslips of hematoxylin-eosin-stained 5-µm thick sagittal sections of the L4-L5 disc. In each of the 19 zones, the healthy disc cells were enumerated in 10 randomly selected nonoverlapping high-power microscope fields.

**Results:** Assessment of the spatial cellularity in a disc divided into 7 parasagittal sections showed that the average density in the posterior annulus was significantly greater than that in the anterior annulus; the average density in the right half of the disc, including the nucleus, was significantly higher than that in the left and lowest in the left anterior quadrant. Studies of midsagittal sections from the spines of 10 men and 10 women, aged 13 to 78 years, showed that nuclear cellularity declined progressively throughout life, whereas that of the annulus ceased to decline after the age of 50 years. Some tears were associated with low cellularity close to the tear but not elsewhere, whereas extensive end-plate separations showed global reductions in cellularity.

**Conclusion:** Disc cellularity declines as age advances and is reduced in the vicinity of major tears. Extensive end-plate abnormalities reduce cellularity by impeding disc nutrition.
Although randomized trials have demonstrated small short-term differences in favor of surgery, long-term outcomes comparing surgical to nonoperative treatment remain controversial.

Methods: Surgical candidates with imaging-confirmed lumbar intervertebral disc herniation meeting SPORT eligibility criteria enrolled into prospective, randomized (501 participants), and observational cohorts (743 participants) at 13 spine clinics in 11 US states. Interventions were standard open discectomy versus usual nonoperative care. Main outcome measures were changes from baseline in the SF-36 Bodily Pain (BP) and Physical Function (PF) scales and the modified Oswestry Disability Index assessed at 6 weeks, 3 months, 6 months, and annually thereafter.

Results: Nonadherence to treatment assignment caused the intent-to-treat analyses to underestimate the treatment effects. In the 4-year combined as-treated analysis, those receiving surgery demonstrated significantly greater improvement in all the primary outcome measures. The percent working was similar between the surgery and nonoperative groups, 84.4% versus 78.4% respectively.

Conclusion: In a combined as-treated analysis at 4 years, patients who underwent surgery for a lumbar disc herniation achieved greater improvement than nonoperatively treated patients in all primary and secondary outcomes except work status.

Identification of early predictors of prolonged disability after back injury could increase understanding concerning the development of chronic, disabling pain, and aid in secondary prevention. Few studies have examined predictors across multiple domains in a large, population-based sample.

Methods: Workers (N = 1885) were interviewed 3 weeks (average) after submitting a lost work-time claim for a back injury. Sociodemographic, employment-related, pain and function, clinical, health care, administrative/legal, health behavior, and psychological domain variables were assessed via worker interviews, medical records, and administrative databases. Logistic regression analyses identified early predictors of work disability compensation 1 year after claim submission.

Results: Significant baseline predictors of 1-year work disability in the final multidomain model were injury severity (rated from medical records), specialty of the first health care provider seen for the injury (obtained from administrative data), and worker-reported physical disability (Roland-Morris disability questionnaire), number of pain sites, very hectic job, no offer of a job accommodation (e.g., light duty), and previous injury involving a month or more off work. The model showed excellent ability to discriminate between workers who were/were not disabled at 1 year.

Conclusion: Among workers with new lost work-time back injury claims, risk factors for chronic disability include radiculopathy, substantial functional disability, and to a lesser extent, more widespread pain and previous injury with extended time off work. The roles of employers and health care providers also seem important, supporting the need to incorporate factors external to the worker in models of the development of chronic disability and in disability prevention efforts.

By using global measures like EQ-5D and SF-36 for the determination of the utility, the changes in quality of life, quality of life (QoL) after an intervention different diagnoses, and treatments can be compared. Total hip replacement (THR) has become almost golden standard in this respect.

Methods: Seven hundred seventy-seven subjects with different common orthopaedic diagnoses scheduled for elective surgery were just before surgery and 1 year after surgery answering both EQ-5D and SF-36. Four groups with different spine diagnoses and procedures were formed and compared with 8 other diagnoses and treatment groups.

Results: Before surgery, subjects with spine diagnoses reported the lowest QoL of all diagnoses compared. Surgery for spinal stenosis, spondylolisthesis, and instability meant the largest improvement of all surgical interventions. Surgery for NHP gave a moderately good improvement, whereas surgery for CLBP only marginally improved those operated. Particularly THR but also TKR more or less completely normalized QoL but made it from a relatively high preoperative level. The greatest improvements after spine surgery, other surgical procedures, and different diagnoses were in the pain/discomfort domain.

Conclusion: Spinal surgery in spinal stenosis, spondylolisthesis, and instability had in comparison to other types of elective orthopaedic surgery an outstanding better ability to improve the operated subject's health-related quality of life than other types of elective orthopaedic surgery. The utility of HNP surgery was somewhat lower and was rather marginal for those operated for nonspecific CLBP.
Physiotherapeutic management of lumbar disorders often utilises specific segmental joint mobilisation techniques; however, there is only limited evidence of any neurophysiological effects and much of this has focused on the cervical spine and upper limbs. This study aims to extend the knowledge base underpinning the use of a unilaterally applied lumbar spinal mobilisation technique by exploring its effects on the peripheral sympathetic nervous system (SNS) of the lower limbs. Using a double blind, placebo controlled, independent groups study design and based upon power calculations, 45 normal naïve healthy males were randomly assigned to one of three experimental groups (control, placebo or treatment; a unilaterally applied postero-anterior mobilisation to the left L4/5 zygapophyseal joint). SNS activity was determined by recording skin conductance (SC) obtained from lower limb electrodes connected to a BioPac unit. Validation of the placebo technique was performed by post-intervention questionnaire.

Results indicated that there was a significant change in SC from baseline levels (13.5%) that was specific to the side treated for the treatment group during the intervention period (compared to placebo and control conditions). This study provides preliminary evidence that a unilaterally applied postero-anterior mobilisation technique performed, at a rate of 2 Hz, to the left L4/5 lumbar zygapophyseal joint results in side-specific peripheral SNS changes in the lower limbs.

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### 2009 Dry Needling Courses with Dr Chris Yelverton

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<td>8</td>
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<td>Cervical Spine Shoulder and Scapular Region</td>
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<td>8</td>
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### Clinical Series—Challenging Patients with Experienced Clinicians

Clinical Presentations to improve your clinical skills

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<td>21 March Sat 9:30– 12:00</td>
<td>New Trends in the management of Patellofemoral Pain—a patient presentation</td>
<td>Arie Michaeli Msc PT</td>
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<td>2</td>
<td>2 June Tues 17:30–20:30</td>
<td>Non-specific LBP—the balance between holistic/specIFIC approaches</td>
<td>Helen David BSc PT</td>
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<td>2</td>
<td>6 Aug Thurs 17:30–20:30</td>
<td>Chronic neck pain, Pain in the neck?</td>
<td>Dr Linda Steyn PhD, PT</td>
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<td>2</td>
<td>15 Oct Thurs 17:30–20:30</td>
<td>Clinical reasoning and diagnostic challenges of patients presenting with referred pain to the Shoulder</td>
<td>Joanne Sklaar MSc PT</td>
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**Course Fee Includes**

Delicious lunch, teas, comprehensive course notes, certificates and accreditation on the day of the Course.

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**Important Information**

### Clinical presentations free of charge

Attend any of Dr D Kostopoulos’ courses and qualify to participate in any one patients presentation of the Clinical Series or any one evening lecture, free of charge (save up to R 400 per course!)

### Fees and Deposits

Early Bird 2 months prior to a course. 50% Deposit to secure your place. The first four courses with International presenters have their own individual early bird fees.

### Venues

**JHB:** Camelot International, Houghton.

**PTA:** University of Pretoria, Medical School.

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May good health, good luck and happiness be your constant companion throughout 2009.