

## Research Abstracts From the *Journal of Manipulative and Physiological Therapeutics*

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*Editor's note:* The first three featured abstracts come from 2009 World Federation of Chiropractic (WFC) award-winning papers.

Association Between Low Back Pain and Osteoarthritis of the Hip and Knee

*Maja Stupar, DC, Pierre Côté, DC, PhD, Melissa French, MSc, and Gillian Hawker, MD, MSc*

**Objective:** The purpose of this study was to determine whether prevalent self-reported back pain predicts future osteoarthritis-related pain and disability in individuals with hip and knee osteoarthritis (OA).

**Methods:** We studied a population-based cohort of Ontario residents who were 55 years of age or older and reported symptomatic hip/knee OA at baseline (between 1996 and 1998). The sample was followed-up between 2000 and 2001. We used multivariable linear regression to model the association between baseline back pain and pain and disability (Western Ontario and McMaster Universities Osteoarthritis Index scores) at follow-up while controlling for confounders.

**Results:** Of the 983 participants, 58% of the cohort reported low back pain at baseline. Baseline low back pain predicted higher hip and/or knee OA-related pain and disability at follow-up ( $\beta = 2.49$ ; 95% confidence interval [CI], 0.4-4.6;  $P = .023$ ). However, this association varied with the location of OA. After controlling for confounders, the association was strong for individuals with hip OA ( $\beta = 11.41$ ; 95% CI, 5.1-17.7;  $P = .001$ ). However, low back pain was not associated with pain and disability in individuals with knee OA ( $\beta = 0$ ; 95% CI 3.39 to 3.39;  $P = .998$ ).

**Conclusions:** In a cohort of individuals with OA of the hip or knee, we found that low back pain predicted subsequent OA-related pain and disability in those with hip disease, but not knee disease. Our study provides valuable prognostic information to clinicians involved in the management of patients with OA of the hip and knee.

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Cervicogenic Headaches: Physical Examination and Self-Reported Pain Outcomes

*Darcy Vavrek, ND, MS, Mitchell Haas, DC, MA, and Dave Peterson, DC*

**Objective:** Objective clinical measures for use as surrogate markers of cervicogenic headache (CGH) pain have not been established. In this analysis, we investigate relationships between objective physical examination (PE) measures with self-reported CGH outcomes.

**Methods:** This is an exploratory analysis of data generated by attention control PE from an open-label randomized clinical trial. Of 80 subjects, 40 were randomized to eight treatments (spinal manipulative therapy or light massage control) and eight PE over eight weeks. The remaining subjects received no PE. Physical examination included motion palpation of the cervical and upper thoracic regions, active cervical range of motion (ROM) and associated pain, and algometric pain threshold evaluated over articular pillars. Self-reported outcomes included CGH and neck pain and disability, number of CGH headaches, and related disability days. Associations between PE and self-reported outcomes were evaluated using generalized linear models, adjusting for sociodemographic differences and study group.

**Results:** At baseline, number of CGH and disability days were strongly associated with cervical active ROM ( $P < .001$  to  $.037$ ). Neck pain and disability were strongly associated with ROM-elicited pain ( $P < .001$  to  $.035$ ) but not later in the study. After the final treatment, pain thresholds were strongly associated with week 12 neck pain and disability and CGH disability and disability days ( $P \leq .001$  to  $.048$ ).

**Conclusions:** Cervical ROM was most associated with the baseline headache experience. However, four weeks after treatment, algometric pain thresholds were most associated. No one PE measure remained associated with the self-reported headache outcomes over time.

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## Spinal Motor Neuronal Degeneration After Knee Joint Immobilization

*Xiaohua He, MD, MS, and Veronica Dishman, PhD*

**Objective:** This study used a unilateral knee joint immobilization model in adult guinea pigs to test the hypothesis that retrograde degeneration of motor neurons in the spinal cord is the result of attenuation of knee joint activities.

**Methods:** A total of 32 adult guinea pigs were used and divided into eight groups based on the duration of knee joint immobilization. Light microscopic studies of Nissl, nitric oxide synthase immunohistochemistry, horseradish peroxidase, and fast blue were carried out to examine the neurons in the spinal cord. Electron microscopy was also performed to examine the neurons and axons.

**Results:** After various periods of knee joint immobilization, a variety of features of motor neuronal degeneration were observed. Specific characteristics included gradual increases in the expressions of neuronal nitric oxide synthase and ultrastructural changes in affected motor neurons including reduction of cell organelles, indentation of the nuclear envelope, and small compact clumps of chromatin in the nuclei. Observation of the peripheral nerve (femoral nerve) also revealed demyelination alterations in some axons innervating the muscles of the knee joint. Interestingly, motor neuronal degenerative changes and demyelination were reversible after the knee joint immobilization was removed and knee joint activity was restored. These findings may assist in further development of models for spinal dysfunction such as the chiropractic subluxation complex.

Conclusion: We conclude that motor neuronal degeneration in the spinal cord and axons in this study was the result of knee joint immobilization. Increases in motor neuronal nitric oxide-mediated oxidative stress level after reduction of target tissue activity may contribute to the mechanism for degenerative changes in the motor neurons in adult spinal cord of the guinea pig.

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### Chronic Shoulder Pain of Myofascial Origin: Randomized Trial Using Ischemic Compression

*Guy Hains, DC, Martin Descarreaux, DC, PhD, Francois Hains, DC, MSc*

Objective: The aim of this clinical trial was to evaluate the effect of 15 myofascial therapy treatments using ischemic compression on shoulder trigger points in patients with chronic shoulder pain.

Methods: Forty-one patients received 15 experimental treatments, which consisted of ischemic compressions on trigger points located in the supraspinatus muscle, the infraspinatus muscle, the deltoid muscle, and the biceps tendon. Eighteen patients received the control treatment involving 15 ischemic compression treatments of trigger points located in cervical and upper thoracic areas. Of the 18 patients forming the control group, 16 went on to receive 15 experimental treatments after having received their initial control treatments. Outcome measures included a validated 13-question questionnaire measuring shoulder pain and functional impairment. A second questionnaire was used to assess patients' perceived amelioration, using a scale from 0% to 100%. Outcome measure evaluation was completed for both groups at baseline after 15 treatments, 30 days after the last treatment, and finally for the experimental group only, six months later.

Results: A significant group x time interval interaction was observed after the first 15 treatments, indicating that the experimental group had a significant reduction in their Shoulder Pain and Disability Index (SPADI) score compared with the control group (62% vs 18% amelioration). Moreover, the patients perceived percentages of amelioration were higher in the experimental group after 15 treatments (75% vs 29%). Finally, the control group subjects significantly reduced their SPADI scores after crossover (55%).

Conclusion: The results of this study suggest that myofascial therapy using ischemic compression on shoulder trigger points may reduce the symptoms of patients experiencing chronic shoulder pain.

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### Anterior Superior Iliac Spine Asymmetry Assessment on a Pelvic Model: An Investigation of Accuracy and Reliability

*Bradley Stovall, BS, Sejong Bae, PhD, and Shrawan Kumar, PhD*

Objective: The purpose of this study was to develop a novel pelvic model and determine the accuracy and the inter- and intraexaminer reliability of anterior superior iliac spine (ASIS) positional asymmetry assessment from both sides of the model by osteopathic predoctoral fellows and osteopathic physicians and to evaluate the effect of training.

Methods: Five osteopathic predoctoral fellows and 5 osteopathic physicians assessed 13 settings of varied ASIS asymmetry of a novel pelvic model for superior/inferior positional asymmetry from both sides of the model in a random order. Assessment from the right and left sides of the model occurred on 2 separate days. Fellows were trained for a week and retested.

Results: Average interexaminer reliability was greatest from the left side of the model for physicians and from the right side for fellows (physicians:  $k = 0.46$ , fellows:  $k = 0.37$ ), whereas intraexaminer reliability was greatest from the right in both groups (physicians:  $k = 0.49$ , fellows:  $k = 0.52$ ). Following training of fellows, interexaminer reliability remained highest from the right side of the model (right:  $k = 0.48$ , left:  $k = 0.36$ ), whereas intraexaminer reliability was higher from the left side (right:  $k = 0.53$ , left:  $k = 0.59$ ). Physicians and fellows before training were more accurate from the right side of the model ( $k = 0.56$  and  $k = 0.52$ , respectively). Following training of fellows, accuracy increased from both sides of the model (right:  $k = 0.59$ , left:  $k = 0.53$ ).

Conclusions: A novel pelvic model was developed to allow assessment of accuracy and reliability of ASIS asymmetry assessment. Individually, physicians and fellows varied in accuracy and inter-/intraexaminer reliability. Further investigation is warranted to understand the clinical and educational application of these results.

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