Dynamic Chiropractic

CHIROPRACTIC (GENERAL)

Chiropractic Research in Review

The following abstracts comefrom two sources: the *Journal of Manipulative andPhysiological Therapeutics* (published nine times annually) and the *Journal of Chiropractic Medicine* (published quarterly). Abstracts are reprinted with permission. The NationalUniversity of Health Sciences, owner of the journals, upholds theircompliance with the highest publication standards, which expressly supporteditorial freedom and best publication practices. Access complete abstractsfrom each issue of *JMPT* and *JCM* online. For background information on National's three peer-reviewed journals(*Journal of Chiropractic Humanities* isthe third), read "The Importance of Our Chiropractic Journals" in the Aug. 26, 2012 issue of *DC*.

Predicting Pain With Disability in Office Workers

Objective: The purpose of this study was to develop a neck pain risk score for office workers (NROW) to identify office workers at risk for developing nonspecific neck pain with disability.

Methods: A 1-year prospective cohort study of 559 healthy office workers was conducted. At baseline, risk factors were assessed using questionnaires and standardized physical examination. The incidence of neck pain was collected every month thereafter. Disability level was evaluated using the neck disability index. Logistic regression was used to select significant factors to build a risk score. The coefficients from the logistic regression model were transformed into the components of a risk score.

Results: Among 535 (96%) participants who were followed up for 1 year, 23% reported incident neck pain with disability (≥5). After adjusting for confounders, the onset of neck pain with disability was significantly associated with history of neck pain, chair adjustability, and perceived muscular tension. Thus, the NROW comprises 3 questions about history of neck pain, chair adjustability, and perceived muscular tension. The NROW had scores ranging from 0 to 4. A cutoff score of at least 2 had a sensitivity of 82% and specificity of 48%. The positive and negative predictive values were 29% and 91%, respectively. The area under the receiver operating characteristic curve was 0.75.

Conclusion: The risk score for nonspecific neck pain with disability in office workers was developed, and it contained 3 items with scores ranging from 0 to 4. This study shows that the score appears to have reasonable sensitivity, specificity, positive predictive value, and negative predictive values for the cut-off point of at least 2.

Source: Paksaichol A, et al. Development of a neck pain risk score for predicting nonspecific neck pain with disability in office workers: a 1-year prospective cohort study. *J Manip Physiol Ther*, September 2014;37(7):468-75.

Traction Approaches for Discogenic Cervical Radiculopathy

Objective: The purpose of this study was to investigate the immediate and long-term effects of a 1-year multimodal program with the addition of 2 different traction approaches on the pain, function, disability, and nerve root function in patients with discogenic cervical radiculopathy (CR). This study also attempted to identify the optimal traction angle based on the maximum recovery of the peak-to-

peak amplitude of the flexor carpi radialis (FCR) H-reflex.

Methods: This randomized clinical trial with one-year follow-up included a total of 216 (101 female) patients with unilateral lower discogenic CR were randomly assigned to 1 of 3 groups. The standard care group (C) received the multimodal program (pain relief methods, muscle strengthening, and thoracic spine manipulation). The ventroflexion traction group (A) received the same multimodal program as group C, with added traditional ventroflexion traction. The novel traction group (B) received the same multimodal program as group C in addition to a flexor carpi radialis (FCR) H-reflex-based traction method. Primary outcomes were the Neck Disability Index (NDI) and secondary outcomes included neck pain, arm pain, and the amplitude and latency of the H-reflex. Patients were assessed at 3 intervals (pre-treatment, 4 weeks post-treatment, and the 1-year follow-up).

Results: The mixed linear model with repeated measures indicated a significant group × time effect in favor of the novel cervical traction group (B) for measures of NDI ($F = 412.6$, $P < .0005$), neck pain ($F = 108.9$, $P < .0005$), arm pain ($F = 91.3$, $P < .0005$), H- reflex amplitude ($F = 207.7$, $P < .0005$), and H-reflex latency ($F = 58.9$ $P < .0005$). We found that the extension position of cervical spine (5° extension) was the position that achieved the maximum improvement in the novel cervical traction method.

Conclusions: This preliminary study showed that a multimodal program with a novel cervical traction method added improved NDI, neck pain, arm pain, and the amplitude and latency of FCR H-reflex for a group of patients with chronic discogenic CR.

Source: Moustafa IM, et al. Multimodal treatment program comparing 2 different traction approaches for patients with discogenic cervical radiculopathy: a randomized controlled trial. *J Chiro Med*, September 2014;13(3):157-67.

Intra-Articular Gas Bubbles Following Manipulation

Objective: The purpose of this study was to investigate the presence of intra-articular gas bubbles in the trapeziometacarpal joint cavity after chiropractic manipulation with audible cavitation and to assess the state of the gas bubbles after a 20-minute refractory period.

Methods: This investigation included 18 asymptomatic male and female participants between the ages of 21 and 26 years. High-resolution (15 MHz) sonograms of the trapeziometacarpal articular cavity were obtained by an experienced musculoskeletal ultrasonographer at 3 intervals: premanipulation, within 30 seconds postmanipulation, and at 20 minutes postmanipulation. The sonograms were saved as digital copies for subsequent reports that were correlated with reports compiled during dynamic visualization of the articular cavity. Data were extracted from the reports for analysis.

Results: The premanipulative sonograms showed that 27.78% of joints contained minute gas bubbles, also known as microcavities, within the synovial fluid before the joint was manipulated. The remaining 72.22% of joints contained no intra-articular microcavities. All of the postmanipulative sonograms revealed numerous large conspicuous gas bubbles within the synovial fluid. The postrefractory sonograms showed that, in 66.66% of the synovial fluid, gas bubbles were still visible, whereas the remaining 33.34% had no presence of gas bubbles or microcavities, and the synovial fluid had returned to its premanipulative state.

Conclusion: The findings of this study suggest that synovial fluid may contain intra-articular microcavities even before a manipulation is performed. Numerous large intraarticular gas bubbles are formed during manipulation due to cavitation of the synovial fluid and were observed in the absence of an axial distractive load at the time of imaging. In most cases, these gas bubbles remained within the joint for longer than 20 minutes.

Source: Jones AR, et al. Ultrasound imaging of the trapeziometacarpal articular cavity to investigate the presence of intraarticular gas bubbles after chiropractic manipulation. *J Manip Physiol Ther*, September 2014;37(7):476-84.

Nonresponsive Chronic Ankle Sprains: Think Tendon Rupture

Objective: The purpose of this case report is to describe the use of mobilization and eccentric exercise training for a patient with ankle pain and a history of chronic ankle sprains and discuss the course of diagnostic decision-making when the patient did not respond to care.

Clinical Features: A 48-year-old police officer who had sustained multiple ankle sprains throughout his life presented with pain and restriction in his ability to walk, run, and work. The Global Rating of Change Scale score was –6, the Numeric Pain Rating Scale score was 7/10, and the Lower Extremity Functional Scale score was –33. Palpation of the peroneus longus and brevis muscles and inversion with overpressure reproduced the chief concern (Numeric Pain Rating Scale 7/10). The patient was initially diagnosed with chronic peroneal tendinopathy.

Intervention and Outcome: Treatment included lateral translation mobilization of the talocrural joint combined with eccentric exercise using an elastic band for the peroneal muscles. The patient reported improvement in pain and function during the course of intervention but not as rapidly as expected. Therefore, follow-up ultrasonographic imaging and radiography were performed. These studies revealed partial rupture of the peroneal brevis muscle and total rupture of the peroneal longus muscle.

Conclusion: A patient with long-term concerns of the foot complex with a diagnosis of peroneal tendinopathy showed slight improvement with eccentric exercises combined with manual therapy of the talocrural joint. After a course of treatment but minimal response, a diagnosis of tendon rupture was confirmed with diagnostic ultrasonography. Clinicians should be aware that when injuries do not improve with care, tendon rupture should be considered.

Source: Bruin DB, et al. Musculoskeletal management of a patient with a history of chronic ankle sprains: identifying rupture of peroneal brevis and peroneal longus with diagnostic ultrasonography. *J Chiro Med*, September 2014;13(3):203-209.

Surface EMG Effective to Assess Paraspinal Muscle Fatigue

Objective: The purpose of this study was to review the literature to determine whether surface electromyography (EMG) is a reliable tool to assess paraspinal muscle fatigue in healthy subjects and in patients with low back pain (LBP). Methods: A literature search for the period of 2000 to 2012 was performed, using PubMed, ProQuest, Science Direct, EMBASE, OVID, CINAHL, and MEDLINE databases. Electromyography, reliability, median frequency, paraspinal muscle, endurance, low back pain, and muscle fatigue were used as keywords.

Results: The literature search yielded 178 studies using the above keywords. Twelve articles were selected according to the inclusion criteria of the study. In 7 of the 12 studies, the surface EMG was only applied in healthy subjects, and in 5 studies, the reliability of surface EMG was investigated in patients with LBP or a comparison with a control group. In all of these studies, median frequency was shown to be a reliable EMG parameter to assess paraspinal muscles fatigue. There was a wide variation among studies in terms of methodology, surface EMG parameters, electrode location, procedure, and homogeneity of the study population.

Conclusions: The results suggest that there seems to be a convincing body of evidence to support the merit of surface EMG in the assessment of paraspinal muscle fatigue in healthy subjects and in patients with LBP.

Source: Mohseni Bandpei MA, et al. Reliability of surface electromyography in the assessment of paraspinal muscle fatigue: an updated systematic review. *J Manip Physiol Ther*, September 2014;37(7):510-21.

NOVEMBER 2014