Dynamic Chiropractic

MUSCULOSKELETAL PAIN

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Editorial Staff

J. Donald Dishman,DC, Kevin Ball,PhD, and Jeanmarie Burke,PhD.

Central motor excitability changes following spinal manipulation: A transcranial magnetic stimulation study.

(1st Prize - Abstracts of the World Federation of Chiropractic)

Background: The physiologic mechanospinal manipulation in which spinal manipulation may reduce pain and muscular spinal manipulation is not fully understood. One such mechanistic theory proposed is that spinal manipulation may intervene in the cycle of pain and SMT by affecting the resting excitability of the motoneuron pool in the spinal cord. Previous data from our laboratory indicates that spinal manipulation leads to attenuation of the excitability of the motor neuron pool, when assessed via peripheral nerve in afferent stimulation (Hoffmann reflex).

Objective: The purpose of this study was to determine the effects of lumbar spinal manipulation on the excitability of the motor neuron pool, as assessed via transcranial magnetic stimulation.

Method: Motor-evoked potentials were recorded subsequent to transcranial magnetic stimulation motor-evoked potentials. Peak-to-peak amplitudes in the right gastrocnemius muscle of healthy volunteers (n=24) were measured before and after: (1) a homolateral L5-S1 spinal manipulation - experimental group; or (2) side-posture positioning, but with no manipulative thrust applied - control group. Immediately after the group-specific procedure, 10 motor-evoked potentials responses were measured at a rate of 0.05 Hz; and then at five and 10 minutes post procedure An optical tracking system (OptoTRAK, Northern Digital Inc., Waterloo, Canada; system error < 0.10 mm RMS) was used to monitor the 3-D position and orientation of the transcranial magnetic stimulation coil, in real time, for each trial.

Results: The motor-evoked potentials amplitudes were significantly facilitated from 20 to 60 seconds relative to the pre-baseline value following the L5-S1 spinal manipulation, without a concomitant change following the positioning (control) procedure.

Conclusions: When motor neuron pool excitability is measured directly by central corticospinal activation utilizing transcranial magnetic stimulation techniques, there is a transient, but significant facilitation occurring as a consequence to spinal manipulation. Thus, a basic neurophysiological response to spinal manipulation is one of central motor facilitation.

Key Indexing Terms: Chiropractic; transcranial magnetic stimulation; electromyography.

Eric Hurwitz,DC,PhD; Hal Morgenstern, PhD; Philip Harber,MD,MPH; Gerald Kominski,PhD;

Thomas Belin,PhD; Fei Yu,PhD; Alan Adams,DC.

The effectiveness of physical modalities among low-back-pain patients randomized to chiropractic care: Findings from the UCLA low back pain study.

(2nd Prize - Abstracts of the World Federation of Chiropractic)

Background: Although chiropractors often use physical modalities with spinal manipulation, evidence that modalities yield additional benefit over spinal manipulation alone is lacking.

Objective: The purpose of the study is to estimate the net effect of physical modalities on low back pain outcomes among chiropractic patients in a managed-care setting.

Methods: Fifty percent of the 681 patients participating in a clinical trial of low-back-pain-treatment strategies were randomized to chiropractic care with physical modalities (n=172) or without physical modalities (n=169). Subjects were followed for six months with assessments at two, four and six weeks, and six months. The primary outcome variables are average and most severe low back pain intensity in the past week, assessed with 0-10 numerical rating scales, and low-back-related disability, assessed with the 24-item Roland-Morris disability questionnaire.

Results: Almost 60 percent of the subjects had baseline low back pain episodes of more than three months' duration. The six-month follow-up was 96 percent. The adjusted mean differences between groups in improvements in average and most severe pain and disability were clinically insignificant at all follow-up assessments. Clinically relevant improvements in average pain and disability were more likely in the modalities group at two and six weeks, but this apparent advantage disappeared at six months. Perceived treatment effectiveness was greater in the modalities group

Conclusions: Physical modalities used by chiropractors in this managed care organization do not appear to be effective in the treatment of patients with low back pain, though a small, short-term benefit for some patients cannot be ruled out.

Key Indexing Terms: Low back pain; chiropractic; physical therapy; randomized controlled trial; managed care.

Jennifer Langworthy,Mphil; Alan Breen, DC,PhD; Steven Vogel,DO; Richard Collier,MSc.

Chiropractic and the national health care system: A basis for partnership in the UK.

(3rd Prize - Abstracts of the World Federation of Chiropractic)

Background: Changes in UK health care policy and legislation have the potential to radically change care for sufferers of musculoskeletal conditions by widening access to manipulation services under its National Health Service (NHS).

Objective: To investigate past and current provision of musculoskeletal services for NHS patients by chiropractors, as well as optimal future arrangements.

Method: 1,042 UK chiropractors on professional registers were sent a two-section questionnaire. The profession was divided into two groups, answering part of the questionnaire from a practitioner or patient perspective.

Results: Sixty-nine percent responded. Of these, 29 percent had previously provided services for NHS patients and 18 percent were currently providing them, reporting moderate to high levels of satisfaction. Ninety-five percent were interested in future arrangements, but on a part-time basis, and which most closely resembled private practice.

Conclusion: The majority of UK chiropractors favor future partnership with the NHS. National health care reform and the statutory self-regulation of chiropractors have brought this closer to a more widespread reality. However, to prosper in this setting, the profession may benefit from a greater understanding of the competing priorities and constraints faced by NHS purchasers, who for their part, should be prepared to implement policy based on evidence.

Key Indexing Terms: Chiropractic; health services research; United Kingdom.

John Scaringe,MS,DC, Dapeng Chen, PhD, and Diane Ross,PhD.

The effects of augmented sensory feedback precision on the acquisition and retention of a simulated chiropractic task.

Objective: To examine the effectiveness of knowledge of results (KR) precision in the acquisition and retention of a simulated manipulative procedure.

Design: Controlled trial with subjects assigned to one of two interventions using a stratified random technique.

Methods: Seventy-one healthy male and female chiropractic student volunteers were asked to control the application of force of a simulated chiropractic manipulative procedure. Two feedback conditions (quantitative and qualitative), two performance conditions (light and heavy force levels), and three delay intervals (one, five and eight days) were studied. Acquisition trials were divided into 10 blocks of five trials, for a total of 50 trials. All subjects performed two blocks of 10 trials (total of 20 trials) during the no-feedback retention phase. Absolute constant error (|CE|) was analyzed as the measure of performance accuracy, and variable error (VE) was used to determine performance consistency.

Results: No significant main effect for the two feedback groups was found for |CE| and VE during the acquisition phase. A significant main effect for force was found for |CE| and VE, indicating that subjects were more accurate during light conditions than heavy conditions. There was a significant main effect for trial blocks for both |CE| and VE, indicating that groups became more accurate and consistent as a result of practice. During the retention phase, a significant main effect for retention group conditions was identified for |CE|, but not for VE. This indicates that the retention groups differed in accuracy but were similar in consistency. Post hoc analyses indicated that subjects were less accurate as time between acquisition and retention trials increased. There was a significant main effect for trial blocks for VE, but not for |CE|, suggesting groups became more consistent between trial blocks. A significant group X trial block interaction was revealed for |CE|. No other main effects or interactions in the analyses were significant for |CE| or VE.

Conclusion: The findings of this study suggest that practice sessions using kinetic devices (simulator) and performance feedback, whether quantitative or qualitative, may be useful when implemented to assist the performance of complex motor skills. There is not enough evidence to support that the training used in this study could generate lasting learning effects.

Key Indexing Terms: Knowledge of results; precision; feedback; psychomotor skill; chiropractic

manipulation; education.

Dirk Kokmeyer; Peter van der Wurff,PT; Geert Aufdemkampe, MSc,PT; Theresa CM Fickenscher.

The reliability of multi-test regimens using sacroiliac pain provocation tests.

Background Data: Studies concerning the reliability of individual sacroiliac tests have inconsistent results. It has been suggested that employing a test regimen to make a clinical decision is a more reliable form of diagnosis than individually performed tests.

Objective: To assess the interrater reliability of multi-test scores using a regimen of five commonly used sacroiliac pain provocation tests.

Methods: Two examiners examined 78 subjects. The threshold for a positive selection was set at three positive tests out of the five tests performed. The test order and order in which the subjects were examined were randomized per patient and the examiners were blinded from all information regarding the subjects tested. Fifty-nine of the subjects were symptomatic for low back pain and 19 of the subjects were asymptomatic. Weighted *kappa* statistic, bias-adjusted kappa, prevalence-adjusted kappa and 95-percent confidence intervals were used to evaluate the interrater reliability of the test regimen.

Results: Weighted kappa was found to be 0.70 (95 percent CI = 0.45-0.95).

Conclusions: Using a multitest regimen of five sacroiliac Joint pain provocation tests is a reliable method to evaluate sacroiliac joint dysfunction although further study is needed to assess the validity of this test method.

Key Indexing Terms: Sacroiliac joint; low back pain; diagnostic test; pain; reliability

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Joanne Nyiendo,PhD; Michael Attwood,AS (U.K.); Carol Lloyd,BA; Bonnie Ganger,BA; Mitchell Haas,DC.

Data management in practice-based research.

Background: Multi-site data collection is complex and requires an effective data management system. This paper explores data management issues encountered in the design, conduct, and analysis of a research project involving 74 community-based sites and a central data management system.

Results: Once the data arrived at the central site, data integrity was maintained at a very high level. Issues encountered in the low back pain study reflected the practice-based nature of the study and the limitations of finances, staff, and facilities.

Conclusion: The task of converting a research protocol to actual procedures for data collection and data management can be very challenging. The importance of early recognition of the effort and resources needed for data management and quality control procedures cannot be overestimated.

Key Indexing Terms: Practice-based research; data management; quality assurance; low back pain

Robert Leach,DC.

Differential compliance instrument in the treatment of infantile colic: A report of two cases.

Objective: To report on a novel use for a computer-assisted adjusting device as a potentially safe method for treatment of infantile colic.

Clinical Features: Two pediatrician-diagnosed cases of infantile colic, characterized by signs of distress, uncontrolled crying, with brief episodes of screaming, were otherwise associated with normal growth (despite low birth weight in the second case) and no other abnormalities.

Intervention and Outcome: A PulStar Function Recording and Analysis System (PulStarFRAS^{tm}) device was used to administer light impulses (viz. u1.7 joules, which produced a three-to-four-lb. force) at each segmental level throughout the dorsal spine, using probe tips spaced two cm apart, straddling the spinous processes. Crying was reduced by 50 percent after a single session of instrumented adjusting in a six-week-old female and after four sessions in a nine-week-old male, according to colic diaries kept prospectively by the mothers. Uninterrupted daily sleep increased from 3.5 to 6.5 average hours after a single session. Within 10 days (five and eight sessions, respectively) colicky behavior disappeared and total daily sleep improved to 14.5 hours average (up from 4.5 hours average, previously); results continued over a 30-day follow-up.

Conclusion: The PulStar mechanical adjusting device appears to have been well tolerated and beneficial in two cases of infantile colic. Further research will be necessary to determine if this device can enhance the safety and/or effectiveness of chiropractic treatment in infants with colic.

Key Indexing Terms: Infantile colic; chiropractic; therapy.

Joel Alcantara,DC; Gregory Plaugher, DC; Darrel Klemp,DC; Chris Salem.

Chiropractic care of a patient with temporomandibular disorder and atlas subluxations.

Objective: To describe the chiropractic care of a patient suffering from cervical subluxation and complaints associated with temporomandibular disorder.

Clinical Features: A 41-year-old woman suffered from bilateral ear pain, tinnitus, vertigo and altered/decreased hearing acuity, and headaches. She had a history of ear infections that had been treated with prescription antibiotics. Her complaints were attributed to a diagnosis of temporomandibular joint syndrome and treated unsuccessfully by a medical doctor and dentist.

Intervention and Outcome: High-velocity, low-amplitude adjustments (i.e., Gonstead technique) were applied to findings of atlas subluxation. The patient's symptomatology improved and eventually resolved after nine visits.

Conclusion: The chiropractic care of a patient suffering from temporomandibular disorder, headaches and subluxation is described. In addition, clinical issues relevant to the care of patients suffering from this disorder are discussed.

Key Indexing Terms: Temperoman-dibular joint; pain, chiropractic manipulation.

Trevor Foshang,DC; Michael Mestan, DC; Lisa Riggs.

Diffuse idiopathic skeletal hyperostosis: A case of dysphagia.

Objectives: To present and discuss the clinical manifestations, radiographic features, and treatment of a patient suffering from diffuse idiopathic skeletal hyperostosis complicated by dysphagia. This case serves as an educational tool by bringing awareness to an uncommon complication of a common disorder. An emphasis is placed on diagnostic imaging.

Clinical Features: A 63-year-old male suffered from dysphagia after a fall from a ladder. Plain film radiographs revealed large flowing hyperostoses arising from the anterior aspect of C-3-6. Advanced imaging, consisting of a CT scan and a modified barium swallow study, were performed to provide additional anatomic and functional information.

Intervention and Outcome: Treatment provided by a speech-language pathologist, focused on the dysphagia and consisted of compensatory management for 2-1/2 weeks. The patient was able to successfully swallow pureed food, and was released with instructions to modify his diet as tolerated.

Conclusion: Dysphagia is a common clinical presentation for many disorders of deglutition. Flowing spinal hyperostoses, such as those seen in diffuse idiopathic skeletal hyperostosis, may become large enough to physically encroach upon the pharynx or esophagus, or indirectly predispose the patient to swallowing problems from posttraumatic edema. Conservative care is the initial treatment of choice, while surgical excision of the hyperostoses is reserved for difficult cases.

Key Indexing Terms: Diffuse idiopathic skeletal hyperostosis; dysphagia; computed tomography.

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