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Research Abstracts for March/April 2000

By Editorial Staff

Prevalence of low back pain in Lesotho mothers. *Zelege Worku, PhD*

Objectives: To identify factors that strongly affect the presence of severe low back pain in mothers living at the Maseru district of Lesotho; to find out whether there is any truth to the widespread belief that rural mothers are more vulnerable to severe low back pain than their urban counterparts; and to identify influential factors that are strongly associated with each other.

Methods: A random sample of 4001 mothers was collected from the Maseru district of Lesotho in September 1994, using sampling techniques of stratification and proportional allocation with respect to size. Ten explanatory variables of study were used: intensive farm work; gravidity (number of births plus abortions); residential area; heavy weight lifting; the literacy status of the mother; strenuous manual labor; the availability of basic health services; the income status of the mother; cooking method at home; and breast feeding. The dependent variable of study was the presence or absence of severe low back pain. Discriminant and log-linear analyses were done to analyze the data collected. Discriminant analysis was done using the presence or absence of severe low back pain as a classifying variable and the 10 explanatory variables that affect the classifying variable. Log-linear analysis was also done using the same data, using 9 of the 11 variables of study.

Results: 405 of the 4001 mothers (10.12%) study suffered from severe low back pain at the time of data collection; 513 (12.82%) had moderate low back pain, and 1422 (35.54%) had mild low back pain. Of the 405 mothers who suffered from severe low back pain, 319 (78.77%) were poor, illiterate, rural mothers. Discriminant analysis revealed that the presence of severe low back pain was strongly affected by intensive farm work, the residential area of the mother, and gravidity of the mother in a decreasing order of strength,

and led to results similar to those obtained from discriminant analysis. The study also showed that rural mothers and their children were more disadvantaged than their urban counterparts in basic health services.

Conclusion: Recommendations were made to the Ministry of Health and Social Welfare of Lesotho to improve the provision of basic health services, including health education on the importance of chiropractors to the community.

Key Indexing Terms: low-back pain; discriminant analysis; log-linear analysis.

Reflex responses associated with Activator treatment. *Bruce Symonsa, Walter Herzoga, Tim Leonarda and Hoa Nguyena.*

Background: Previous studies have demonstrated the existence of a reflex response, measurable by surface electromyography (sEMG), following manually-delivered spinal manipulative therapy (SMT). This reflex response has been characterized as being consistent and reproducible within individual subjects, and is non-local in that it extends beyond the site of manipulation. However, the nature and magnitude of possible reflex responses in the paraspinal and proximal limb muscles elicited by non-manual SMT, such as with an Activator adjusting instrument, remain unknown.

Objective: To characterize the reflex responses associated with Activator-SMT using sEMG to record the responses of 16 muscles before, during and after treatment.

Study Design: The electromyographic responses of 16 paraspinal and proximal limb muscles in nine healthy, asymptomatic male volunteers were measured simultaneously by sEMG before, during and after chiropractic spinal manipulative therapy using an Activator adjusting instrument.

Methods: SMTs were delivered with an Activator II instrument to nine asymptomatic volunteers at six sites bilaterally (C3/4, T2/3, T6/8, T11/12, L2-4 and S1). Reflex responses were measured from 16 muscles using bipolar sEMG electrodes and were collected at 2000 Hz per channel with CODAS data acquisition software.

Results: Approximately 68% of the SMTs resulted in a detectable reflex response, as follows: cervical spine, 50%; thoracic spine, 59%; lumbar spine, 83%; and sacroiliacs, 94%. Treatments delivered to the thoracic spine elicited the largest responses, whereas the lumbar spine demonstrated the most heterogeneous

responses. Whenever a reflex response was observed, it always occurred close to the treatment site ipsilaterally, and was detected in muscles that had either their origin or insertion into the vertebral level adjusted.

Conclusions: Based on the local nature, magnitude and characteristic shape of all reflex responses observed, we hypothesized that they were likely generated by a single proprioceptor. Furthermore, the temporal properties of this reflex response suggest they originated from the muscle spindles. In contrast to our previous observations on reflex responses following manual SMT, the Activator treatments elicited reflex responses that varied between subjects but were consistent within an individual and were local in nature. We conclude that Activator-delivered SMT results in a reflex response that is quantitatively and qualitatively different from manual SMT.

Key Indexing Terms: muscles; reflexes; chiropractic.

Is it possible to differentiate people with or without low back pain on the basis of tests of lumbopelvic dysfunction? *Charlotte Leboeuf-Yde, DC,MPH,PhD, and Kirsten Ohm Kyvik,MD,PhD*

Objective: To determine the prevalence of positive chiropractic tests in relation to low back pain status and the sensitivity, specificity and predictive (positive and negative) values of these tests.

Design: The subjects were examined by a chiropractor who was unaware of their low back pain status. Information on low back pain was then collected in a self-report questionnaire. Setting: Research laboratory at the Odense University Hospital (Denmark).

Subjects: A subset of 166 healthy twins taken from a panel of population-generated twins born between 1953-1982.

Examiner: Chiropractor with approximately 10 years of clinical experience.

Main Outcome Measures: The prevalence of a number of lumbopelvic dysfunctional tests (four observational, six pain-on-movement and two pain provokation tests) and a "diagnostic" conclusion based on these tests were studied in relation to low back pain status.

Results: No single test was found to be clinically acceptable in relation to all five aspects of the study. At least one "pain-on-movement" test was the only variable that had a totally acceptable pattern.

Conclusion: Although no individual test was accurate, the "diagnostic" discrimination based on these tests was satisfactory.

Key Indexing Terms: chiropractic; sensitivity; specificity; predictive value; prevalence; low back pain.

The effects of orthotic intervention and nine holes of simulated golf on club head velocity in experienced golfers. *David Stude,DC, and Jeff Gullickson,DC.*

Objective:. This study was an initial investigation evaluating the effects of orthotic intervention on club head velocity (CHV) among a group of experienced golfers before and after nine holes of simulated golf.

Setting: Northwestern College of Chiropractic, Bloomington, MN.

Participants: Twelve experienced golfers.

Method: CHV was measured before and after wearing orthotics, and before and after completing nine holes of simulated golf using the Bel-Tronics Swing Mate, a measurement device used by numerous PGA and LPGA teaching professionals. Subjects wore custom-made, flexible orthotics daily for six weeks, then were retested using the same objective measurement parameters.

Outcome Measure: CHV (swing speed in miles per hour) was measured in all subjects before and after wearing custom-fit, flexible orthotics for six week and before and after completing nine holes of simulated golf.

Results: There was an approximate increase in CHV of 3-5 mph, or a relative increase in CHV by up to 7% after subjects had worn custom-made, weightbearing, flexible orthotics daily for six weeks. A 5 mph increase in CHV is equivalent to an approximate increase in golf ball travel distance of 15 yards (45 feet), a significant increase for the tour player where small increases in performance can reflect large position changes on the roster board. Additionally, the use of these custom orthoses eliminated the effects of fatigue associated with playing nine holes of golf (i.e., relative to CHV) and so may potentially improve the

likelihood for more consistent golf performance.

Conclusion: The use of the custom-fit, flexible orthotics used in this study had a positive influence on CHV in experienced golfers.

Key indexing terms: biomechanics; orthotic devices; golf; sports.

Is there a role for premanipulative testing before cervical manipulation? *Peter Licht,MD; Henrik Christensen, DC,MD; Poul Carlsen,MD,DMSc*

Background: Spinal manipulative therapy is used millions of times every year to relieve symptoms from biomechanical dysfunction of the cervical spine. Concern about cerebrovascular accidents following cervical manipulative therapy is common, but it is rarely reported. Premanipulative tests of the vertebral artery are presumed to identify patients at risk, but controversy exists about their usefulness.

Objective: The aim of this study was to examine vertebral artery blood flow in patients with a positive premanipulative test, giving contraindication to spinal manipulative therapy. In addition, we wanted to investigate if chiropractors would reconsider treating such patients if dynamic vascular Doppler examination was normal.

Design and Setting: A prospective study at a university hospital vascular laboratory.

Methods: Private practicing chiropractors from three Danish counties referred patients with a positive premanipulative test for an examination of vertebral artery blood flow. Premanipulative testing was performed by an experienced chiropractor. Flow velocities were measured in both vertebral arteries by color duplex sonography. In addition, we asked chiropractors if they would treat their patient despite a positive premanipulative test if the vascular ultrasound examination was normal.

Results: A total of 20 consecutive patients were referred with a positive premanipulative test. Five were excluded because we could not reproduce any symptoms during the vascular examination. In the remaining patients, we found no significant difference in peak flow velocity or time-averaged mean flow velocity with different head positions. Of 21 chiropractors would treat their patient despite a positive premanipulative test if the vascular examination was normal. Eight patients with a positive premanipulative test were treated

without complications. Six are now free of symptoms, and two have improved. The remaining eight patients refused manipulation; they all still suffer from the same symptoms.

Conclusion: It appears a positive premanipulative test is not an absolute contraindication to manipulation of the cervical spine. Provided the test has a role at all in identifying patients at risk of cerebrovascular accidents, we suggest that patients with a reproducible positive test be referred for a duplex examination of the vertebral artery flow. If duplex flow is normal, the patient should be eligible for cervical manipulation despite the positive premanipulative test.

Key Indexing Terms: vertebral artery; doppler; blood flow; chiropractic manipulation.

Assessment of published reliability studies for cervical spine range of motion measurement tools.

Kelvin Jordan, MSc.

Objective: To assess the reliability of tools to measure cervical spine range of motion (ROM) in clinical settings and discuss the necessary components for reliability studies of this nature.

Data Sources: Databases searched included: Bandolier; BIDS; British Nursing Index; CINAHL; English National Health Care Database; Index of Scientific and Technical Proceedings; Medline; Occupational Therapy Index; Physiotherapy Index and Rehabilitation Index for English language articles from 1966. In addition, citations were searched.

Study Selection: Studies were selected which assessed the tool for intra or inter-observer reliability, evaluated it on movements of flexion/extension, lateral flexion or rotation and measured ROM of the whole of the cervical spine.

Data Extraction: All papers were read by one non-clinical researcher using a data extraction sheet. A consultant rheumatologist and a physiotherapist were each asked to read a sample of the papers to give a clinical viewpoint.

Data Synthesis: Evidence for the reliability of measurement tools was assessed qualitatively based on the quality of the study designs, appropriateness of analysis and strength of the reliability based on reported intraclass correlation coefficients (the most appropriate analysis technique for reliability studies of this

nature). Measurement tools were found not to have been fully tested for reliability, particularly for adequate sample size and appropriate analysis techniques. There were also wide variations in the research design including the protocol for movement; the characteristics of observers and study population; whether warm-ups were allowed; whether the movement was active or passive; and time intervals between repeated measurements.

Conclusion: While the cervical range-of-motion device has shown promise in reliability and has a number of advocates, its practicality for clinical use can be questioned. Further work needs to be performed on all measurement tools. Researchers need to produce more rigorous studies and consider the issues discussed here.

Key Indexing Terms: range-of-motion articular; cervical vertebrae; spine.

Nephrolithiasis with an unusual initial symptomatic presentation. *Keith Wells, DC.*

Objective: To describe a less common symptomatic presentation of nephrolithiasis, as well as its diagnostic pitfalls, risk factors and mimicry of other conditions. Intervention and long-term management of nephrolithiasis are also presented.

Clinical Features: A 25-year-old man suffered from sudden bilateral inguinal and occasional periumbilical pain. The initial presentation suggested abdominal pathology; however, costovertebral angle pain followed an hour later with no radiation between the two anatomical sites. The initial urine dipstick was negative for hematuria, but a KUM revealed a smooth 2x3 mm stone lodged at the left vesicoureteral junction.

Intervention and Outcome: The patient was referred to a regional university medical center and was to receive extracorporeal shock wave lithotripsy scheduled several days after his initial visit. He was given pain medicine for the waiting period and received daily lumbar spine adjustments, which mildly reduced the pain. He eventually received ureteroscopic laser lithotripsy due to failure of the shock wave unit. The fragment analysis showed a calcium oxalate composition, and the patient was advised to lower his intake of oxalates. The patient had become a vegetarian approximately three months before this first stone episode.

Conclusion: Nephrolithiasis is a common condition likely seen in chiropractic practice. Although usually relatively easy to recognize, the diagnosis can be elusive if the typical historical factors and diagnostic results are absent or altered. The short-term management of nephrolithiasis includes pain management, stone elimination, and the collection of a specimen to identify the composition and underlying metabolic abnormality. Long-term management is to prevent stone recurrence. Conservative comanagement by the chiropractic physician can be implemented through nutritional means.

Key Indexing Terms: kidney calculi; lithotripsy; ureter.



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