Spinal manipulation alters electromyographic activity of paraspinal muscles: a descriptive study.

James W. DeVocht, DC, PhD; Joel G. Pickar, DC, PhD; David G. Wilder, PhD

Objective: To examine the effect of spinal manipulation on electromyographic (EMG) activity in areas of localized tight muscle bundles of the low back.

Methods: Surface EMG activity was collected from 16 participants in 2 chiropractic offices during the 5 to 10 minutes of the treatment protocol. Electrodes were placed over the 2 sites of greatest paraspinal muscle tension as determined by manual palpation. Spinal manipulation was administered to 8 participants using Activator protocol; the other 8 were treated using Diversified protocol.

Results: Electromyographic activity decreased by at least 25% after treatment in 24 of the 31 sites that were monitored. There was less than 25% change at 3 sites and more than 25% increase at 4 sites. Multiple distinct increases and decreases were observed in many data plots.

Conclusion: The results of this study indicate that manipulation induces a virtually immediate change, usually a reduction, in resting EMG levels in at least some patients with low back pain and tight paraspinal muscle bundles. In some cases, EMG activity increased during the treatment protocol and then usually, but not always, decreased to a level lower than the pretreatment level.


Charlotte Leboeuf-Yde, DC, PhD; Iben Axen, DC; Jess James Jones, MSc; Annika Rosenbaum, BAppSc (Chiro); Peter W. Lovgren, DC; Laszlo Halasz, MHSc (Clin Biomech); Kristian Larsen, MPH, PT
**Objectives:** (1) To describe the low back pain (LBP) pattern at baseline; (2) to describe the long-term outcome pattern; (3) to investigate the presence of distinct subgroups in relation to outcome; (4) to establish whether short-term outcome is a predictor of long-term outcome.

**Methods:** A 3- to 6- and 12- to 18-month, multicenter practice-based, prospective descriptive study was performed in private chiropractic practices in Sweden. Fifty-eight of 64 previously compliant chiropractors each recruited a maximum of 30 consecutive patients with LBP. Complete baseline clinical information was provided on 1,054 patients, of which 93% were interviewed approximately 3 months later, and 57% responded to a questionnaire at approximately 12 months. Chiropractic treatment was decided by the treating chiropractor. Twelve descriptive subgroups were created based on (1) duration of LBP at baseline, (2) duration of LBP in the past year, and (3) LBP pattern in the past year. The predictive value was tested for outcome status at the fourth visit. Information on self-reported LBP status and improvement over the past months were collected.

**Results:** Patients were spread in a U-shaped fashion from benign to severe, with the 2 extreme groups being most prevalent. About half the participants reported "no LBP in the past week" at 3 months and somewhat fewer at 12 months. Almost 75% claimed to be definitely better at 3 months, and approximately 50% at 12 months.

Specific predictive subgroups can be identified, mainly in relation to the past-year history of LBP. Improvement at the fourth visit is a predictor of long-term outcome.

**Conclusion:** Knowledge of specific subgroups may improve the quality of care and the selection of homogeneous study populations in clinical trials.

**Body chart pain location and side-specific physical impairment in subclinical neck pain.**

_Haejung Lee, MHSc; Leslie L. Nicholson, PhD; Roger D. Adams, PhD; Sung-Soo Bae, PhD_

**Objective:** To test computer-using students to examine the relationship between location of neck pain as indicated on pain drawings and physical impairments compared with those subjects not reporting pain.
Methods: This cross-sectional study enrolled 81 healthy student volunteers at the College of Rehabilitation Science, Daegu University, Korea, ages 18 to 30 years. Outcomes were endurance time of neck muscles and neck range of motion (ROM) sensitization or stretch effects on repeated range tests. Active neck ROM measures were taken twice, 10 minutes apart. Neck muscle endurance time was obtained using a horizontal head-holding test with a 10-minute goal. After all physical measurements were completed, information about any neck pain was collected and 4 groups were formed on the basis of the pain location noted on the body chart.

Results: Sixty-seven subjects experienced recurrent neck pain. Nineteen had right-side pain, another 19 had left-side pain, 29 reported pain on both sides, and 14 did not experience neck pain. Neck muscle endurance time was significantly lower for all pain groups. For extension, left and right rotation movements at the second test, ROM decreased for subjects reporting subclinical pain and increased for those with no pain. Location of the pain to one side was related to the ROM decreased, in that the amount of reduction in the second-test rotation range was significantly greater on the side opposite to the pain.

Conclusions: The location of neck pain that occurs intermittently, but is not present during range testing, affects the second test when the rotation involves stretching of tissue on the side of pain.

Reliability of the Spin-T cervical goniometer in measuring cervical range of motion in an asymptomatic Indian population.

Shamnam Agarwal, MSc; Garry T. Allison, PhD, PT; Kevin P. Singer, PhD, PT

Objective: To examine the intratester reliability of the Spin-T goniometer, a cervical range-of-motion device, in a normal Indian population.

Methods: Subjects comprised 30 healthy adults with mean age of 34 years (range, 18-65 years). The subjects were stabilized in the sitting position and the Spin-T goniometer mounted on the head of the subject. The study design was a within-subject repeated intratester reliability trial conducted for cervical range of motion in 6 directions of movement. Three measurements were taken in each direction (flexion, extension lateral flexion, and lateral rotation) per participant. Reliability coefficients, intraclass correlation coefficients, and 95% confidence interval were derived from repeated-measures analysis of variance (ANOVA). Where differences in ANOVA were detected, a paired t test was conducted and the typical error
values and coefficient of variance were calculated.

**Results:** All repeated measures showed high intraclass correlation coefficients (all >0.96, P < .01). The ANOVA detected no differences between trials for all movements except rotation. The typical error values for the rotation trials did not exceed 2.5° and the coefficient of variance did not exceed 4%, which is clinically acceptable considering the normally variable cervical range of movement.

**Conclusion:** In this study, the Spin-T goniometer proved to be a reliable measuring instrument for cervical range of movement in an Indian population. The use of a laser pointer fixed to the instrument ensured a consistent neutral start position.

---

**The relationship between spinal dysfunction and reaction time measures.**

*Louise B. Lersa, BSc; Cathy M. Stinear, BSc (Chiro), PhD; Roy A. Lersa, BSc*

**Objective:** The objective of this study was to investigate the relationship between the number of sites of spinal dysfunction and a range of measures of cognitive processing.

**Methods:** This double-blind, randomized, observational pilot study was performed at a chiropractic college clinical training facility. Thirty volunteers with clinical evidence of cervical spinal joint dysfunction participated. Subjects were classified into 2 groups, depending on whether they exhibited signs of cervical spinal joint dysfunction at one or more sites. A range of computer-based tasks was used to determine simple reaction time (RT), choice RT, probe RT, and inhibition of a preplanned response.

**Results:** Multiple sites of cervical spinal joint dysfunction were related to impaired cortical processing as revealed by significantly higher loads on central capacity, significantly less accurate response selection, and a trend toward more variable performance of an anticipated response. Multiple sites of cervical spinal joint dysfunction do not appear to be related to the speed of response selection or the ability to inhibit a preplanned response.

**Conclusion:** This pilot study provides a context for the improvements in cortical processing observed after cervical spine adjustment. It shows that probe RT may be a useful tool in further studies examining the effects of cervical spine manipulation of joint dysfunction and the associated effect on cognitive function.
Sagittal skin contour of the cervical spine: interexaminer and intraexaminer reliability of the Flexicurve instrument.

Deed E. Harrison, DC; Jason W. Haas, DC; Donald D. Harrison, DC, PhD; Burt Holland, PhD; Tadeusz Janik, PhD

Objectives: To evaluate reliability of a simple instrument, the Flexicurve, in determining cervical sagittal skin contour.

Methods: This study obtained repeated random measurements involving 3 investigators and 30 subjects once per day over a 2-day trial period. Thirty normal subjects were examined for cervical spine skin contour twice by 3 separate investigators with a 1-day delay. With subjects in a neutral standing position, investigators placed the Flexicurve on the posterior portion of the subject’s neck from the external occipital protuberance to the vertebral prominens and traced the Flexicurve shape onto paper. The tracings were divided into 6 equal arcs and digitized. Statistical computation was performed on the depth at 5 points, arc angle, and arc radius of curvature. Interexaminer and intraexaminer correlation coefficients (ICCs) were calculated to determine reliability.

Results: All interexaminer correlation coefficients were in the poor range (<0.40). For the arc radius, arc angle, depth at top one third, and depth at bottom two thirds, the intraexaminer correlation coefficients were in the poor range. For the 3 deepest depths, the intraexaminer correlation coefficients were in the fair range (0.4-0.50).

Conclusion: The Flexicurve showed marginal reliability with most (12/16) ICCs in the poor range (ICC <0.40) and 4 values in the fair range (0.4 < ICC < 0.5).

Chiropractic manipulation and acute neck pain: a review of the evidence.

Michael T. Haneline, DC, MPH

Objective: The aim of this study was to review the chiropractic and medical literature in an effort to determine the extent of current evidence supporting the use of chiropractic manipulation for the treatment of acute neck pain.
Methods: A literature search of the MEDLINE/PubMed and MANTIS (Manual Alternative and Natural Therapy Index System) databases, extending from 1966 to September 2003, was conducted. Search terms included "cervical," "neck," "chiropractic," "neck pain," "patient satisfaction," and "manipulation." The inclusion criteria for article selection were studies dealing with the treatment of neck pain by means of chiropractic manipulation, regardless of the number of subjects involved or whether randomization was implemented.

Results: Two hundred sixty-seven citations were identified. Most were eliminated because they either did not specifically deal with the treatment of acute neck pain with manipulation or were not written in English. Less than 10 articles marginally dealt with the treatment of acute neck pain with cervical manipulation. Moreover, there has only been one randomized clinical trial published in the English language that specifically dealt with the treatment of acute neck pain by manipulation. Other studies involved patients with neck pain of a subacute or chronic nature or treated test subjects with mobilization techniques rather than manipulation.

Conclusion: There has been scant investigative research into the treatment of acute neck pain with chiropractic manipulation. Consequently, more data are needed and appropriate studies should be initiated.

Manipulation under anesthesia: a report of four cases.
Edward Cremata, DC; Stephen Collins, DC; William Clauson, MD; Alan B. Solinger, PhD; Edward S. Roberts, DC

Objective: To report the results of manipulation under anesthesia (MUA) for 4 patients with chronic spinal, sacroiliac, and/or pelvic and low back pain.

Methods: The treatment group was arbitrarily selected from the chiropractor’s patient base who received the MUA protocol along with a follow-up in-office articular and myofascial release program that mimics the MUA procedures. The chiropractic adjustments and articular and myofascial release procedures were performed in a chiropractic office. The MUA procedures were performed in an outpatient ambulatory surgical center. Patients with chronic pain who had not adequately responded to conservative medical and/or a reasonable trial (4 months minimum) of chiropractic adjustments, and had no contraindications to anesthesia or adjustments, were selected. The 4 patients went through 3 consecutive days of MUA followed
by an 8-week protocol of the same procedures plus physiotherapy in-office without anesthesia. Data included pre- and post-MUA passive ranges of motion, changes in the visual analog scale, and neurologic and orthopedic examination findings. The patients had follow-up varying from 9 to 18 months.

**Results:** Increases in passive ranges of motion, decreases in the visual analog scale rating, and diminishment of subsequent visit frequency were seen in each of the patients.

**Conclusion:** Manipulation under anesthesia was an effective approach to restoring articular and myofascial movements for these 4 patients who did not adequately respond to either medical and/or in-office conservative chiropractic adjustments and adjunctive techniques.

---

**Possible generators of retrotrochanteric gluteal and thigh pain: the Gemelli-obturator internus complex.**

*James M. Cox, DC; Barclay W. Bakkum, DC, PhD*

**Objective:** To investigate and correlate the anatomy of the gluteal region with the clinical findings of retrotrochanteric and posterior thigh pain, as seen in clinical chiropractic practice, and describe potential treatment options.

**Methods:** A descriptive gross anatomic study is correlated to a case presentation of a patient with deep persistent aching pain in the retrotrochanteric region of the left hip and upper posterolateral thigh.

**Results:** The structures that are located in the same location as the retrotrochanteric pain described by the patient are the Gemelli-obturator internus muscle complex and associated bursae.

**Conclusions:** In patients with persistent gluteal and sciatica-like pain, especially when centered in the retrotrochanteric region, the Gemelli-obturator internus muscle complex and associated bursae should be considered as a possible source of the pain.

---

**Myelopathy: a report of two cases.**

*Sanjay N. Patel, DC; Norman W. Kettner, DC; Corey A. Osbourne, DC*
Objective: To present diagnostic imaging findings of two cases of cervical myelopathy, with different etiologies, presenting to a chiropractic office.

Clinical Features: The patient with acute transverse myelitis had neck and upper back pain and nonspecific headaches for 40 years. The patient with posttraumatic syringomyelia experienced intermittent left arm pain starting in the anterolateral shoulder and radiating down the arm into the third, fourth, and fifth digits. Neither of these patients presented with typical myelopathic symptoms.

Intervention and Outcome: Chiropractic spinal manipulative therapy using high-velocity low-amplitude thrusts and concomitant medical management were used for the patient with posttraumatic syringomyelia. The patient with acute transverse myelitis was not treated.

Conclusion: Practitioners should be aware of the etiology, pathophysiology, clinical features, laboratory, diagnostic imaging findings, and treatment options pertaining to patients with cervical myelopathy.

Editor’s note: Due to space constraints, not all abstracts from the September 2005 issue of JMPT are featured in this article. To review the entire table of contents for the September issue, please visit www.mosby.com/jmpt.