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Editorial Staff

The Nordic Back Pain Subpopulation Program: Can patient reactions to the first chiropractic treatment predict early favorable treatment outcome in nonpersistent low back pain?
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Objective: To investigate whether three distinct patterns of reactions to chiropractic care can predict early favorable treatment outcome in patients with nonpersistent low back pain (LBP).

Design: Multicenter practice-based predictive validity study.

Study Subjects: Sixty private practice chiropractors in Sweden each recruited a maximum of 20 consecutive patients with LBP, with a duration of less than two weeks at the time of consultation and a maximum of 30 days total over the past year.

Methods: Chiropractic management was decided on by the treating chiropractor. The outcome variable was self-reported "definite improvement" at the fourth visit. The predictor variables included three hypothesized prognostic groups (best, intermediate, and least favorable), on the basis of clinical information collected at baseline and at the second visit. The covariates included age, sex, pain intensity during the past 24 hours, description of disability, duration and pattern of pain during the present attack, and duration and pattern of pain during the past 12 months. The three predictor groups were cross-tabulated against the outcome variable and the other covariates. Backward stepwise logistic regression was performed to test for confounding or modification from relevant covariates.

Results: Information was provided on 708 patients, of which 674 questionnaires were valid. Of the 223 patients in the hypothesized best prognostic group, 91% (95% CI, 79-100) reported to be "definitely improved" by the fourth visit, vs. 76% (72-80) of the 420 patients in the intermediate prognostic group, and 36% (19-53) of the 31 patients in the least favorable prognostic group. These results were not altered after controlling for the covariates.

Conclusion: For chiropractic patients with nonpersistent LBP, these findings show that it is possible to predict already by the second visit which patients may or may not report improvement at the fourth visit.

The effect of low-force chiropractic adjustments for four weeks on body surface electromagnetic field.

John Zhang, MD, PhD; Brian J. Snyder, DC

Objective: To study the effects of four weeks of low-force chiropractic adjustments on body surface electromagnetic fields (EMFs).

Method: Thirty-five chiropractic students randomly assigned into control (17 subjects) and experimental groups (28 subjects). A triaxial fluxgate magnetometer was used for EMF detection. The subjects' body surface EMF was determined in the prone position before and after the chiropractic adjustment. A Toftness low-force chiropractic adjustment was applied to the cervical, thoracic, lumbar, and sacral areas as determined by the practitioner. Heart rate variability analysis was recorded once a week to determine autonomic nervous system activity in both the control and experimental groups.

Results: The EMF on the subjects' body surface decreased after chiropractic adjustment at the cervical, thoracic, lumbar, and sacral regions in all six visits during the four-week treatment period. The EMF showed a downtrend over the four-week period after the low-force adjustment. The same changes were not observed in the control group. The chiropractic adjustment group had a slight decrease in heart rate over the four-week treatment period, and no significant change was observed in the control group. Heart rate variability analysis did not show consistent changes before and after the low-force adjustments during the treatment period.

Conclusion: Low-force chiropractic adjustment in the cervical and thoracic areas resulted in a consistent reduction of the body surface EMF after four weeks of active treatment. No statistically significant differences were found in heart rate and heart rate variability in the four-week study.

The selection effects of the inclusion of a chiropractic benefit on the patient population of a managed health care organization.

Craig F. Nelson, DC; R. Douglas Metz, DC; Thomas M. LaBrot, DC; Kenneth R. Pelletier, PhD, MD(hc)

Objective: The aim of this study is to measure the selection effects of the inclusion of a chiropractic benefit on a managed care health plan.

Design: An analysis of enrollment data from a managed care health plan over a four-year period was conducted. Employers could select the managed care plan with or without a chiropractic care benefit. Comparisons of demographic and comorbid characteristics were made between employees who had the chiropractic benefit and those who did not, and between individuals who self-selected chiropractic care and those who self-selected medical care.

Results: The cohort with chiropractic coverage was younger, with fewer subjects in the older age group (>65 years; 6.5% vs. 9.6%) and more subjects in the younger age group (0-17 years; 31.9% vs. 26.2%). The mean age of the group with coverage was 32.9 compared with 35.5 in the group without coverage. Comparing self-selected chiropractic patients to self-selected medical patients, there were fewer subjects older than 65 years in the chiropractic group (4.9% vs. 9.2%) and fewer subjects ages 0 to 17 years (9.4% vs. 19.4%). In six of the eight comorbid conditions studied, the rates were lower in the cohort with chiropractic coverage compared with the group without coverage. The rates of comorbid conditions in self-selected chiropractic patients were lower in all eight categories compared with self-selected medical patients.

Conclusion: The inclusion of a chiropractic benefit in a health plan produces modest favorable selection processes, resulting in a slightly younger patient population with fewer comorbidities. At the level of patient self-selection, chiropractic patients are considerably younger and healthier than comparable medical patients.

Ian D. Coulter, PhD; Betsy B. Singh, PhD; David Riley, MD; Claudia Der-Martirosian, PhD

Objective: To determine the inter-referral patterns among physicians and complementary and alternative medicine (CAM) providers in an independent practice association integrated medical system.

Method: Data from a one-year period were collected on referral patterns, diagnosis, number of visits, cost, and qualitative aspects of patient care. The independent practice association provided care for approximately 12,000 patients.

Results: In the selected integrative network, there are those primary care physicians (PCPs) who refer and those who do not. Among those PCPs who refer to CAM, a preference is shown for a limited number of providers to whom they refer. Although doctors of chiropractic get more referrals, they are also more concentrated among selected providers than are doctors of Oriental medicine.

Conclusion: This study shows the inter-referral patterns among the PCP and CAM providers working within an integrated medical system. One effect of being in the network for doctors of chiropractic and doctors of Oriental medicine might be the possible inter-referrals between each other.

Predictive efficacy of chiropractic college assessment test scores in basic science chiropractic education.

Kevin A. Cunningham, DC, PhD; Stephen L. DesJardins, PhD; Mark G. Christensen, PhD

Objective: To evaluate the ability of the Chiropractic College Assessment Test (CCAT) to explain academic success within a chiropractic basic science curriculum.

Methods: The CCAT examination was administered to 202 subjects from one chiropractic college on the first day of classes. Zero-order Pearson correlations were used to examine for associations between the pre-chiropractic grade point average (GPA), CCAT scores, and basic science GPA. Multiple regression techniques were applied to determine the predictive efficacy of CCAT scores on basic science GPA.

Results: Study results indicate a correlation between pre-chiropractic GPA, CCAT scores ($r = 0.348, P < .001$), and basic science GPA ($r = 0.559, P < .001$). Correlation was also noted between CCAT scores and basic science GPA ($r = 0.537, P < .001$). Using multiple regression, together the variables (age, postsecondary education, pre-chiropractic GPA, and CCAT scores) accounted for a significant portion ($R^2 = 0.483, P < .001$) of the total variance in basic science GPA. Furthermore, the CCAT scores accounted for significant unique explanation (change $R^2 = 0.081, P < .001$) beyond that offered by the traditionally used pre-chiropractic GPA.

Conclusion: The CCAT examination provides a valuable a priori indicator of success within the basic science curriculum of this particular chiropractic program. Consideration should be given to adopting the CCAT examination as one of a number of heuristic guides students and college officials use in making enrollment decisions.

Insomnia: does chiropractic help?

Jennifer R. Jamison, PhD, EdD

Objective: To evaluate the effect of chiropractic care on insomnia.

Design: Tripartite pilot study.

Methods: The expectations of the chiropractic community were canvassed, a retrospective study to recall changes in sleep patterns was undertaken, and a prospective pilot study to monitor sleep patterns after chiropractic care was carried out. Convenience sampling was used.

Results: The 221 patients and 15 chiropractors who completed the expectation study tended to believe that patients with sleeping difficulties benefited from chiropractic care. The chiropractors were more guarded in their expectations than participating patients. One-third of the 154 patients who completed the semistructured interview reported their sleep pattern was changed immediately after their chiropractic adjustment. All but one of these 52 patients reported improvement. Twenty patients with insomnia participated in the prospective study. Although compared with the report in their screening questionnaire, improvement was noted in certain sleep parameters in the six days after their adjustment, no temporal trends emerged in the days and/or weeks after the chiropractic consultation. Most patients reported experiencing less or no discomfort during the duration of the study.

Conclusion: Although a number of patients do perceive that chiropractic care offers temporary respite from their insomnia problem, when changes were more objectively monitored, improvements were erratic and no consistent temporal trends were detectable. Convincing evidence has yet to be produced before routine chiropractic care can be considered adequate intervention for patients with sleeping difficulties. More definitive answers may result from future research being undertaken in sleep laboratories.

Determining the relationship between cervical lordosis and neck complaints.

Jeb McAviney, MS(Chiro); Dan Schulz, BSc; Richard Bock, MS(Chiro); Deed E. Harrison, DC; Burt Holland, PhD

Objective: To investigate the presence of a "functionally normal" cervical lordosis and identify if this and the amount of forward head posture are related to neck complaints.

Methods: Using the posterior tangent method, an angle of cervical lordosis was measured from C2 through C7 vertebrae on 277 lateral cervical X-rays. Anterior weight-bearing was measured as the horizontal distance of the posterior superior body of the C2 vertebra compared to a vertical line drawn superiorly from the posterior inferior body of the C7 vertebra. The measurements were sorted into two groups: cervical complaint and noncervical complaint groups. The data were then partitioned into age by decades, sex, and angle categorie.

Results: Patients with lordosis of 20° or less were more likely to have cervicogenic symptoms ($P < .001$). The association between cervical pain and lordosis of 0° or less was significant ($P < .0001$). The odds that a patient with cervical pain had a lordosis of 0° or less was 18 times greater than for a patient with a noncervical complaint. Patients with cervical pain had less lordosis and this was consistent over all age ranges. Males had larger median cervical lordosis than females (20° vs 14°) (two-sided Mann-Whitney U test, $P = .016$). When partitioned by age grouping, this trend is significant only in the 40- to 49-year-old range (two-sided Mann-Whitney U test, $P < .01$).

Conclusion: We found a statistically significant association between cervical pain and lordosis $<20^\circ$ and a "clinically normal" range for cervical lordosis of 31° to 40°. Maintenance of a lordosis in the range of 31° to 40° could be a clinical goal for chiropractic treatment.

Symptomatic expansile vertebral hemangioma causing *conus medullaris* compression.
Jeffrey A. Rich, DC; Thomas C. Donahue, DC; Timothy J. Mick, DC

Objective: To present a case of symptomatic, expansile L1 vertebral hemangioma.

Clinical Features: A 46-year-old man presented with progressive neurologic changes and insidious onset of low back pain.

Intervention and Outcome: After a trial of three visits of conservative chiropractic care, no improvement was noted. Magnetic resonance imaging was obtained, revealing an expansile hemangioma with extraosseous component compromising the *conus medullaris* at the level of the L1 lumbar vertebra. Neurosurgical intervention resulted in clinical improvement.

Conclusion: Primary care physicians treating patients with low back pain should be aware of neurologic red flags requiring prompt attention. Magnetic resonance imaging is the imaging modality of choice when evaluating a neurologic abnormality presumably related to a space-occupying lesion. Although a disk herniation is the most common cause of these symptoms, clues in the history and examination must prompt physicians to expand their differential diagnosis to include a variety of other extradural masses.

Treatment of a case of subacute lumbar compartment syndrome using the Graston Technique.
Warren I. Hammer, DC, MS; Mark T. Pfefer, RN, MS, DC

Objective: To discuss subacute lumbar compartment syndrome and its treatment using a soft-tissue mobilization technique.

Clinical Features: A patient presented with low back pain related to exercise combined with prolonged flexion posture. The symptoms were relieved with rest and lumbar extension. The patient had restrictive lumbar fascia in flexion and rotation, and no neurological deficits.

Intervention and Outcome: The restrictive lumbar posterior fascial layers and adjoining restrictive fascia (thoracic, gluteal, hamstring) were treated with a form of instrument-assisted soft-tissue mobilization called the Graston Technique. Restoration of fascial extensibility and resolution of the complaint occurred after six treatment visits.

Conclusions: The posterior spinal fascial compartments may be responsible for intermittent lower back pain. Functional clinical tests can be employed to determine whether the involved fascia is abnormally restrictive. Treatment directed at the restrictive fascia using this soft-tissue technique may result in improved fascial functional testing and reduction of symptoms.

ONLINE EXCLUSIVE

Conservative treatment of a patient with previously unresponsive whiplash-associated disorders using clinical biomechanics of posture rehabilitation methods.

Joseph R. Ferrantelli, DC; Deed E. Harrison, DC; Donald D. Harrison, DC, PhD; Denis Stewart, MD

Objective: To describe the treatment of a patient with chronic whiplash-associated disorders (WADs) previously unresponsive to multiple physical therapy and chiropractic treatments, which resolved following clinical biomechanics of posture (CBP) rehabilitation methods.

Clinical Features: A 40-year-old man involved in a high-speed, rear-impact collision developed chronic WADs, including cervicothoracic, shoulder, and arm pain and headache. The patient was diagnosed with a confirmed chip fracture of the C5 vertebra and cervical and thoracic disk herniations. He was treated with traditional chiropractic and physical therapy modalities, but experienced only temporary symptomatic reduction and was later given a whole-body permanent impairment rating of 33% by an orthopedic surgeon.

Intervention and Outcome: The patient was treated with CBP mirror-image cervical spine adjustments, exercise, and traction to reduce forward head posture and cervical kyphosis. A presentation of abnormal head protrusion resolved and cervical kyphosis returned to lordosis post-treatment. His initial neck disability index was 46%, and 0% at the end of care. Verbal pain rating scales also improved for neck pain (from 5/10 to 0/10).

Conclusion: A patient with chronic WADs and abnormal head protrusion, cervical kyphosis, and disk herniation experienced an improvement in symptoms and function after the use of CBP rehabilitation protocols, when other traditional chiropractic and physical therapy procedures showed little or no lasting improvement.

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