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Editorial Staff

Evaluation of chiropractic management of pediatric low-back pain patients: a prospective cohort study.

*Jill Hayden, DC; Silvano Mior, DC; Marja Verhoef, PhD*

**Background:** Recent epidemiological studies have estimated that the lifetime prevalence of LBP in children is approximately 50%, with almost 15% of children experiencing frequent or continual pain. No empirical studies published addressing conservative treatment of childhood LBP have suggested that treatment, including spinal manipulation, should follow the clinical guidelines described for adult low back pain.

**Objective:** To describe chiropractic management of low back pain in patients between the ages of 4-18 years, and outcomes and factors associated with the outcomes.

**Methods:** Prospective cohort study of consecutive pediatric low back pain patients seeing randomly selected chiropractors within the cities of Calgary, Alberta, and Toronto, Ontario, Canada. Follow-up data collection included the type and extent of treatment rendered and its outcome, measured with a five-point subjective rating scale and a self-report pediatric VAS.

**Results:** Fifteen chiropractors provided data on 54 consecutive pediatric LBP patients. The average age of the patients was 13.1 years; 57% were male; 61% were acute; 47% attributed onset to a traumatic event (most commonly sports-related); and 24% reported episode duration of greater than three months. Almost 90% of cases presented with uncomplicated mechanical LBP, most frequently diagnosed as lumbar facet dysfunction or subluxation. Patients were managed with manipulation, with a minority (7.7%) receiving some form of active management. "Important" improvement was seen in 62% and 87% on the VAS and subjective scale, respectively, within a six-week course of management (Kaplan-Meier survival analysis). Patients with chronic LBP were less likely to respond within the median number of treatments (RR= 2.1).

**Conclusions:** Patients responded favorably to chiropractic management, and there were no reported complications. Future investigations should establish the natural history and compare chiropractic management to other forms of treatment, to gain knowledge about the effectiveness of chiropractic in managing pediatric low back pain.

**Key Indexing Terms:** Low back pain; chiropractic, child; adolescent; pediatric.

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Chiropractors' use of radiography in Switzerland.

*Abbas Aroua, PhD; Ina Decka; Jean Robert, DC; John-Paul Vader, MD; Jean-Francois Valley, PhD*

**Objective:** This paper investigates the use of diagnostic radiology by chiropractors in Switzerland,

and aims at determining their contribution to the annual radiation collective dose.

**Methods:** 138 chiropractors possessing radiological equipment were approached and asked to provide, among other information, the frequency of X-ray examinations. The dose associated with each type of X-ray examination was established separately. The collective dose was determined by convolution of frequency and dosimetric information.

**Results:** The number of chiropractic X-ray examinations performed in Switzerland in 1998 was 60,000, mainly spine and pelvis examinations. The associated annual collective dose was found to be 144 Sv (an annual effective dose of 20 mSv per caput). The chiropractic contribution to the total dose due to conventional radiography in Switzerland is about 6%.

**Conclusion:** Considering the number of chiropractors in Switzerland (less than 200), their contribution to the collective dose is relatively high. This is because of the high effective dose associated with the main types of examinations performed (e.g., lumbar spine). It is therefore necessary to develop and apply guidelines on the use of this type of X-ray examinations, and quality control programs, to optimise the radiographic technique and hence reduce the doses.

**Key Indexing Terms:** Radiography; chiropractic; dose; radiation, spine; pelvis.

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Empowerment of chiropractic faculty: a profile in context.

*Dennis Marchiori, DC; Alan Henkin, PhD*

**Background:** The primary resource base and core human capital in chiropractic education is found among its faculty. The chiropractic profession depends on a motivated faculty for continuous quality improvement and innovation in areas of curriculum, scholarship, and practice.

Empowerment has been associated with increased intrinsic motivation. Assessments of attitudes of faculty in terms of empowerment, a set of cognitions created by the work environment, may inform executive decision-making related to development of a productive professional work environment.

**Objective:** The goal of this exploratory study is to provide an initial understanding of empowerment among faculty in the organizational context of chiropractic education; to construct a profile of perceived faculty empowerment; and to inquire into potential associations between perceived empowerment and faculty demographic and workplace characteristics.

**Study Design:** Full faculty survey utilizing descriptive statistics and multivariable analysis.

**Methods:** Surveys were distributed to full- and part-time faculty working in the United States and Canada. The survey was composed of Spreitzer's multidimensional measure of psychological empowerment and additional items designed to measure faculty demographics and workplace variables including: academic rank; years at the institution; years in higher education; sex; age; area of assignment; employment status; and academic rank.

**Results:** More than 54% of the study population (N=609) completed and returned the instrument. Respondents were typically male (68.4%) and employed full-time (81.6%). Almost half (47.5%) of the respondents were assigned to the area of patient care at their institution. Area of assignment and employment status emerged as important variables for explaining the variance in dependent variable scores.

**Conclusion:** The findings of this research provide a basic profile and some initial perspectives of empowerment in the context of the work environment of the chiropractic profession's learning

institutions.

Key Indexing Terms: Faculty; faculty development; chiropractic.

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Comparative analysis of low back loading on chiropractors utilizing various workstation table heights and various tasks.

*Kenneth Lorme, DC; Syed Naqvi, PhD*

Background: There is epidemiological evidence that identifies chiropractors as a high-risk group for low back disorders. However, to date, there are no known biomechanical studies to determine if their workstations may be a contributing factor.

Objective: To investigate whether chiropractors' workstation table height or the tasks they perform make them susceptible to low-back strain. In addition to investigating low-back strain, a screening was performed to determine whether chiropractors' upper extremities were at risk to undue strain as workstation table height was varied.

Study Design: Experimental pilot study.

Setting: A university ergonomic laboratory.

Methods: An adjustable manipulation table was set at three different heights: 465mm, 665mm and 845mm. Seven volunteer chiropractors were fitted with a lumbar motion monitor (LMM), and videotaped and photographed for analysis while performing spinal manipulation to the cervical, thoracic and lumbar spine of a volunteer patient at each workstation table height. Two biomechanical models, the static 3-D static strength prediction program (3DSSPP) and the dynamic lumbar motion monitor (LMM) program, were used to record the dependent variables. A screening of various upper-extremity variables was also performed with the static model.

Of the various tasks, the thoracic task was found to be the least straining, followed by the cervical and then the lumbar manipulation task. However, even the least straining task still produced an unacceptable amount of sagittal flexion. This high amount of sagittal flexion, combined with axial rotation velocity and lateral flexion velocity, would be considered high-risk to the chiropractor's own low back. Two upper-extremity variables, dominant elbow moment and dominant (thrusting) shoulder rotation moment, demonstrated significant changes for the various tasks. The elbow moment does not appear to be a major risk factor. The shoulder, however, is believed to be of major concern, especially during the lumbar manipulation task.

Conclusion: Workstation table height was found to have a significant effect on low-back load on the subjects under study. The results of this study demonstrate an overall unacceptably high amount of sagittal flexion, ligament strain and disc compression force on the chiropractor subjects in the tasks performed.

Key Indexing Terms: Workstation height; occupational health; ergonomics; chiropractic; low back pain.

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Objective manual assessment of lumbar posteroanterior stiffness is now possible.

*Adit Chiradejnant, M.Physio (Manips), Christopher G Maher, PhD; Jane Latimer, PhD*

**Objective:** To evaluate the reliability and criterion-related validity of a revised version of the reference-based protocol for manually assessing lumbar posteroanterior (PA) stiffness. With the revised protocol, a therapist matched the stiffness of the spine to one of 11 stiffness references provided by a mechanical device.

**Subjects:** Two physiotherapists and 41 asymptomatic subjects participated.

**Methods:** Subjects' PA stiffness was assessed by the therapists and the Spinal Assessment Machine (criterion measure) under standardized conditions. The therapists pressed on the subject's spine and then the mechanical device, the task being to match the stiffness of the back to one of the 11 stimuli provided by the device. Each of the 11 stiffness stimuli represented a point on the -5 to 5 stiffness scale. Interrater reliability was evaluated using a two-way ANOVA intraclass correlation coefficient for a single rating (ICC[2,1]) and the standard error of the measurement (SEM), while criterion-related validity was evaluated using Pearson's R, including Fleiss' correction.

**Results:** The ICC (2,1) was 0.78 (SEM 0.56) and the criterion-related validity reached 0.74 (Fleiss correction 0.86).

**Conclusions:** This research demonstrates that therapists can accurately judge asymptomatic subjects' spinal stiffness using a matching task. We believe this method may allow therapists to quantify lumbar PA stiffness in clinical practice.

**Key Indexing Terms:** Lumbar spine; palpation; tests and measurements; stiffness; mobilization.

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Predicting academic success in the first year of chiropractic college.

*Bart Green, DC, MEd, Claire Johnson, DC, MEd; Kevin McCarthy, DC, MEd*

**Purpose:** To determine if any pre-admission academic or personal variables exist that predict academic success in the first year of the Palmer College of Chiropractic West (PCCW) program.

**Participants:** 192 students at PCCW who had completed the first year of the program.

**Methods:** One-way analysis of variance and stepwise linear multiple regression.

**Results:** Men had a significantly higher mean matriculating grade point average (MatGPA) than women, but no such relationship existed in the cumulative year-one GPA (Y1GPA). There was no statistically significant difference in MatGPA for students possessing a degree compared to those without a degree, but degree-holding students had a significantly higher Y1GPA. There was no statistically significant difference in MatGPA for students born in English-speaking countries compared to students born in non-English-speaking countries, but those born in English-speaking countries had a significantly higher Y1GPA. MatGPA, physics GPA and chemistry GPA provided the strongest regression model, eliciting a R<sup>2</sup> value [the measure of the percent of variability in the response variable that can be explained by the linear regression on another variable] of 0.327.

**Conclusion:** Student characteristics upon entering PCCW may help predict student performance in the first academic year. A relatively strong and statistically significant prediction model for Y1GPA (R<sup>2</sup> = 0.327) exists for PCCW. Used in conjunction with other available empirical data, this regression model may allow the institution to make more informed decisions when selecting students for admission.

**Key Indexing Terms:** Chiropractic; school admission criteria; education, professional; educational

status.

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Is chiropractic practice evidence-based? A pilot study.

*Adrian Wenban, BAppSc, MMedSc*

Objective: To calculate the proportion of care delivered in a chiropractic practice that was supported by good-quality clinical trials.

Design: Retrospective survey.

Method: Data was collected from patient files relating to 180 consecutive patient visits in a suburban chiropractic practice in the north of Spain. Each patient's presenting complaint was paired with the chiropractor's chosen primary intervention. Based on a literature review (Medline, Mantis and non-automated searches of local medical libraries), each presenting complaint/primary intervention pairing was categorized according to the level of supporting evidence as follows:

Category 1 - Intervention based on good quality clinical trial evidence;

Category 2 - Intervention based on poor quality, or no, clinical trial evidence. To distinguish between good- and poor-quality clinical trials, studies were critically appraised and assigned quality scores.

Results: Of the 180 cases surveyed, 123 (68.3%) (95% confidence interval 61.5% to 75.1%) were based on clinical trials of good methodological quality. Only 57 (31.7%) (95% confidence interval 24.9% to 38.5%) of the cases were based on poor quality, or no clinical trial evidence (category 2).

Conclusion: When patients were used as the denominator, the majority of cases cared for in a chiropractic practice were done so with interventions based on evidence from good-quality randomized clinical trials. When compared to the many other studies of similar design, which have evaluated the extent to which different medical specialties are evidence-based, chiropractic practice was found to have the highest proportion of care (68.3%) supported by good quality experimental evidence.

Key Indexing Terms: Evidence-based practice; chiropractic; survey; interventions; JMPT.

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Is cervical spinal manipulation dangerous?

*Peter Licht, MD, PhD; Henrik Christensen, DC, MD; Poul Hoiland-Carlsen, MD, DMSc*

Objective: Concern of cerebrovascular accidents after cervical manipulation is common. We report a case of cerebrovascular infarction without sequelae.

Clinical Features: A 39-year-old man with nonspecific neck pain was treated by his general practitioner with cervical manipulation.

Intervention and Outcome: Manipulation immediately elicited severe headache and neurological symptoms that disappeared completely within three months, despite permanent signs of a complete left-sided cerebellar infarction on CT and MR imaging. At seven-year follow-up, the patient was fully employed, and repeat MR imaging still showed infarction of the left cerebellar hemisphere. However, the patient remained completely free of neurological symptoms, and color duplex

ultrasonography showed normal cervical vessels, including patent vertebral arteries.

Conclusion: It appears that the risk of cerebrovascular accidents following cervical manipulation is low considering the enormous number of treatments given each year, and much lower than the risk of serious complications associated with generally accepted surgery. Provided there is a solid indication for cervical manipulation, we believe the risk involved is acceptably low and the fear of serious complications greatly exaggerated.

Key Indexing Terms: Chiropractic manipulation; cervical spine; stroke.

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