ABSTRACTS OF ACC CONFERENCE PROCEEDINGS

Platform Presentations

An Investigation Into Motor Pattern Differences Used During Prone Hip Extension Between Subjects With and Without Low Back Pain

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OBJECTIVE

The purpose of this study was to investigate whether any differences exist between subjects with and without low back pain (LBP) in the motor patterns of the gluteus maximus (GM), hamstring (HAM), contralateral erector spinae (CES), and ipsilateral erector spinae (IES) muscles used during prone hip extension (PHE).

METHODS

A convenience sample of 31 non-LBP subjects and 20 unilateral LBP subjects performed 10 repetitions of PHE. For the non-LBP sample, only the right leg was tested. For the LBP sample, both legs were tested. This gave rise to three "groups" for comparison purposes: non-LBP (N), LBP-symptomatic leg (S), LBP-asymptomatic leg (A). Using surface electromyography, the mean onset times of each muscle relative to the onset of leg movement were calculated for each subject and these values were used to calculate group means (with 95% CIs). Between-group differences were analyzed for significance by calculating the 95% CI of the difference as well as p values ($\alpha = .05$).

RESULTS

Compared to the non-LBP group, the GM was significantly delayed in both S (Difference = 107.5 ms; 95% CI = 78.3-136.7 ms; $p < .001$) and A (Difference = 75.4 ms; 95% CI = 47.8-103.0 ms; $p < .001$).

CONCLUSION

Although the activation of the GM appears to be delayed in both legs during PHE in unilateral LBP subjects, further research needs to be performed in order to better determine the clinical significance of this apparent motor control alteration in the diagnosis and treatment of LBP.

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The Journal of Chiropractic Education

Vol. 21, No. 1. Printed in U.S.A.
1042-5055/$22.00

Orienting New Faculty at a Chiropractic College
A Pilot Project

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INTRODUCTION

Qualitative studies on mentoring are sparse especially in academic populations. They are nonexistent in the area of chiropractic. Mentoring is important in academia. It ensures that important values and practices of an organization are upheld, it reduces turnover, and it empowers faculty, increasing their personal growth and employment satisfaction. These factors lead to increased faculty productivity, which benefits the institution and student population.

METHODS

After obtaining approval from the human subjects committees of both Palmer College of Chiropractic and Fielding Graduate University, we obtained a list of full-time faculty hired at Palmer College of Chiropractic in the past 5 years. A representative sample of five was selected to include faculty from the clinical sciences, basic sciences, research, and both genders. Open-ended interviews followed a script, with allowance made to pursue other avenues of questioning. Interviews were recorded and transcribed. We coded the responses separately and then jointly.

RESULTS AND DISCUSSION

Definite patterns were evident from the interviews. Cross-gender relationships in mentoring and peer guides were so common that they were not remarkable. Our respondents stated a preference for informal relationships, where one party sought out the other rather than being assigned. The respondents who had the easier transition reported working under supportive department heads. Interestingly, even though we found room for improvement, everyone we interviewed had no immediate intention to leave the college's employ and no faculty reported an absence of collegiality.

CONCLUSION

We would recommend that the orientation program by Human Resources be delayed until the new faculty member has a few days to acclimate. A survey of the entire population of new faculty would be beneficial and is feasible.

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Relationship Between Lumbar Facet Joint Capsule Strain and Paraspinal Muscle Spindle Discharge During Vertebral Movement

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BACKGROUND

Little is known about neural encoding of spinal kinematics.

OBJECTIVE

We investigated the relationship between strain in a lumbar facet joint capsule (FJC) and the discharge of lumbar paraspinal muscle spindles during passive lumbar vertebral movement.

METHODS

An anesthetized cat model was used. Single unit activity from multifidus ($n = 2$) and longissimus muscle spindles ($n = 10$) was recorded from teased filaments of the L6 dorsal root. Computer-controlled ramp (0.4 mm/s) and hold displacements of the L6 vertebra were applied cephelad using the L6 vertebra's spinous process. Eulerian plane strains of the L6-7 FJC were measured using a method similar to computer-aided speckle interferometry. Principal strains were calculated and reported from the plane strains.

RESULTS

During the cephalad vertebral translations of 0.2, 0.4, 0.6, 0.8, and 1.2 mm, FJC maximum principal strains (E1) were $1.4 \pm 0.6\%$, $1.9 \pm 0.8\%$, $3.3 \pm 2.6\%$, $4.7 \pm 3.1\%$, and $7.8 \pm 4.3\%$, (mean $\pm$ SD), respectively. The tensile FJC E1 strain was linearly correlated with vertebral displacement (average $r = 0.86$) with an average sensitivity of $6.0 \pm 4.0\%$ FJC strain/mm of vertebral displacement. During vertebral translations of 0.2, 0.4, 0.6, 0.8, and 1.2 mm, average muscle spindle discharge increased 7.2 ± 5.1 Hz, 12.1 ± 6.2 Hz, 16.7 ± 7.5 Hz, 19.4 ± 8.0 Hz, and 23.7 ± 8.1 Hz, respectively. The relationship between vertebral displacement and muscle spindle discharge was moderately linear (average $r = 0.71$) with an average spindle sensitivity of $15.9. \pm 8.2$ impulses/s/mm of vertebral displacement. Spindle discharge showed a moderate, linear correlation to capsule strain (average $r = 0.6$; slope = 2.5 impulses/s/% FJC strain).

DISCUSSION AND CONCLUSION

The data show that cranialward distraction of a lumbar facet joint elicits muscle spindle activity from paraspinal muscles crossing that joint in a fashion that can be linearly related to strain in the capsule. These data suggest that paraspinal muscle spindles may contribute to encoding vertebral movement.

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Tumoral Calcinosis Associated With End-Stage Renal Disease
A Case Study

Marni Capes, MS, DC, and **R. Bruce Fox**, DC, Life University

OBJECTIVE

The purpose of this paper is to discuss the case of a patient with end-stage renal disease (ESRD) associated with tumoral calcinosis and right elbow pain.

CLINICAL FEATURES

A 28-year-old male presented with right elbow pain, swelling, and dysfunction. In October 2005, the right elbow pain was exacerbated secondary to the patient lifting luggage and feeling a sudden "pop." Since that time, he has had recurrent episodes of significant swelling, locking, catching, and discomfort, which occurred with strenuous use. He had previously sought relief with chiropractic care (extremity adjusting) for his elbow pain and, in May 2006, he again sought care for the most recent episode of symptoms.

INTERVENTION AND OUTCOME

Several physical exam findings led to a referral for co-management with an orthopedic surgeon who ordered MRI of the right elbow.

CONCLUSION

This case study describes the physical, radiographic, and MRI findings for a patient with ESRD presenting with tumoral calcinosis at the right elbow. In the United States, approximately 8 million adults have physiological evidence of chronic kidney disease (determined by reduced glomerular filtration rate), with approximately 450,000 under treatment for ESRD. Because patients with ESRD can present with musculoskeletal symptoms, this case illustrates the importance of careful correlation of patient symptomatology, physical examination, diagnostic imaging findings, and patient history.

Attaining Grading Reliability and Validity With Student Teaching Assistants

Linda Carlson, MS, RT, and **Daniel J. Weinert,** DC, MS, Palmer College of Chiropractic

BACKGROUND

The use of teaching assistants (TAs) is common in higher education. Advantages and disadvantages are possible when TAs participate in course grading. By adopting effective strategies, advantages may be maintained while minimizing disadvantages.

OBJECTIVE

The purpose of this study was to measure the differences in grading between TAs and faculty instructors and to discuss possible strategies to enhance consistency between the graders.

METHODS

Grades from a chiropractic radiographic positioning course were analyzed to compare TA and faculty performance. Independent *t* tests and analyses of variance were used to compare means.

RESULTS

A small but significant difference existed between TA and faculty scores.

CONCLUSION

Teaching assistants can effectively grade practical exams, but do show small, but significant differences from faculty graders.

~

Analysis of Peak Force in Applied Kinesiology Manual Muscle Testing

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OBJECTIVE

The purpose of this study was to investigate factors contributing to variable peak forces observed in manual muscle tests performed by applied kinesiology (AK) practitioners.

DESIGN

A secondary analysis of data from an observational study was performed.

METHODS

Forty-one volunteer AK doctors tested the middle deltoid of 36 volunteer subjects attending a professional conference. Tests were performed in each style of muscle testing that the examiner routinely employed in practice—examiner-started, patient-started, and/or near-simultaneous. Peak force and duration of test were recorded and correlated with size, age, and experience of examiners and subjects as well as style of testing and result.

RESULTS

A broad range of force (0.55-23.6 lb) was used. There were poor correlations between peak force and the examined variables with the exception of a moderate correlation ($r = 0.55$) between peak force and duration of test.

CONCLUSION

Applied kinesiology muscle testers test muscles at submaximal peak forces over relatively short times. The choice of force used does not correlate well with the size of subject or examiner, muscle testing style, or outcome of the test. The clinical importance of these differences from other manual muscle testing merits further investigation.

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Identification of Thoracic Spinal Levels by Palpation Versus an X-Ray Gold Standard

Robert Cooperstein, MA, DC, **Michael T. Haneline**, DC, MPH, and **Russell Wilson**, RTR, CRT, Palmer Center for Chiropractic Research, Palmer College of Chiropractic West

INTRODUCTION

Most evidence suggests that x-ray line marking is reliable, but less is known about its validity. A clinician purporting to correlate x-ray findings with palpatory procedures so as to treat effectively must be able to find the correct level on a patient. Our goals were to investigate whether the standing T7 spinous process (SP) corresponds to the inferior scapular tip, as commonly thought, and to determine how accurately a manual palpator could identify SPs three levels above and below.

METHODS

IRB approval was obtained. Standing subjects were palpated to locate the putative T4, T7, and T10 SPs mostly using the inferior scapular tip for reference point. Lead markers were placed alongside each segment approximately 5 cm left of the SPs. AP full-spine x-rays were taken, and later visually analyzed to determine the location of the markers in relation to the SPs.

RESULTS

The actual level of BB placement for the targeted T4 segment was on average 0.8 spinal segment low; for T7, approximately 1.0 segment low; and for T10, 0.9 level low. Thus, the examiners showed internal consistency and quite accurately located segments three levels above and below the middle marker, which corresponded more closely to T8 than to T7.

DISCUSSION

Since this study found the scapular inferior tip near the T8 SP, manual therapists using the standing "scapular tip = T7" rule may not be treating the intended thoracic spinal levels, nor correlating radiographic and manual examination findings accurately.

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Feigned Pain and Subluxation Calls
A Pilot Study on the Role of Expectation Bias

Robert Cooperstein, MA, DC, **Michael T. Haneline**, DC, MPH, **Makani Lew**, DC, **Morgan Young**, BS, and **Jennifer M. Hettich**, BS, Palmer Center for Chiropractic Research

INTRODUCTION

Manual therapists differ as to the significance of patients' pain, some finding it largely irrelevant and others finding it crucial to diagnosis. It is unknown how the location of a patient's spinal complaint influences the manual therapist's judgment as to spinal level to be treated. Foreknowledge of spinal tenderness may result in examiner expectation bias.

OBJECTIVES

This study investigates how such foreknowledge affects subluxation calls.

METHODS

One of the investigators palpated prone subjects' thoracic region from T4 to T9, marking the spinous process (SP) of the actual most tender segment. Feigned tender SPs from T4 to T9 were randomly chosen and also marked. Both a student and an experienced clinician located and marked the most subluxated segment. Distances between markings were measured. The project was IRB-approved.

RESULTS

The two examiners' subluxation calls showed little concordance, although two trends were noticed: the doctor's subluxation calls were closer to feigned tenderness, and the student's were closer to actual tenderness. The student was about equally likely to call subluxation at the real or feigned pain, whereas the doctor was more likely to find subluxation at the feigned level.

DISCUSSION

This was a pilot study that served well as a full-dress rehearsal for the full-blown study we are about to undertake, with certain design modifications. Since this was a pilot study, we think it best not to overinterpret the data.

~

Diagnosis and Management of Functional Femoral Neuropathy
A Case Study

Ariane Desmarais, Renaud Jeffrey-Gauthier, and **Martin Descarreaux**, DC, PhD, Université du Québec à Trois-Rivières

INTRODUCTION

Femoral neuropathy is a rare condition caused by several mechanisms, leading to a confusing clinical presentation.

OBJECTIVE

The purpose of this paper is to describe the clinical presentation and management of a 58- year-old female with a functional femoral neuropathy.

METHODS

A 58-year-old woman presented to a chiropractic office with a femoral neuropathy. The patient complained of right buttock pain, irradiating to the right groin and knee. Physical examination revealed a diminished patellar reflex and weakness of the psoas, quadriceps, and sartorius muscles. Tinel's sign was positive over the inguinal ligament. Paresthesia was noted at the anterior aspect of the right thigh and medially to the knee.

RESULTS

A treatment plan was initiated consisting of chiropractic adjustments in addition to stretching and myofascial therapies. The goal was to reduce pain and inflammation in the sacroiliac articulation by restoring the normal biomechanical function. A rehabilitation program was initiated in order to release the tension in the musculature, thus reducing the mechanical stresses exerted on the femoral nerve. The patient received five treatments and, after 3 weeks, complete recovery was observed.

DISCUSSION

Two hypotheses were brought forward. The first one is that the femoral nerve might have been compressed and stretched in the iliopsoas groove under the thick iliac fascia. The second one suggests that the femoral nerve might as well have been compressed under the inguinal ligament following an excessive hip abduction, external rotation, and flexion brought on by the position of the legs in the horseback riding posture.

CONCLUSION

Even though peripheral lower limb nerve entrapments are uncommon conditions, clinicians must not overlook the possibility of a mononeuropathy because it can produce confusing clinical presentation and lead to ineffective patient management.

~

Relationship of Paraspinal Surface EMG Levels to Perceived Muscle Tightness of Low Back Pain Patients in a Clinical Study

James W. DeVocht, DC, PhD, **Edward F. Owens, Jr.,** MS, DC, **Ram Gudavalli**, PhD, Palmer Center for Chiropractic Research, **David G. Wilder**, PhD, University of Iowa, **Joseph O. DiDuro**, DC, and **William C. Meeker**, DC, MPH, Palmer Center for Chiropractic Research

INTRODUCTION

Muscle tightness is commonly used by many chiropractors as an indication of where to adjust the spine but is difficult to quantify accurately. This paper compares resting EMG levels with perceived paraspinal muscle tightness.

METHODS

Participants were of ages 18 to 55 in good general health with uncomplicated chronic low back pain. Each signed a consent form approved by an Institutional Review Board. A total of 192 participants were recruited: 89 females and 103 males (average age 40 years).

Participants were placed prone on an adjusting table. Muscle tightness was rated from 0 to 10 by palpation at the two paraspinal sites of greatest tightness and their symmetric sites. The participant was asked to relax while raw EMG data were collected.

RESULTS

The EMG value at each site on each patient was compared to the perceived tightness of the muscle bundle at those same sites. No significant correlations were found. The vast majority of EMG values were observed to be clustered together at low values.

DISCUSSION

It would seem that an elevated resting EMG level at a

particular spinal level would indicate the presence of a spasm or tight muscle bundle at the level, which is often taken as an indication of the need to adjust that level. However, these results did not show any significant correlation with resting EMG levels and the perceived muscle tightness.

CONCLUSION

The task of identifying the specific place in the spine to be adjusted is a complex issue without a simple, consistent, or well-defined answer. Hopefully, future discoveries will help to clear some of the fog surrounding these types of issues.

~

Examination of Joint Hypermobility as a Premanipulative Test

Joseph O. DiDuro, DC, **Dennis P. Lopez**, DC, **Steven L. Silverman**, DC, **Dennis Malik**, DC, MS, **Thomas A. Wicks**, PhD, DC, **Scott Carpenter**, DC, and **James V. Owens**, DC, Palmer Center for Chiropractic Research

OBJECTIVE

The purpose of this study was to examine the prevalence of benign joint hypermobility syndrome in patients seeking chiropractic care.

METHODS

This was a prospective study carried out from October 2005 to June 2006 at an outpatient chiropractic teaching clinic in Davenport, IA. Patients were examined at the first visit to the clinic.

OUTCOME

Benign joint hypermobility syndrome (BHJS) was measured on a 9-point Beighton hypermobility score. A minimum score of 5 would indicate joint hypermobility for patients less than 50 years of age and 4 when a patient was older than 50.

MAIN RESULT

For 103 patients (46% female, mean age 34, SD 15), the mean Beighton hypermobility score for the group was 2.0 (SD 2.6) indicating that in general, BJHS is not common. Fifteen female patients (26.8% of females, 14.6% of total sample) demonstrated BJHS, while only three males demonstrated BJHS (6.4% of males, 2.9% of total sample).

DISCUSSION

Hypermobility has been identified as a possible risk factor for cervical artery dissection (CAD), and large numbers of patients with connective tissue disorders experience cervical artery dissections. A possible correlation between a unique patient population (women under 45 years of age who present for manipulation) and both hypermobility syndromes and cervical artery dissections is presented.

CONCLUSION

Many clinicians omit tests for hypermobile joints from their examination. Since patients with BJHS and those who present for manipulative care suffer from chronic musculoskeletal pain, particularly of the spine, the high percentage of hypermobile individuals in the population of women under 45 years of age suggests that examining joint hypermobility may identify a specific subgroup of patients at risk for cervical artery dissection.

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Chiropractic Academic Affiliations Within the Department of Veterans Affairs Health Care System

Andrew S. Dunn, DC, MEd, MS, VA of Western New York Healthcare System, New York Chiropractic College

INTRODUCTION

With the recent implementation of chiropractic into the Department of Veterans Affairs (DVA) Health Care System, chiropractic institutions nationwide now share common educational ground with 107 of the nation's 126 medical schools and over 1200 other educational institutions. Chiropractic students may undergo clinical training within VA medical facilities that have affiliation agreements with chiropractic institutions. The purpose of this study was to gain a greater understanding of the current state of chiropractic academic affiliations within the DVA.

METHODS

Survey method was utilized to obtain information about the program design and operation of VA chiropractic academic affiliations. A review of the literature regarding the implementation and development of optometry and podiatry within the DVA provided a frame of reference for chiropractic profession.

RESULTS

Chiropractic academic affiliations, with internships of varying hours and duration, have been established within four VA medical facilities in association with three chiropractic colleges. In the 30 years since the inclusion of optometry and podiatry within the DVA, academic affiliations have developed at 130 VA medical facilities involving all of the accredited teaching institutions for those disciplines.

DISCUSSION

The four existing chiropractic academic affiliations were largely dissimilar in terms of their design and operation with different strengths and program characteristics identified. The chronology of implementation for podiatry and optometry and the development of VA academic affiliations for these disciplines may serve as a frame of reference for and provide guidance to VA doctors of chiropractic and the chiropractic profession.

CONCLUSION

Variation is the rule rather than the exception with each chiropractic academic affiliation serving as a model only within its unique setting. Additional study is needed to determine the impact that program variation has on the clinical care and educational functions of VA chiropractic academic affiliations.

~

Infectious Microbes on Chiropractic Treatment Tables
Assessment and Risk Reduction

Marion Willard Evans, Jr., DC, PhD, **Jennell Breshears**, DC, **Alan Campbell**, PhD, **Chris Husbands**, BAAS, and **Ronald Rupert**, MS, DC, Parker College of Chiropractic Research Institute

OBJECTIVE

The purpose of this study was to investigate the presence of pathogenic microbes on chiropractic treatment tables in one outpatient teaching clinic. Additional aims of the study were to test two inexpensive disinfectants on table surfaces that may kill microbes if present and to suggest basic infection control measures for chiropractic offices, teaching clinics, and classrooms.

METHODS

Ten treatment tables were selected and sterile swabs were utilized to sample possible microbial flora on face pieces and hand pieces of the table. Swabbed samples were cultured on MacConky's agar and mannitol salt agar, labeled appropriately, and incubated for up to 48 hours. Further confirmatory testing of microbes to determine if drug resistant forms were present was performed. Among the initial tables tested, five were selected to test disinfectants. One-half of the face piece and one hand piece were treated with an alcohol wipe and the other with Lysol brand wipes and then posttested for microbes.

RESULTS

Pathogenic microbes were present on treatment tables including methicillin-resistant *Staphylococcus aureus*. Application of simple disinfectants to the surfaces of treatment tables neutralized the pathogens.

CONCLUSION

There is no standardized protocol for table sanitizing and infection control in chiropractic teaching institutions or clinics. Pathogenic microbes may be present on chiropractic treatment tables and can be effectively killed with proper disinfecting. Hand washing or hand sanitizing is an important measure in infection control as is table sanitizing several times per day. This study proposes rudimentary changes to improve chiropractic clinic infection control. More comprehensive behavioral models are needed. All teaching clinics and private chiropractic offices should adopt infection control practices, including routine hand-sanitizing and table-disinfecting procedures. Simple, effective measures can be put in place at minimal costs. Accrediting bodies of chiropractic institutions should mandate an infection control plan for member institutions immediately.

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An Electronic Survey of Nomenclature Used in Chiropractic Colleges in the United States

Meridel I. Gatterman, MA, DC, MEd, Educational Consultant, and **Kathryn T. Hoiriis**, DC, Life University

INTRODUCTION

This paper reports the results of a survey of the faculty and administrators of the Council on Chiropractic Education (CCE) accredited chiropractic colleges in the United States. The current survey was designed to revisit a study sponsored by the Consortium for Chiropractic Research reported in 1995. The participants in that nomenclature consensus process had broad academic geographic and philosophical representation. The terms and definitions agreed upon through both a nominal and a Delphi consensus process were incorporated into the current survey.

METHODS

The e-mail addresses were requested in an electronic document format. For those institutions that failed or refused to provide an e-mail list, a manual entry was done using the institutional e-mail convention published on the Internet. A master list ($N = 1062$) was submitted for electronic survey using Zoomerang software. The Zoomerang technician handled all invitations, responses, data files, and reports from a secure site (http://www.zoomerang.com). The software accepted one response from each e-mail address. Survey responses were anonymous and participants were given an e-mail address for contact in the invitation to have any questions answered.

RESULTS

The survey generated 492 (46%) visits and 348 (33%) completions. The respondents were primarily faculty with degrees in chiropractic. The responses demonstrated ongoing variability in the terminology used by chiropractic educators.

CONCLUSION

Electronic survey of chiropractic faculty and administrators was made more difficult by failure to respond to the requests for electronic addresses by four schools and security locking by the information technology departments in two others. The individual responses generated by the survey can be used to explore terminology being used by chiropractic educators and to facilitate a more standard nomenclature within the chiropractic educational community.

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Directional Effect of Vertebral Position on Muscle Spindle Responsiveness at L6–7 Segments

Weiqing Ge, PhD, and **Joel G. Pickar**, DC, PhD, Palmer Center for Chiropractic Research

BACKGROUND

Maintained changes in vertebral position will affect muscle length history and may alter paraspinal muscle spindle responsiveness. Vertebrae can move with 6 degrees of freedom. The aim of this study was to investigate how the responsiveness of lumbar paraspinal muscle spindles at rest and during movement is affected by the direction of static change in vertebral position.

METHODS

Action potentials were recorded from muscle spindle afferents in the L6 dorsal root. Succinylcholine was used to confirm an afferent originated from a muscle spindle. The L6 vertebra was "conditioned" along the dorsal-ventral or caudal-cranial axis by holding it in a position that shortened (hold-short), lengthened (hold-long), or held the paraspinal muscles at an intermediate position (hold-intermediate). The vertebra was returned to and maintained at the intermediate position for 0.5 seconds (static test) and then moved in a direction that loaded the muscle spindle (dynamic test). Muscle spindle responsiveness after hold-long or hold-short conditioning was compared with that after hold-intermediate.

RESULTS

Receptive fields were located in the lumbar multifidus ($n = 2$) or longissimus ($n = 8$) muscles. During the static test, mean instantaneous frequency after hold-long (ΔMIFlong) decreased by -16.7 (-23.6, -9.9) and -24.2 (-31.5, -17.0 imps/s (lower, upper 95% CI) and ΔMIFshort increased by 4.6 (1.5, 7.7) and 4.8 (1.6, 8.1) imps/s for the caudal-cranial and dorsal-ventral directions, respectively. During the dynamic test, mean frequency with hold-long (ΔMFlong) decreased by -5.4 (-8.9, -2.0) and -8.5 (-14.0, -3.0) imps/s and ΔMfshort increased by 1.3 (0.1, 2.5) and 2.2 (0.6, 3.8) imps/s for the caudal-cranial and dorsal-ventral directions, respectively.

DISCUSSION

For the same magnitude of vertebral displacement, the effect of a change along the dorsal-ventral axis was greater than that along the caudal-cranial axis. Spinal manipulation directed posterior-anterior may be more effective at stretching lumbar paraspinal muscles than manipulation directed inferior-superior.

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Impact of Cervical Spine Manual Therapy on Mouth Opening Measurements in an Asymptomatic Population

James W. George, DC, **Jason Fennema**, DC, **Adam Maddox**, DC, **Martha Nessler**, DC, and **Clayton D. Skaggs**, DC, Logan College of Chiropractic

INTRODUCTION

Temporomandibular disorders (TMD) are a group of disorders affecting the temporomandibular joint (TMJ) and/or masticatory muscles. One of signs associated with TMD is a reduction in mouth opening. During normal mouth opening extension occurs at the cervical-cranial junction. The purpose of this investigation was to determine if manual therapy applied to the cervical-cranial junction would significantly improve mouth opening capacity.

METHODS

The institutional review board of Logan College approved this study. One hundred and one participants were randomly assigned to one of three groups: Active Release Technique (ART), 34; high-velocity low-amplitude manipulation (HVLA), 34; or control, 33. A TheraBite range of motion scale was used to measure mouth opening by a masked investigator. Participants received ART to the suboccipitals, HVLA to cervical spine at C1, or sat with an investigator for 3 minutes with no treatment. Following the treatment session, mouth opening was re-measured. A repeated measures analysis of variance (ANOVA) was used to compare the group means. The a priori alpha level was. 05.

RESULTS

The repeated measures ANOVA showed no significant difference between the ART, HVLA, or control groups' pretreatment and posttreatment measurements ($F = 0.41$, $p > .05$).

DISCUSSION

There are several possible explanations for the lack of improvement in our population's mouth opening measurements. The population was asymptomatic and had measures within the normal cited range. A single treatment application was administered and several manual therapy sessions may be necessary. Furthermore, there are numerous techniques used to improve motion in the cervical spine and only two were used in the current study. The results provide a normative data set to compare to symptomatic populations.

CONCLUSION

Manual therapy to the cervical spine did not significantly improve mouth opening in our population. Future trials using participants with restricted mouth opening measures are warranted.

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Rhabdomyolysis: The Importance of Accurate Diagnosis
A Case Report and Literature Review

Micheal L. Gilbert, DC, and **Jean-Nicolas Poirier**, DC, Parker College of Chiropractic

INTRODUCTION

Rhabdomyolysis refers to the destruction of somatic muscle. It is characterized by myocyte disintegration and death followed by leakage of intracellular contents into the extracellular compartment and circulation. It is commonly caused by eccentric loading of a muscle against a high resistance; however, other less likely causes such as enzyme deficiencies, infections, trauma, and intoxications may be

considered. We report on a case of exercise-induced rhabdomyolysis affecting the lumbosacral paraspinal musculature.

CLINICAL FEATURES

A 24-year-old healthy male performed multiple sets of heavier than normal dead-lifts. About 6 hours postexercise, he noticed dark brown urine upon micturition. Several hours later, he developed right-sided lower extremity weakness, increased muscle stiffness, and low back pain. He sought treatment at the local emergency room.

INTERVENTION AND OUTCOME

Dramatically elevated levels of creatine phosphokinase and aspartate transaminase were recorded. CK-MM subtype was predominant. The patient was admitted to the hospital where intravenous infusion of sodium bicarbonate and sodium chloride was initiated. A magnetic resonance imaging examination of the lumbar spine was performed and demonstrated an area of right paraspinal musculature affected by rhabdomyolysis. Soon after, the patient's lab values returned to normal and he was released from the hospital. He has regained normal function without reported sequela.

DISCUSSION

Untrained persons involved in strenuous exercise are the most commonly affected patient group in exercise-induced rhabdomyolysis. Maintaining a gradual training regimen with adequate recovery time and proper hydration may help the athlete avoid this condition. The classic triad of clinical symptoms includes myalgia, weakness, and dark-colored urine secondary to myoglobinuria. The latter, if severe enough, can lead to acute renal failure. Hyperkalemia and hypocalcemia represent more acute complications and may be responsible for cardiac arrhythmia or cardiac arrest. Immediate diagnosis and rapid intervention are necessary in an effort to avoid these complications.

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Feasibility of Audio Recording Chiropractor–Patient Encounters in a Private Practice Setting

Andrea G. Haan, DC, **Cynthia R. Long**, PhD, and **Maria A. Hondras**, DC, MPH, Palmer Center for Chiropractic Research

INTRODUCTION

The dynamics of the chiropractic clinical interaction, particularly communication, are thought to play a part in the healing process. This study was used to develop protocols for data collection, including audio recording the chiropractor-patient encounter, in private practice settings.

METHODS

A convenience sample of two chiropractors with very different practices was chosen. Patients were enrolled over 2 half-day periods at each office. An audio recording was made of the chiropractor-patient encounter for each consenting patient. Chiropractors completed a practice characteristic form and postvisit questionnaire about the nature of the visit and the perceived effect of audio recording. Patients completed a postvisit questionnaire of demographics, satisfaction, and the effect of recording the visit. Audio recordings were not analyzed for this study.

RESULTS

Twenty-two patients were asked to participate and 14 were enrolled. Lack of time (4) and lack of interest (4) were cited as reasons for nonparticipation. However, no patients indicated not wanting to be audio recorded as a reason. Chiropractors completed the two-page, postvisit questionnaire in approximately 2 minutes, while the patient three-page questionnaires were completed in about 8 minutes. Both chiropractors and all patients reported they were unaffected by audio recording.

DISCUSSION

The four patients who indicated a lack of time for not participating were all on the first day. Therefore, the protocol was changed to give patients the option to return questionnaires in a preaddressed, stamped envelope. In future studies, patient data collection forms will be separated into questions that are not time sensitive, such as demographics, and those that are, such as satisfaction with the visit. Chiropractor demographic forms will be completed during training sessions.

CONCLUSION

Data collection and audio recording the chiropractor-patient encounter in private practices is feasible with attention to minimize the time needed of the chiropractor and patient.

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A Review of the Use of Likelihood Ratios in the Chiropractic Literature

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BACKGROUND

The use and importance of likelihood ratios (LRs) in clinical decision making has frequently been described in the medical and physical therapy literature; however, it is unknown to what extent the topic has been portrayed in the chiropractic literature. The use of LRs in clinical practice can be very helpful because they enable a practitioner to estimate the probability of a patient having a condition after a relevant test has been performed. The LR is a single index that merges the benefits of both sensitivity and specificity and tells the practitioner how much the results of a test will increase or decrease the pretest probability of the condition under consideration.

OBJECTIVE

The objective of this review is to determine how frequently LRs have been used or described in the chiropractic literature and to depict their appropriate use in the clinical setting.

METHODS

A literature search was conducted of the MEDLINE, MANTIS, and Index to Chiropractic Literature (ICL) databases, with search years encompassing 1966 through June 2006. Citations in the English language that addressed the following search terms were retrieved: "likelihood ratio" in combination with "manipulation" and "chiropractic."

RESULTS

The searches netted a total of 64 citations: 10 MEDLINE, 34 MANTIS, and 20 ICL. Three of these articles met the inclusion criteria and were reviewed. None of the reviewed articles provided a description of LRs and only two used them in a clinical context.

DISCUSSION

The use of LRs can be very helpful in patient management; however, LRs are rarely reported in the chiropractic literature. Accordingly, chiropractic practitioners are most likely uninformed on the subject and may not have the capacity to use them in formulating diagnoses. It is suggested that researchers increase the reporting of LRs and chiropractic clinicians begin to make use of them in day-to-day practice.

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Sensitivity and Specificity of Elliptical Modeling and Sagittal Lumbar Alignment Variables in Normal Versus Chronic Low Back Pain Subjects
Does Pelvic Morphology Explain Group Lordotic Differences?

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STUDY DESIGN

This study involved a computer analysis of digitized vertebral body corners on lateral lumbar radiographs of normal volunteers and low back pain patients.

SUMMARY OF BACKGROUND DATA

Measures of lumbar lordosis and elliptical modeling variables have been shown to discriminate between normal and chronic low back pain subjects. Pelvic morphology has been shown to influence an individual's sagittal lumbar alignment. However, no study to date has systematically looked at pelvic morphology differences and sagittal alignment between normal and pain groups.

METHODS

Fifty normal subjects were matched to 50 chronic low back pain subjects. Radiographic variables included L1-L5 lordosis, T12-S1 lordosis (Cobb's and posterior tangent methods), b/a elliptical ratio, sacral endplate to horizontal (SBA), and sacral tilt to vertical (posterior tangent S1). Three different measures of pelvic morphology were determined for each subject. Group means, standard deviations, correlations among variables, and linear statistical models were sought. To evaluate the sensitivity and specificity of the diagnostic comparisons (b/a ratio and lordosis variables) between groups, receiver operating characteristics curves (ROC curves) were analyzed.

RESULTS

Pelvic morphology showed similar mean values between the groups ($p > .05$). The distribution of both SBA and pelvic morphology variables was smaller for normal than pain subjects; however, no difference in the SBA versus pelvic morphology relationships for either pain category or sex was found. Several moderate to strong correlations among variables were found and varied according to group: L1-L5 versus SBA $= -.604$ and $-.401$, L1-L5 versus API $= -0.378$ and -0.242 for normal and chronic pain groups, respectively. Lordosis L1-L5 of 36.1° and b/a had good discrimination between groups (AUC $= .78$ and. 72).

CONCLUSION

Pelvic morphology measures are similar between normal and chronic low back pain subjects. L1-L5 lordosis of 36° is suggested as a minimum value for lumbar lordosis.

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Identifying Student Learning Styles and the Implementation of Alternative Teaching Methods in the Classroom

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BACKGROUND

There has been a paradigm shift toward student-centered learning which necessitates pedagogical innovation. Designing a learning environment that engages all students should be the objective for all instructors.

OBJECTIVE

The purpose of this study was to identify student learning styles and implement alternative teaching methods.

METHODS

The online VARK learning style assessment was utilized for this 1-year study. The VARK method identifies whether information is processed visually, through listening, reading/writing, or kinesthetically. The students were instructed to complete the VARK questionnaire, print the results, and review the study strategies. Postsurveys were distributed to assess whether this site was beneficial. Teaching methods that were implemented included online Blackboard Learning System, cooperative learning groups, collaborative projects, and journals. The Blackboard site included diagrams, photographs, and online quizzes. Group B's collaborative project was to design a kinesthetic palpation board. Group C had to design a project that utilized two to four of the VARK learning styles. The journals required students to analyze 10 individuals weekly and record any physical findings.

RESULTS

Of the 179 respondents, 48.5% ($n = 86$) were single mode and 52% ($n = 93$) were multimodal learners. Results indicated that less than 3% ($n = 4$) were auditory learners. Postsurvey of 131 students indicated that 82% ($n = 107$) found the VARK site to be beneficial. The collaborative projects were creative and can be utilized in other classes. The journaling has shown an improvement in lab skills.

DISCUSSION

Understanding the different learning styles encourages creativity in classroom. Results may indicate that oral presentations may be the least effective. The study strategies appear to be beneficial to the students. Students were enthusiastic about the projects. The use of these collaborative projects and small groups promotes peer learning.

CONCLUSION

Identifying the various learning styles of the students challenges the instructor to design a multimodal learning environment and will be expanded to other courses.

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Augmentation of Interleukin-2-Induced Antibody Production Following a Single Spinal Manipulative Therapy in Normal Subjects

Stephen Injeyan, PhD, DC, **Julita Teodorczyk-Injeyan**, MSc, PhD, and **Richard Ruegg**, PhD, DC, Canadian Memorial Chiropractic College

INTRODUCTION

In normal subjects, interleukin-2 (IL-2)-regulated immune responses may be altered following a single manipulative therapy (SMT). However, the direct effect of IL-2 on the function of immune cells in subjects exposed to SMT has not been examined.

OBJECTIVE

The purpose of this study was to determine if a single SMT affects the IL-2-induced antibody synthesis in normal subjects.

METHODS

All subject-handling procedures were approved by the Institutional Research Ethics Board. Sixty-three age- and sex-matched normal (asymptomatic) subjects were assigned to SMT ($n = 25$), sham manipulation (SHM, $n = 19$), or venipuncture ($n = 19$) control. SMT consisted of a single bilateral hypothenar (Carver-Bridge)-type adjustment applied to the involved vertebral segment of the upper thoracic spine. Antibody production was induced by exposure of peripheral blood mononuclear cell cultures to human recombinant IL-2 (100 U/106 cells). After 7 days of cultivation, concentrations of immunoglobulin G (IgG) and M (IgM) were determined using a specific immunoassay.

RESULTS

Compared with respective baselines (before treatment), the production of IL-2-induced IgG increased significantly ($p = .032$) in cultures established from SMT-treated subjects at 20 minutes posttreatment (289 ± 43 vs. 411 ± 80 ng/mL). IgM production was significantly augmented ($p = .048$) in cultures derived from SMT-treated subjects at 2 hours postmanipulation (means: 799 ± 153 ng/mL compared with 540 ± 74 ng/mL at baseline). No significant changes in the level of IL-2-induced IgG or IgM synthesis were observed during the posttreatment period in the controls (VC and SHM). Throughout the posttreatment period, the number of B lymphocytes remained unchanged in all study groups.

CONCLUSION

The results of the present investigation suggest strongly that, in normal subjects, IL-2-regulated antibody responses may be temporarily facilitated following a single SMT. This may result from the manipulative therapy-related sensitivity (priming) of antibody-producing cells to this cytokine.

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Integrating Community Education With Chiropractic Continuing Education

Patricia M. Jestel, BS, and **Laurie Mueller**, DC, Palmer College of Chiropractic

INTRODUCTION

One of the primary modems that we have to increase the awareness that the public has for chiropractic is that of education via community events. Institutions and state associations must adhere to strict budgetary limitations that can make the presentation of such events difficult. Our pilot project was an experiment in maximizing event planning strategies.

METHODS

Our institution contracted with a best-selling author/scientist to keynote at one of our postgraduate symposia. We approached him about the possibility of presenting an additional program for the public. We incorporated the community in two different ways throughout the weekend. First, we invited other health care professionals to our Saturday/Sunday continuing education event: nurses, dieticians, nutritionists, physical therapists, massage therapists, MDs, and DOs. Second, we targeted the public lay audience for a special event on Friday evening. We partnered with local companies for sponsorship and promotional efforts. All marketing was handled at a grassroots level. We also included a service expo in conjunction with the community event.

RESULTS

Presentation of a high-quality program to the community, at a fraction of the cost of putting on a stand-alone program, increased community awareness for chiropractic. An ongoing stream of positive press surrounding the event was reflective on the college and the profession.

DISCUSSION

Similar community outreach endeavors exist both in and outside of the profession. Our budgetary approach was unique.

CONCLUSION

Strategic implementation can afford fiscally aware chiropractic institutions opportunities to add community events to their already existing seminar calendars. The addition of community events supports public awareness of the profession and promotes our colleges. Our findings from this pilot event are that positive community relations, professional relations, and press relations were cultivated through the effort, and that we were able to achieve these results within an already existing budget.

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MEG Response to Electroacupuncture Stimulation
A Case Study

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BACKGROUND

Magnetoencephalography (MEG) is a powerful functional neuroimaging modality capable of detecting the electrophysiological activity of neurons with high temporal resolution. It localizes the magnetic field responses generated by neuronal activity originating in the cerebral cortex and can help elucidate the temporal dynamics in response to sensory, motor, or cognitive stimulation. The clinical benefits of acupuncture treatment are diverse and suggest that neurophysiological mechanisms, both peripheral and central, may underlie its effects. Acupuncture interactions within the central nervous system have been subject to ongoing scientific investigation utilizing functional neuroimaging techniques such as positron emission tomography and, more recently, functional magnetic resonance imaging.

METHODS

We used the high temporal resolution capability of MEG to monitor the cortical responses to 2-Hz electroacupuncture at PC-6 in a healthy adult subject. Equivalent current dipole strengths and locations were determined for the main somatosensory evoked field deflections at the contralateral primary (S1) somatosensory cortex.

RESULTS

MEG activity associated with 2-Hz electroacupuncture stimulation at PC-6 produced multiple peaks indicating a very strong source near or within the contralateral S1. The earliest cortical sensory components seen were the M20 and M30, also indicating dipole localization near S1. Neuronal activation was also noted in the ipsilateral S1. Frequency analysis revealed strong beta activity evoked in the 20-Hz range, stronger in S1 and less in S2.

CONCLUSION

2-Hz electroacupuncture at PC-6 may activate a network of cortical responses that includes areas responsive to somatosensory and cognitive processing. It appears feasible to use MEG in controlled trials for the study of electroacupuncture stimulation.

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Implementing Cobb Kids Straighten Up and Move
A National Public Health Week Educational Outreach

Ron Kirk, MA, DC, and **Richard Franz**, DC, Life University

INTRODUCTION

Recent studies demonstrate the benefit of training school children in postural improvement exercises. In today's sedentary digital culture, many children spend much time in stooped awkward postures that have been correlated with poor spinal health. Noting that increasing children's activity levels was a central focus for National Public Health Week 2006, Life University conducted activity-based spinal health promotion outreaches in local elementary schools.

OBJECTIVE

The project's principal objective was to design, implement, and evaluate local spinal health promotion outreaches conducted in association with National Public Health Week.

METHODS

After several brainstorming sessions, a work group utilized a proposal template, including: project title, background, assumptions, plan, expected outcomes, assessment methods, pros and cons, and budgetary impact to create a comprehensive project proposal. During hour-long educational outreaches at three elementary schools, college participants led children and physical education teachers and principals through several sets of postural exercises. To assess the effectiveness of the outreaches, feedback surveys were completed by participating elementary school faculty and administrators and college participants. As educational research, the project was IRB exempt.

RESULTS

Approximately 750 elementary school children learned the postural exercises. The exercises have been incorporated within two of the schools' programs for daily use. Numerical and narrative survey responses indicated enthusiastic appreciation for the outreaches.

DISCUSSION AND LIMITATIONS

Survey responses indicate that participants considered the outreaches to be beneficial. Data derived from the feedback surveys are promising, but sample sizes are small.

CONCLUSION

Cobb Kids Straighten Up and Move was highly successful. Two of the three participating elementary schools have now incorporated the Posture Pod Straighten Up exercises in their physical education and classroom routines.

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Development of an Applied Skills Lab in Therapeutic Exercise at the Canadian Memorial Chiropractic College

Rhonda Kirkwood, DC, **Kim Ross**, PhD, DC, and **Hettie Till**, MSc, MMedEd, DEd,
Canadian Memorial Chiropractic College

INTRODUCTION

At the Canadian Memorial Chiropractic College (CMCC), education surrounding chiropractic care as it relates to the diagnosis and management of musculoskeletal conditions continues to evolve. Traditionally, the curriculum has included the delivery of auxiliary care techniques such as rehabilitation protocol development and therapeutic exercise prescription. This was traditionally delivered within a didactic, lecture-based framework and lacked the practical hands-on component that students would require to effectively and safely prescribe therapeutic exercise regimens.

METHODS

This paper provides a descriptive account of the recent development and implementation of an applied skills rehabilitation laboratory (lab) into the curriculum of the preclinical year (3rd year) at CMCC.

RESULTS

The main objective of the lab is to instruct chiropractic students on the how to effectively and safely prescribe therapeutic exercise within the chiropractic plan of management. A diagnostic course evaluation was administered to the 3rd-year student body for the current year and the results are pending.

DISCUSSION

Major challenges in implementing the course included: 1) finding time in an already laden 3rd-year timetable; 2) updating faculty on current and evidence-based rehabilitation protocols, and 3) finding space and purchasing equipment pertinent to the administration of low-tech rehabilitation techniques.

CONCLUSION

Instructing chiropractic students on the how to effectively and safely prescribe therapeutic exercise within the chiropractic plan of management is an essential component of the modern-day, evidence-based chiropractic curriculum.

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Standards, Learning Objectives, and a Curricular Model for Teaching Evidence-Based Practice

Ron LeFebvre, DC, **Dave Peterson**, DC, **Mitch Haas**, DC, **Charles Novak**, and **Richard Gillette,** Western States Chiropractic College

INTRODUCTION

There are no commonly accepted standards to guide an evidence-based practice (EBP) curriculum and little vision as to what such a curriculum would look like beyond a journal club or an EBP course or two. We have produced a document similar to the Council on Chiropractic Education (CCE) standards for clinical competency which can be used to drive an EBP curriculum. However, successful implementation also requires a new curricular model.

METHODS

Funded by an NIH grant in partnership with OHCU, a panel at Western States Chiropractic College (WSCC) has assessed the literature and conducted structured interviews with its faculty to ascertain behaviors regarding the teaching and utilization of EBP. Using a nominal panel consensus format, the panel has produced a number of documents and recommendations.

RESULTS

The panel produced a new model for integrating EBP into the curriculum and documents establishing standards and learning objectives for EBP specifically and information literacy in general. We believe the EBP standards and learning objectives document is the first of its kind, in terms of both detail and scope. The individual learning objectives are also weighted based on their perceived importance or competency level.

DISCUSSION

Our curricular model consists of three main components. 1) Core courses in EBP must lay the groundwork for acquiring the skills necessary to conduct an in-depth literature search and in-depth assessment and to rapidly access and digest high-quality evidence from prefiltered sources. 2) A series of "curricular threads" must penetrate the majority of courses and divisions, consisting of discrete active learning assignments, specific EBP "mini-skills," and EBP terminology, concepts, and content. 3) A framework must ensure application of EBP in a busy teaching clinic.

CONCLUSION

Our hope is that our standards documents and curricular model may be used by other institutions as a convenient and time-saving starting point for their own endeavors.

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Treating Musculoskeletal Injuries With Monochromatic Infrared Light Therapy

Three Case Studies With a Literature Review Examining This Technology and Its Impact on Patient Care

Kathleen L. Linaker, DC, Life University, **Quoc Giang**, DC, Physical Medicine Associates, and **Angela Silva**, DC, Physical Medicine Associates

Three musculoskeletal cases (avulsion fracture, bone contusion, and medial collateral ligament sprain) that were treated with monochromatic infrared energy (880 nm) are presented showing a 50% to 75% reduction in the expected time to return to play. A summary of the literature and a basic explanation of the physics and photobiology behind the efficacy of monochromatic infrared treatments are presented.

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Managing Conflicts of Interest in Continuing Medical Education

A Comparison of Policies

Anthony J. Lisi, DC, VA Connecticut Healthcare System, University of Bridgeport College of Chiropractic

BACKGROUND

Altruism is a central underpinning of professional behavior; however, physicians may face instances in which their secondary (financial) interest is in competition with their primary (patient health, research integrity, professional education) interests. Most medical institutions have developed policies to manage conflicts of interest, but chiropractic institutions, organizations, and providers may not be well acquainted with such policies.

OBJECTIVE

The purpose of this paper is to compare the policies of the Department of Veterans Affairs (VA) and the North American Spine Society (NASS) regarding management of conflicts of interest in continuing medical education (CME).

METHODS

This paper presents a qualitative review of published policies of the VA and NASS.

The policies of each organization were retrieved and reviewed, and data were entered into a spreadsheet for comparison. Content experts at each organization were contacted to provide additional information.

RESULTS

The VA and NASS provide explicit policies to manage conflicts of interest in CME. Proposed speakers are required to disclose the nature and value of financial relationships relevant to content of their planned talk/presentation. Procedures for committee review, mitigation of conflict, or prohibiting the participation of a given speaker have been described. Disclosure must be made to the attendees of an educational activity in printed materials and at the time of presentation.

CONCLUSION

The VA and NASS appear similar in their policies to manage conflicts of interest in CME. The policies of the VA and NASS may provide examples for the chiropractic profession to consider in relation to chiropractic continuing education.

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Undiagnosed Metastatic Disease Presenting as Mechanical Spinal Pain

A Report of Three Cases and Review of Management Strategies

Anthony J. Lisi, DC, VA Connecticut Healthcare System, University of Bridgeport College of Chiropractic, and **Gregory Mara**, BS, University of Bridgeport College of Chiropractic

OBJECTIVE

The purpose of this paper is to present three cases of undiagnosed metastatic disease referred to a chiropractic clinic as mechanical spinal pain and to discuss related management strategies.

SUMMARY OF BACKGROUND DATA

Red flags of serious pathology presenting as spinal pain are well known. The presence of one or more suggests the need for further testing; yet these findings are not quantifiable, and clinical judgment ultimately must be used. This is particularly true in the older adult patient population, who by definition always have one (age > 50) and often two (history of cancer) red flags. Management strategies attempt to strike a balance between not overtesting those with simple musculoskeletal pain and not overlooking those with serious pathology.

CLINICAL FEATURES

Three patients were referred to the chiropractic clinic of a major US medical center. Two complained of lumbar pain and one complained of thoracic pain. All were over 50 years old; two had a history of cancer. Before consultation all were seen by at least two medical physicians at the facility and/or privately, and all had negative x-rays.

INTERVENTION AND OUTCOME

Despite negative x-rays, spinal manipulation was withheld during chiropractic treatment. No case improved. In each case, subsequent advanced imaging revealed spinal metastasis with pathologic vertebral fracture.

DISCUSSION

When history suggests malignancy, erythrocyte sedimentation rate (ESR) ≥ 50, ESR ≥ 20, and/or lumbosacral x-ray have sensitivities of 0.56, 0.78, and 0.70 respectively.

Magnetic resonance imaging (MRI) or bone scan each has a sensitivity of 0.95. It is estimated that MRI only after positive x-rays and ESR will miss 4 cases of cancer per 1000 patients, whereas MRI on all patients with a history of cancer will miss 2 cases per 1000. This paper describes three cases of spinal metastasis referred to a chiropractic clinic as mechanical pain. Appropriate clinical decision making was required regardless of referral source.

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Doctor-Driven, Patient-Centered Care in the Campus Health Center

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INTRODUCTION

Surveys at New York Chiropractic College (NYCC) showed that student satisfaction with the intern-driven clinical experience was poor. As a result, NYCC has decided to adopt the doctor-driven, patient-centered care model. The purpose of this study was to determine the current level of doctor-driven care in the Campus Health Center and student satisfaction in clinical education.

METHODS

A focus group was assembled from all health centers to gain feedback from clinicians regarding strengths and challenges of doctor-driven care. To determine the current level of doctor-driven care and student satisfaction, two surveys were developed, one for 7th-trimester students (89% response rate) and the other for patients who had been in the health center in the past 6 months (29% response rate). The questions on the surveys correlated directly with the doctor-driven process map. For each of the steps in the process map, we were expecting the percent agreement between the step and clinician or the clinician/intern percentage to be 85%-90%. The chi-square statistic was used to test the statistical significance in student satisfaction between years 2003 and 2006 and significance of correlation with each process step.

RESULTS

Student satisfaction increased from the year 2003 to 2006. However, it was evident that clinicians were not following the doctor-driven care model at the expected significance level.

DISCUSSION

Clinicians are not following the doctor-driven process. There may be multiple reasons for this, such as unclear expectations and student attitudes. There are steps in the process which clearly show that doctor-driven care is occurring. The expected value is set at 90%, which is too high for this early in the process. Student satisfaction has increased, which may be the direct result of the partial switch to this new system. The hypothesis was not supported, but gives NYCC a baseline with which to draw future conclusions.

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Exploring Associations Between Patient–Provider Trust, Patient's Frequency of Visits, Continuity of Care, and Expectations of Care in Chiropractic Practice

Dennis M. Marchiori, Palmer College of Chiropractic, and **Alan B. Henkin**, University of Iowa

INTRODUCTION

Trust is an essential part of any relationship. Patient trust is especially important in the context of health care. Trust between patients and their providers extends beyond the quality of the relationship to the results of patient care. Recent research recognizes the importance of trust as a critical variable within patient-centered models of health care delivery.

OBJECTIVE

This research focuses on chiropractic practice and is designed to investigate potential associations between patient-provider trust and selected parameters of the patient's visit to the provider's practice, including the patient's continuity of care, frequency of care, and expectations of care.

METHODS

The patient sample was collected from the 72 US chiropractors participating in a practice-based research program. Self-report questionnaires were administered to the first 10 adult established patients presenting to these offices during the study period. In total, 676 complete patient forms were received from the 72 practitioners. Patient-provider trust was measured by the Trust in Physician scale.

RESULTS AND DISCUSSION

A significant association between the patient's expectation of care and the level of patient-provider trust was found. Conversely, the patient's continuity of care and frequency of visits were not associated with the level of trust. The positive association is consistent with the related literature that recognizes the importance of "expectations of the truster" in the formation of trust. High expectancy denotes increased confidence that the behavior will produce the outcome, and low expectancy, just the opposite.

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Attitudes Toward Chiropractic Paradigm and Practice
An Exploratory Study

Brian J. McAulay, DC, PhD, Life University

INTRODUCTION

This paper provides an empirical approach to determining the relationship between attitude toward chiropractic paradigm (or "philosophy") and practice type.

METHODS

Using a sample of chiropractic students, this paper uses a 24-item survey instrument to operationalize eight essential variables related to attitudes toward chiropractic paradigm and chiropractic practice. The eight variables are: IMP (the philosophy of chiropractic is an important topic); NEW (the philosophy of chiropractic is contemporary); MED (a medical lifestyle is an effective approach to health); THER (as a profession, chiropractic ought to be oriented toward a condition treatment model); SELF (living organisms have a striving toward optimum function (autopoeisis)); OBFR (chiropractors should be free to pursue a practice objective of their own choosing); VSOB (the objective of the chiropractic profession should be to correct subluxations); and VSIN (vertebral subluxations interfere with normal physiology).

RESULTS

This paper uses established procedures to establish validity and reliability for the variables. There were positive correlations among the variables that are oriented toward a philosophy-centered paradigm of chiropractic (IMP, NEW, SELF, VSOB, and VSIN) and between the two variables that take a more condition-centered approach to health care (MED, THER). There was a positive correlation between the condition-centered variables and the notion that a chiropractor ought to be free to choose his or her own practice therapeutic focus.

DISCUSSION

The paper explores the future research of this stream of research, as it advances the notion that operationalization of these variables provides the potential to transcend the polemic plaguing the profession for the last several decades, to be replaced by the language of empirical social science.

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A Survey of Chiropractic Students' Knowledge and Attitudes Regarding Diagnosis and Primary Care

Matthew McCoy, DC, **Marc Schneider**, DC, **Michael Pryor**, MPH, DC, and **Karen Numeroff**, DC, Life University

OBJECTIVE

The purpose of this survey was to ascertain students' knowledge and opinions regarding some of the issues related to diagnosis and primary care following the implementation of a chiropractic primary care clinical training program and to briefly review the related literature.

METHODS

Two hundred forty (240) students were surveyed on the topics in question from Winter quarter 2004 through Spring quarter 2005. The students included those enrolled in 6th through 14th quarter and were asked to respond in writing to the following questions:

1. Do most state laws include some type of "duty to diagnose" statement in their statutes/rules/regulations? Yes No
2. In your opinion, do chiropractors have a duty to diagnose? Yes No
3. What is the difference between a primary care provider and a portal-of-entry provider?

RESULTS

The results show that 86.6% of the students felt that most state laws have some type of "duty to diagnose" statement in their statute/rules/regulations, while only 58% stated that in their opinion chiropractors have a duty to diagnose. Fifteen percent specifically wrote that chiropractors had a duty to diagnose subluxation only, and only 4.5% of students correctly characterized the difference between a primary care and portal-of-entry provider.

CONCLUSION

Student attitudes regarding the issue of diagnosis and primary care appear to mirror that of the profession as a whole. There does not appear to be a clear consensus on these issues that educators can look to and, beyond the classroom, practicing chiropractors appear conflicted about how much responsibility and autonomy they actually want. In light of its stated mission, the results of this survey should provide some framework to begin a dialogue about how the Doctor of Chiropractic Program is addressing these issues, especially regarding primary care, throughout its curriculum.

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Facilitating the Learning Process
A Pilot Study of Collaborative Testing Versus Individualistic Testing in the Chiropractic College Setting

Jamie K. Meseke, MSM, Cardinal Stritch University, **Rita Nafziger**, MBA, Palmer College of Chiropractic, and **Christopher A. Meseke**, PhD, Palmer College of Chiropractic Florida

INTRODUCTION

Research confirms that collaborative testing as an instrument for learning and assessment is practiced at numerous institutions of higher education. Research has yet to evaluate the impact of this pedagogy on learning in chiropractic colleges. In order to assess this research topic, this pilot study was conducted to examine the effect that collaborative testing has on achievement of students taking a neurology course at a chiropractic college.

METHODS

The grades of two cohorts of students taking neurology were compared: the control group from first academic quarter of 2006, and the experimental group from second academic quarter of 2006. The control cohort completed weekly quizzes as individuals. The experimental cohort completed the weekly quizzes in small collaborative groups. Grades for each cohort included: weekly unit quizzes, small-group discussion problems, interval unit examinations, laboratory performance, and a comprehensive final exam. Multivariate analysis of variance (MANOVA) was used for statistical analysis (SPSS version 13.0).

RESULTS

Overall, the experimental group differed from the control group (Wilks' lambda $= 0.199$; $F = 27.032$, $df = 14, 94$; $p < .001$). No significance, however, was observed in the first two unit exam scores, summative exam scores, or final point totals. The only areas of the course related to the collaborative exam paradigm that yielded statistically significant differences were the weekly quizzes. For every quiz, the experimental group scored higher than the control.

DISCUSSION

The results of this study confirm previous reports that student performance is enhanced by collaborative learning. Collaborative testing provided students with the opportunity to discuss their reasoning and to receive immediate feedback from other group members regarding their rationale. Through this, student understanding of course material was enhanced. Students were encouraged to become more active in the course, as group discussions emerged from individual perspectives. The collaborative learning process may enhance critical thinking abilities, which are vital for future chiropractic practitioners.

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Principal Components Analysis of the Atlas Vertebra

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INTRODUCTION

Although variation of the atlas has been previously recognized, the extent
and importance are unknown. Because of the limited availability of cadaveric specimens, most previous studies have relied on radiographs, with limited data extraction.

METHODS

Two hundred thirty-seven atlases were obtained from the Hamann-Todd Osteological Collection housed at the Cleveland Museum of Natural History in Cleveland, Ohio. The following dimensions were bilaterally measured: anteroposterior length of the superior articular facet, width of the superior articular facet, length of the transverse process, width of the vertebral canal, anteroposterior diameter of the inferior facet, height of the lateral mass, transverse diameter of the inferior articular facet, width of the inferior lateral mass, slope of the inferior facet, convergence angle of the superior facet, circumference of the inferior articular facet, and circumference of the superior articular facet. Multivariate analysis of variance (MANOVA) was used to identify differences between right and left sides for each variable. Principal components analysis was used to determine sources of variation within the data set.

RESULTS

Comparison of variables based on sidedness showed no significant differences (Wilk's lambda $= 0.932$, $F = 2.518$; $df = 12, 411$; $p > .05$). Only width of the vertebral canal differed based on the right and left side comparison ($F = 10.637$; $df = 1,422$; $p < .01$). Although 98.79% of variance was accounted for across 10 eigenvectors, all were predominated by a single variable (except the first, which was based on a combination of transverse width of the vertebral canal and width of the lateral masses, and the sixth, which was based on a combination of anteroposterior length of the superior articular facet and circumference of the inferior articular facet).

CONCLUSION

Based on MANOVA and the eigenvector loading of the variables, significant asymmetry was not detected, except in width of the vertebral canal. The role of this variable in encroachment on the spinal cord warrants further investigation.

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Analysis of Written Continuing Education Materials in Determining Allocation of CE Credits

Laurie L. Mueller, DC, and **Sharon Whitney**, Palmer College of Chiropractic

BACKGROUND

Determining how many credit hours should be allocated to text-based media has been a subjective process for self-study and online continuing education (CE) units.

OBJECTIVE

To orchestrate a study that would supply data to give providers, course developers, and state boards a guideline for how much a given piece of text-based material should be worth in terms of continuing education hours.

METHODS

Six timed 3-hour seminars were audio/videotaped, and then transcribed. The word counts were then averaged to a per-hour rate to determine what our recommended text length would be for 1 hour of continuing education credit. Also taken into consideration were other industry standards in this area, such as the captioning industry and interpretation services for the deaf.

RESULTS

A range of 4681-5469 words would serve as a fair equivalent for 1 hour of text-based learning time.

DISCUSSION

This study was conducted to create an average and basic guideline from which course developers, continuing education providers, and state boards could formulate decisions that need to be made regarding the CE worth of text-based continuing education materials.

Deaf services and captioning industry standard averages, as well as research on reading speeds for educated adults, and speech-rate property studies utilized in aural media were high when compared with our transcription studies. This difference could be due to speakers presenting in a lecture format and at a speed for learners to digest intricate material.

CONCLUSION

A total of 4681-5469 words (for ease of use 4500-5500) translates into 1 hour of CE for learners assuming content is of an advanced and intricate nature. This information could become a standard for chiropractic continuing education, and a guide for course developers to prepare materials more effectively for self-directed study or live lecture formats.

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Kinematics and Kinetics of Chiropractors During Side-Posture Lumbar Spine Manipulation
A Pilot Study

Joshua Myers, MS, Medtronics Inc., **M. Ram Gudavalli**, PhD, Palmer Center for Chiropractic Research, and **David Wilder**, PhD, University of Iowa

INTRODUCTION

Chiropractors bend their body at various joints and use their hands for delivering quick dynamic forces in the treatment of low back pain. The purpose of this study was to provide data on biomechanical measures such as forces, electromyographic activity of muscles, and the motions of the body segments of chiropractors during high-velocity low-amplitude (HVLA) lumbar side-posture spinal manipulation.

METHODS

This study was approved by the Institutional Review Boards (IRB) of Palmer Center for Chiropractic Research and University of Iowa. We recruited three doctors of chiropractic and five patient participants from the employees/students population. The participants were excluded if there was a contraindication to spinal manipulation. Doctors used palpation to determine which vertebral segments needed spinal manipulation.

We used electromagnetic sensors to monitor position and orientation, and surface electrodes to monitor the EMG activity of superficial muscles surrounding the lumbar spine of the doctor. Force transducers were placed between the doctors' hands and the patient.

EMG data were collected while the doctor performed submaximal voluntary contractions in flexion, lateral bending, and twisting while holding a 15-lb weight. Using MathCad software, motion, EMG activity, and manipulation load parameters were extracted at preload and peak load phases of the spinal manipulation.

RESULTS

Preloads, peak loads, and rates of loading were significantly different between the doctors with no differences in

durations. We noticed differences in activation of different muscle groups between the three doctors. Also differences in the joint motions of lumbar flexion and rotation of the three doctors were noticed.

DISCUSSION AND CONCLUSION

We developed an approach to studying the kinematics and kinetics of chiropractors during a side-posture lumbar manipulation. A comparison of three chiropractors demonstrated different styles of performing a side-posture HVLA-SM. All three doctors applied similar peak loads but used different strategies.

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Pain Patterns and Descriptions in Patients With Radicular Pain Does the Pain Necessarily Follow a Specific Dermatome?

Donald R. Murphy, DC, DACAN, Rhode Island Spine Center, Brown University School of Medicine, New York Chiropractic College, **Eric L. Hurwitz**, DC, PhD, University of Hawaii, **Jonathan K. Gerrard**, DC, Rhode Island Spine Center, and **Ronald Clary**, DC, Rhode Island Spine Center

OBJECTIVE

The purpose of this paper is to describe and discuss the diagnostic utility of the distribution of pain in patients with cervical and lumbar radiculopathy.

METHODS

Pain drawings and descriptions were assessed in consecutive patients diagnosed with cervical or lumbar nerve root pain. These findings were compared with accepted dermatome maps to determine whether they tended to follow along the involved nerve root's dermatome.

RESULTS

Two hundred twenty-two nerve roots in 222 patients were assessed. Pain related to cervical radiculopathy was nondermatomal in over two-thirds (69.7%) of cases. In the lumbar spine, the pain was nondermatomal in just under two-thirds (64.1%). The majority of nerve root levels involved nondermatomal pain patterns except C4 (60.0% dermatomal) and S1 (64.9% dermatomal). The sensitivity (SE) and specificity (SP) values for dermatomal pattern of pain were low for all nerve root levels with the exception of the C4 level (SE 0.60, SP 0.72) and S1 level (SE 0.65, SP 0.80), although in the case of the C4 level, the number of subjects was small ($n = 5$).

CONCLUSION

In most cases nerve root pain should not be expected to follow along a specific dermatome, and a dermatomal distribution of pain is not a useful historical factor in the diagnosis of radiculopathy. The exception to this is S1 radiculopathy, in which a dermatomal pattern of pain is relatively sensitive and specific.

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Epidemiology of Musculoskeletal Injuries Among Students Entering Chiropractic College

Harrison T. Ndetan, MSc, and **Ronald L. Rupert**, MS, DC, Parker Research Institute

OBJECTIVE

Previous studies have identified a high level of injury to chiropractors in private practice. This raises the question of how many of those injuries existed prior to entering the profession. The purpose of this research is to address that question.

METHODS

A descriptive cross-sectional design using self-administering survey was given to 1st-year chiropractic students ($n = 255$). Survey questions were adopted from the Standardized Nordic and Outcome Assessment Health Status Questionnaires. Data were collected on the frequency, perceived effects, and period of last perception of low back (LB), hand/wrist (H/W), and neck/shoulder (N/S) injuries of the students prior to attending chiropractic college.

RESULTS

Two hundred fifty-two (98.8%) valid surveys were analyzed from 66.7% male and 33.3% female respondents. A history of LB was reported by 50.4%, 40.1% H/W, and 53.2% N/S disorders prior to attending chiropractic college. Of the respondents, 48.8% were overweight/obese and 51.2% were normal weight. The overweight cases were more likely to report injuries (OR = 1.1 [LB], 2.1 [H/W], and 1.7 [N/S]) and, among them, the mean BMI for the females was significantly greater than for the males.

DISCUSSION

The study identified a high prevalence of musculoskeletal injuries among students prior to attending chiropractic college. Only a small percentage of those injuries were severe enough to impede normal daily work. Females with high BMI seem to be at greater risk. Students with a history of previous injury may be at greater risk of new injuries or exacerbation as a result of manual training-related activities in college. A cohort design isolating risk factors may confirm the assertion that precollege injury history is a potential determinant for musculoskeletal disorders in the chiropractic student population.

~

Prevalence of Musculoskeletal Injuries Sustained by Chiropractic Students While in College

Harrison T. Ndetan, MSc, and **Ronald L. Rupert**, MS, DC, Parker Research Institute

OBJECTIVE

The purpose of this study was to assess prevalence and risk factors of injuries to the low back (LB), hand/wrist (H/W), and neck/shoulder (N/S) among chiropractic students while receiving and/or administering adjustments.

METHODS

An epidemiological survey was taken employing a cross-sectional design with chiropractic students in all trimesters ($n = 890$). Use was made of a self-administered anonymous three-page questionnaire. This was divided into sections to collect data separately on injuries associated with receiving or administering chiropractic adjustments. Result analyses included descriptive statistics, t tests, chi-square, regression analyses, and cross-tabulations.

RESULTS

The response rate was 64.3% (62.6% males, 36.4% females). Overall prevalence of injuries prior to attending college was 67.7% and the overall lifetime prevalence in college was 31.5% (40.6% exacerbations of prior complaint and 26.4% new cases). Injuries from receiving adjustments were most prevalent to N/S, whereas H/W injuries were most common when administering adjustment. Interns administered, on average, 20 adjustments weekly. Diversified, Gonstead, and upper cervical adjustment techniques were perceived to be the most injury related. Of students with injuries, 61.4% were not exercising for strength/flexibility prior to their first symptoms. As a result of injury, 50.1% changed their adjusting procedures.

DISCUSSION

Students enroll in college with preexisting injuries that can easily be exacerbated. Others sustain new injuries from receiving and giving adjustments. Potential risk factors may include age, height, BMI, and nonexercising. This study failed to isolate injuries due to adjusting "set-ups," which may be a worthwhile consideration in future designs. The risk factors and mechanism responsible for the high levels of H/W injuries need further examination. A longitudinal study to assess the impact of twisting, weightbearing, and imparting to the H/W should be considered. This research identifies an important need to design a comprehensive and logical protocol to prevent injury to chiropractic students.

~

First Rib Fracture of Unknown Etiology
A Case Report and Review of the Literature

Hang T. Nguyen, DC, The Center for Spine Pain, **Joel P. Carmichael**, DC, The Center for Spine Pain, **J. Scott Bainbridge**, MD, Denver Spine, and **Craig Kozak**, DC, The Center for Spine Pain

OBJECTIVE

The purpose of this paper is to describe the clinical presentation of a patient with medial scapular, upper thoracic spine, and sternal pain, who did not respond to chiropractic treatment and was subsequently diagnosed with a first rib fracture.

CLINICAL FEATURES AND OUTCOME

A 24-year-old otherwise healthy male electrician presented with onset of medial scapular, upper thoracic, and sternal pain while using a power drill in the overhead position. An initial trial of treatments consisting of spinal manipulation and modalities failed to alleviate the patient's symptoms. Chiropractic treatment was discontinued and further diagnostic testing with advanced imaging was performed. Once the pathology was identified, the patient was placed on light duty at work with restrictions limiting overhead activities. No other treatment was rendered. The patient was symptom free approximately 10 months following the onset of pain.

CONCLUSION

Patients with complaints of spine and scapular pain commonly present to a chiropractor for care. In most cases, these musculoskeletal symptoms are caused by joint and myofascial dysfunction and resolve well with various manual therapies. However, when these types of symptoms do not respond to conservative therapy, other causes should be investigated. In this case, the patient's symptoms resulted from a nontraumatic fracture of the first rib. First rib fractures should be considered in the differential diagnosis of patients with spine and/or scapular that is not responsive to conservative care.

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Baseline Spinal Stiffness Characteristics of Patients Enrolled in a Clinical Study of Spinal Manipulation for Low Back Pain

Edward F. Owens, Jr., MS, DC, Palmer Center for Chiropractic Research, **James DeVocht**, DC, PhD, Palmer Center for Chiropractic Research, **Ram Gudavalli**, PhD, Palmer Center for Chiropractic Research, **David G. Wilder**, PhD, University of Iowa, and **William C. Meeker**, DC, MPH, Palmer Center for Chiropractic Research

INTRODUCTION

We developed a hand-held device to take measurements of posterior-to-anterior spinal stiffness (PAS) on patients in a study of spinal manipulation for patients with low back pain.

METHODS

The project was approved by the college's IRB. The PAS device consisted of a plastic rod with a force transducer mounted at the lower end and a position tracker mounted at the upper end. The device was pressed manually into the soft tissue overlying the spinous processes of each lumbar segment using up to 80 N of compression. Linear regression was used to calculate the force versus displacement relationship, resulting in a stiffness value in N/mm.

RESULTS

One hundred ninety-two patients (89 female, 103 male, average age 40.0 [SD 9.4]) were studied. The average Roland-Morris Score was 9.7 (SD 3.2) on a 24-point scale. Initial VAS scores were 55.7/100 (SD 20.9). Sixty-two percent of patients had suffered from low back pain (LBP) for more than a year. PAS measures were successfully recorded for 162 patients. Females were on the average 2 N/mm more compliant than males ($p < .001$).

Significant correlations were seen between segmental stiffness and demographic factors: age, gender, weight, and body mass index (BMI). However, no clinical factors correlated with spinal stiffness, including: chronicity of complaint, Roland-Morris scores, VAS for pain, or lumbosacral (LS) range of motion. The weight and BMI correlation was most significant at the lowest lumbar segments.

CONCLUSION

The PAS system of computer-monitored equipment, with human operation, performed well in this clinical study of low back pain. Spinal stiffness was found to be different between males and females, and age and body mass index were related to PAS. We found no significant relationship between the severity or chronicity of the LBP complaint and spinal stiffness.

~

Preparing Learners for National Board of Chiropractic Examiners (NBCE) Part IV Objective Structured Clinical Examination Utilizing Blended Learning

Kristina L. Petrocco-Napuli, DC, and **Patricia R. Merkle**, BA, New York Chiropractic College

INTRODUCTION

In order to combat the discrepancy of practice before the National Board of Chiropractic Examiners (NBCE) Part IV Objective Structured Clinical Examination (OSCE), a Clinical Correlations elective was developed for students in 7th trimester and above. The goal of this course was to improve student preparedness for the NBCE Part IV OSCE. The course was offered at multiple clinic locations.

METHODS

This course was designed as an 8-week review utilizing a blended method approach in which the learners studied course materials online via a learning management system and two face-to-face sessions which included OSCE assessments and instructional sessions. A student preparedness perception survey was administered via Zoomerang after the Part IV board examination and before the release of the scores. The survey was distributed to all students who qualified to take the Spring 2006 NBCE Part IV OSCE.

RESULTS

The overall average score for students enrolled in the course was increased in comparison to students who did not take the course by 35 points and 7 points higher than the national mean. The respondents of the survey demonstrated an increase in student perception of preparedness.

DISCUSSION

The outcome of the clinical correlations group suggests an increase in scores which may be correlated to the preparation for the examination. The students who completed the course had a perceived level of confidence and general understanding of the structure of the examination. The students perceived the course as a useful and effective method for assisting in preparation for the NBCE Part IV OSCE.

CONCLUSION

Blended learning as preparation for a high-stakes OSCE such as NBCE Part IV can be beneficial to learners. The process incorporates both cognitive and behavior attributes such as the aspects of the examination. This was a preliminary study and more research should be done in this area.

~

Descriptive Study of DISH Patients Presenting to Teaching Clinics in Québec and France

A Pilot Study to Determine the Feasibility of a Randomized Control Trial

Marie-Helene Pilon-Choquette, Université du Québec à Trois-Rivières, **Isabelle Sideleau**, Université du Québec à Trois-Rivières, **Marie-Sonia Marcellin**, Institut Franco-Europeen de Chiropratique, **Camille Koch**, Institut Franco-Europeen de Chiropratique, **Caroline Andre**, Institut Franco-Europeen de Chiropratique, **Martin Descarreaux**, Université du Québec à Trois-Rivières, and **Michelle Wessely**, Institut Franco-Europeen de Chiropratique

OBJECTIVE

The objective of this descriptive retrospective study was to determine the prevalence of chiropractic patients presenting with diffuse idiopathic skeletal hypertrophy (DISH) in the Québec teaching clinic practice and the French teaching clinic practice and to describe the clinical characteristics of patients with DISH in the chiropractic teaching clinics to determine the similarities and differences in the patient population.

METHODS

The clinical records for patients presenting to two Quebec teaching clinics over a 10-year period were accessed. In France, the clinical records were accessible for the past 2 years. The inclusion criteria for the study were those patients presenting to the teaching clinics with the clinics' chiropractic radiologist interpretation of the imaging. Exclusion criteria were those clinical files with insufficient data, no reference to DISH, or hyperostosis in the key words in the clinical search or the reference to hyperostosis in the appendicular skeleton.

RESULTS

This study demonstrated that the localization of the DISH in the Québec patients in the spine included 101 cases (69.66%) in the thoracic spine, 38 (26.21%) in the lumbar spine, 15 (10.34%) in the cervical spine, and 8 (5.52%) affecting the cervical, thoracic, and lumbar spine simultaneously. In France, the cervical spine was the spinal area with DISH most commonly detected in 9 patients (56.25%), then the lumbar spine in 5 patients (31.25%), then the thoracic spine in 3 patients (18.75%).

CONCLUSION

The information provided from this study as well as the areas of weaknesses, will provide the basis from which to construct a randomized controlled trial of patients with the imaging diagnosis of DISH.

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Chiropractic Treatment of Chronic Childhood Constipation
A Case Report

David M. Quist, DC, and **Stephen M. Duray**, PhD, Palmer College of Chiropractic

OBJECTIVE

The purpose of this paper is to describe the history, treatment, and proposed explanation of positive outcome in a patient with chronic constipation.

CLINICAL FEATURES

An 8-year-old male accompanied by his mother presented to a chiropractic office with a complaint of chronic constipation. His mother reported that this had been a problem since the child's birth. Allopathic treatment had not been effective to date. This was his first visit to a chiropractor.

INTERVENTION AND OUTCOME

The patient was examined and found to have sacral subluxation complex. He was adjusted using diversified adjusting procedures. External massage of the abdomen starting in the right lower quadrant and following the course of the large intestine in a clockwise direction was also applied. The patient reported an immediate, dramatic improvement in bowel function following the first treatment. Treatment was continued for a 4-week period (two visits per week), and then discontinued, as the patient (confirmed by his mother) reported consistently normal bowel function. A follow-up call made 13 years after treatment revealed continuing normal bowel function.

CONCLUSION

This case suggests that subluxation may play an important role in some cases of chronic constipation. Clinical trials are warranted.

~

The Challenges of Ethical Recruitment of Patients Into Simultaneous Clinical Studies in a Chiropractic Research Clinic

Robert M. Rowell, DC, **Dana J. Lawrence**, DC, and **Edward F. Owens, Jr.**, MS, DC,
Palmer Center for Chiropractic Research

BACKGROUND

There are a growing number of clinical trials being conducted in the chiropractic profession. Because trials are expensive to conduct, and because patient recruitment is critically important to the success of that research, means need to be found to maximize the recruitment yield when chiropractic institutions conduct more than one study. At the same time, it is even more important to protect patient autonomy and ensure that the ethics of enlisting a patient for a trial other than the one they expressed interest in is handled in an ethical manner.

OBJECTIVE

To develop a process for use at Palmer Center for Chiropractic Research (PCCR) that creates an ethical means to bring other research projects to the attention of an individual who failed to meet the inclusion criteria of the project for which they originally expressed interest, and to discuss the ethical issues surrounding patient recruitment and enrollment.

METHOD

A general consensus process was employed via meetings of key individuals.

RESULTS

A process and flow sheet for offering new study information to individuals who did not meet the criteria for participation was developed. Once rejected, they are asked if they wish to learn about other studies, are sent home with information, and are instructed to call back if they wish to volunteer. Consent will be used to take baseline information from the first study and apply it to the second. This approach has been approved by the Human Protections Administrator for PCC.

CONCLUSION

The process has been implemented for use in the PCCR. Patient autonomy is preserved in the method that was developed.

~

Psoas Major
A Case Report and Review of Literature

Sandy S. Sajko, MSc, DC, Canadian Memorial Chiropractic College

INTRODUCTION

A better understanding of the implications of the function of the psoas muscle on the stability of the lumbopelvic region may improve clinical management of related dysfunction. This report will provide a brief case report followed by an evidence-based approach to the anatomy, biomechanics, and function of the psoas major muscle.

CASE REPORT

A 25-year-old male professional hockey player presented after 5 days of preseason training camp with right-side hip pain. The pain, which had progressively worsened since its insidious onset 3 days prior, was characterized as sharp and was aggravated by weightbearing on the right leg and striding out during skating. Rest, ice, taping to minimize hip extension and abduction, and nonsteroidal anti-inflammatory

drugs (NSAIDs) decreased the patient's pain, but striding out during skating continued to increase it. Upon inspection of the region, the patient was diagnosed with myofascopathy of the right psoas major and rectus femoris. He continued with the ice, taping, and NSAIDs and was prescribed a 4-week active strengthening program. The program progressed from resisted concentric to eccentric abduction/adduction exercises, balance training, core stabilizing, and endurance exercises in the first 2 weeks. For the remaining 2 weeks of the rehabilitation program, the patient continued with the previously mentioned exercises, and hockey-specific exercises, such as sumo squats, side lunges, and the skating slide board, were introduced cautiously initially under supervision.

DISCUSSION

A review of literature of the anatomy, biomechanics, function, and clinical applications of the psoas major is assessed.

CONCLUSION

Practitioners should be cognizant of the anatomy and the biomechanical influence that this muscle has on lumbar spine stability when assessing and treating patients. A stable spine maintained with healthy and wise motor patterns, along with higher muscle endurance, is protective and may help to reduce the incidence of low back pain.

~

Effect of Chiropractic Treatment on Hip Extension Ability and Running Velocity Among Young Male Running Athletes

Jörgen Sandell, DC, **Per J. Palmgren**, DC, and **Lars Björndahl**, MD PhD, Scandinavian College of Chiropractic

BACKGROUND

The basic biomechanical restrictions for running velocity are step frequency and step length. Reduced hip extension has been attributed to tight hip flexor muscles or decreased elasticity of joint or tendon structures, leading to increased anterior tilt of the pelvis, which could explain decreased running performance. In the present pilot study, we investigated if chiropractic care could increase the hip joint extension ability and the running velocity.

METHODS

A randomized controlled experimental pilot study was conducted. Research participants ($N = 17$) were young, healthy, male running athletes. Hip extension ability and running velocity before and after the investigation period were measured using motion palpation of the SI and hip joints, Thomas' test of the ability to extend the leg, tests for sacral rotation, and posterior to anterior gliding in the hip joints. Findings of restrictive joint dysfunctions were the basis for the pragmatic choice of chiropractic care. High-velocity low-amplitude manipulations (HVLA) were performed.

RESULTS

No difference in hip extension ability between the two groups was noted before treatment, but the after-treatment group showed significantly higher hip extension ability than controls. Pairwise analyses showed increased hip extension ability for the treatment group but not for controls. The treatment group showed decreased running time (increased running velocity) after treatment, while there was no difference for the control subjects.

DISCUSSION

The results of this pilot study, with a limited number of participants, indicate that HVLA manipulation of joint dysfunctions and restrictions in the SI and pelvic regions can influence both hip extension ability and the running velocity. Further investigations are necessary before any wider conclusions can be drawn and should also involve groups of athletes with injuries involving the hip and pelvis regions to evaluate the potential of chiropractic care and rehabilitation for such injuries.

~

Attitudes of Chiropractic Students Regarding Academic Integrity

Marc P. Schneider, DC, and **Sue Dudt**, MA, Life University

INTRODUCTION

According to studies performed by McCabe, Trevino, and Bowers between 67% and 75% of students admit to cheating at least once in their academic career. Cheating is a constant on the campuses of many colleges and universities. This paper describes the actions by Life University to address academic integrity on its campus.

METHODS

Life University formed a task force consisting of administrators, faculty, and students charged with studying the culture of academic integrity on its campus. The task force in collaboration with Dr. Donald McCabe (the founder of the Center for Academic Integrity), developed a survey instrument to be administered on their campus.

RESULTS

Fifty (50%) of Doctor of Chiropractic Program (DCP) respondents are within 3% of the norm of students in graduate programs when it comes to engaging in specific behaviors and 50% exceed the norms of graduate students in engaging in specific behaviors. When rating the seriousness of specific forms of cheating, students enrolled in the DCP demonstrate attitudes predominantly above the norm on whether or not a specific behavior is not cheating and predominantly below the norm on whether or not a specific behavior is serious cheating.

DISCUSSION

Interpretation of the survey results suggest that students enrolled in the DCP have engaged in cheating behaviors more often than students in graduate programs. These chiropractic students also tend to minimize the relative seriousness of cheating behaviors when compared to graduate students.

CONCLUSION

Assessment results are being utilized to educate the faculty, students, and administrators at the institution as well as to form the baseline attitudes regarding academic integrity. The task force will utilize these initial data to develop strategies to improve the culture of academic integrity at the institution.

~

Pain Medication Use in an Obstetric Population
Indication for Reconsidering Approaches to Musculoskeletal Pain in Pregnancy

Clayton D. Skaggs, DC, Logan College of Chiropractic, **James W. George**, DC, Logan College of Chiropractic, **Doug Adair**, DC, Private Practice, **Mark A. Wyatt**, DC, Private Practice, **Kristan Giggey**, DC, Logan College of Chiropractic, and **David Adair**, MD, University of Tennessee College of Medicine

INTRODUCTION

Low back pain (LBP) and pelvic pain (PP) in pregnancy are common and are the primary predictors and highest risk factors for the development of chronic LBP among women. Persistent musculoskeletal pain often leads to prescribed and nonprescribed medications known to have serious complications during pregnancy. The purpose of this study was to identify and describe the incidence of pain medication use in an obstetric population.

METHODS

Institutional Review Board approval was obtained for this study and HIPAA guidelines were followed. This study used a questionnaire with a cross-sectional design to determine musculoskeletal pain, pain intensity, and pain medication usage in pregnant participants from a university medical center obstetric practice.

RESULTS

Two hundred ninety-five gravid females participated and 138 (46.8%) were taking pain medications; 37.3% of women taking pain medication were in their second trimester and 62.7% were in the third trimester, and 42.8% of the women were taking combinations of up to five medications.

DISCUSSION

Our results have identified a high incidence of musculoskeletal pain during pregnancy in a standard obstetric practice. Surprisingly, we also found a high rate of pain medication use. While the risks of pain medication use during pregnancy are well known, and the use is largely discouraged in standard obstetrical care, pain medication use in our population was found in nearly half the women. These findings suggest that there is a large misconception of the risks of taking pain medication during pregnancy, and women who are pregnant are often very compromised by their pain.

CONCLUSION

Because of the potential negative effects associated with pain medication during pregnancy, there is an ever-growing need of alternative pain management for pregnant women. Evaluating interventions based on established theoretical principles for treating LBP in the general population will provide a starting point for developing management strategies for pregnancy-related pain.

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Effect of Chiropractic Adjustments on Locomotion in a Patient With Xeroderma Pigmentosum

Dean L. Smith, DC, PhD, Private Practice, Miami University, **Mark Walsh**, PhD, Miami University, and **Jane P. Smith**, DC, Private Practice

OBJECTIVE

The purpose of the study was to investigate the effects of chiropractic on selected measures of locomotion (running) in a 5-year-old female patient with xeroderma pigmentosum. The patient presented with delayed fine motor and gross motor skills. The parents' chief complaint was an excessive forward lean during walking and running that led to falling.

METHODS

A single-participant ($n = 1$), prospective, AB design was used. Two digital video cameras and reflective markers located on the participant's head, hip, knee, ankle, foot, shoulder, elbow, and wrist were used to collect data during running trials before and after chiropractic adjustments. Data from the video cameras were collected and synchronized using SIMI motion analysis software. The examined kinematic variables (sagittal plane) included trunk forward lean angle and step length.

RESULTS

Following the adjustments, the patient significantly reduced the trunk forward lean angle to become more vertical. In addition, the patient experienced a significant increase in step length.

DISCUSSION

This study quantified the effect of a single session of chiropractic adjustments on gait parameters in a single subject during a course of chiropractic care. Over several months

of care, the improvements noticed in trunk forward lean by the parents and clinician were accompanied by a reduction in gait instability and falls. This provides support for the clinical significance of the intervention in addition to the statistical significance. The improvement in stability is the probable reason her step length improved.

Our society is keenly interested in finding ways to improve the untoward effects of dysfunctional locomotion (eg, falls). There is now sufficient evidence from several laboratories that chiropractic can positively affect motor behavior.

CONCLUSION

The results of this study demonstrated significant changes in locomotion in a patient receiving chiropractic adjustments. Further investigation is needed to examine the effect of chiropractic on locomotion in both symptomatic and asymptomatic patients.

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Demographic and Referral Analysis of a Free Chiropractic Clinic Servicing Ethnic Minorities

Gerald L. Stevens, DC, MS, New York Chiropractic College

BACKGROUND

The Lighthouse Free Chiropractic Clinic is part of a multidisciplinary clinic designed to handle the overall health needs of the ethnic minority poor in Buffalo, NY. Ethnic minorities often see a disparity in health care, which this free clinic attempts to address.

OBJECTIVE

The overall purpose of this retrospective study is to determine who comes to a free clinic in an ethnic poor neighborhood and how they came to find out about this clinic. The objective of this study is to collect and analyze the demographic and referral data of a free clinic.

METHODS

Data were collected on patient age, race, language, sex, chief complaint, and referral source. The data were processed via Microsoft Excel and compared to other studies in the literature.

RESULTS

The mean patient age was 44.8 years ($n = 257$); 65% (168) were female and 35% (89) were male. The race of the majority of the patients was African American (63%, 162) and English was the main spoken language (95%, 256). Low back pain made up the majority of the chief complaints (51%, 169), followed by neck pain 23% (75) and extremity complaints at 17% (58). Referrals to this clinic were from patients (27%, 69), walk-ins (25%, 65), and the result of multiple marketing efforts (34%, 98).

DISCUSSION

The low back/extremity chief complaints, amount of females, and amount of walk-ins to this free clinic were higher than expected when compared to other studies.

CONCLUSION

The majority of the patient population were African American and female, spoke English, were an average age of 44.8 years, had low back pain chief complaints, and were mostly referred by patients or walk-ins.

~

Professional Attire for Preclinical Students
A Good Idea or a Wasted Effort?

John W. Strazewski, DC, and **Ramneek S. Bhogal**, DC, Palmer College of Chiropractic

INTRODUCTION

Many qualities make a successful doctor of chiropractic, including mannerism and appearance. We assessed how 2nd-year chiropractic students perceive the requirement of professional attire during technique practical examinations.

METHODS

The survey was distributed to 112 members of the 4th-trimester class. Clinical attire was valued at 1 point with a possible total of 25 on each of three practical examinations. If the student satisfied the requirement, as outlined in the "Clinic Professional Appearance Code," he or she received the point. If the student failed to meet the requirement, he or she sacrificed the point. The timing of the survey was to allow the students to dress in clinical attire on all three separate examinations. The survey consisted of 10 items; seven items sought to gather information about the issue of clinical attire and three questions sought to delineate the demographics of the sample.

RESULTS

The requirement for clinical attire was overwhelmingly supported by the students (item 6), as 92% responded either strongly agree or agree. All found the Clinic Professional Appearance Code easy to understand. Fourth trimester was not too soon to begin the transition from student to doctor, according to 92% of the students. Seventy-three percent agreed that they felt like a doctor when dressed in professional attire. Item 4 addressed confidence when professionally dressed and 57% agreed, 31% were neutral, and 12% disagreed. The cost of having professional attire clothing was not a financial drain on personal budgets for 54% of students and 87% felt that the professional attire requirement should continue. The demographic distribution showed little variation, with the only exception being those who held a doctorate degree (1%); these students showed the high mean score in all items. The female students in the class showed a higher mean score on four items.

DISCUSSION

Although most students accepted the requirement for clinical attire, some did not. We will continue to require clinical attire during practical exams and re-evaluate perception of the requirement with the same assessment tool in a year to see if attitudes change.

~

A Feasibility Study Assessing Spinal Manipulative Care and Bimodal Care in Subacute and Chronic Neck Pain Patients

Richard G. Strunk, DC, MS, and **Maria A. Hondras**, DC, MPH, Palmer Center for Chiropractic Research

OBJECTIVES

The purpose of this study was to design a randomized clinical trial (RCT) of spinal manipulation (SM) versus SM plus postisometric relaxation (PIR) in patients with subacute or chronic neck pain.

SUMMARY OF BACKGROUND DATA

SM is commonly used to treat neck pain, but there is no conclusive evidence for its effectiveness. SM is often associated with minor adverse reactions such as pain and stiffness. Preliminary evidence suggests that SM and muscle energy techniques, such as PIR, may be helpful for neck pain.

METHODS

Patients were recruited in Davenport, Iowa. After a baseline assessment visit, eligible patients were randomly assigned to cervical spine SM or bimodal care (thoracic and sacroiliac SM + PIR) for four treatment visits over 2 weeks. Outcome assessments included the Neck Disability Index (NDI), Visual Analog Scale (VAS), and Posttreatment Response Questionnaire (PTRQ).

RESULTS

Twelve participants were screened and six patients were enrolled and randomly allocated to care. All patients completed five visits. Five of six patients had an improvement on the NDI. On the VAS, two patients improved at 2 weeks while the other four got worse. Five patients completed the PTRQ; two of the five indicated they experienced discomfort or an unpleasant reaction from the study treatments. One patient experienced mild neck pain and dizziness while the other patient indicated severe neck pain.

CONCLUSION

Designing a successful RCT requires considerable planning, development and pretesting forms and protocols, and training clinicians and staff for standardized protocols. The small sample size and short duration of care for patients with subacute and chronic neck pain preclude conclusions related to efficacy. However, patients were willing to be randomized, follow treatment protocols, complete baseline and outcome assessments, and return 83% of the follow-up questionnaires. In addition, the protocols and procedures were successfully implemented in the midst of ongoing studies at our institution.

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Spinal Manipulative Therapy (SMT) Does Not Alter the State of Activation of Systemic T Lymphocytes in Normal Subjects

Julita Teodorczyk-Injeyan, MSc, PhD, **H. Stephen Injeyan**, PhD, DC, and **Richard Ruegg**, PhD, DC, Canadian Memorial Chiropractic College

BACKGROUND AND OBJECTIVES

In normal subjects, the in vitro production of the T lymphocyte-derived cytokine, interleukin-2 (IL-2), and also certain IL-2-induced immune responses are augmented following a single manipulative therapy. This may suggest that the activity of IL-2-producing and IL-2-responsive lymphocytes is enhanced. The present study was undertaken to investigate whether the putative effect of SMT on IL-2 synthesis in vitro may result from the treatment-related systemic preactivation of the circulating T lymphocytes.

METHODS

All subject-handling procedures were approved by the Institutional Research Ethics Board. Seventy-four age- and sex-matched normal (asymptomatic) subjects were assigned randomly to venipuncture (VC, $n = 24$), sham manipulation (SHM, $n = 23$), or SMT ($n = 27$). SMT consisted of a single bilateral hypothenar (Carver-Bridge) type adjustment applied to the involved vertebral segment. Serum samples were obtained before (baseline) and then at 20 minutes and 2 hours posttreatment. The outcome measures included determinations of serum levels of IL-2 and those of its soluble receptor (sIL-2Rα) by specific immunoassays.

RESULTS

The number of subjects whose sera contained detectable levels of IL-2 and the means of serum levels of IL-2 (15-21 pg/mL) were comparable in all groups and remained essentially unaltered during the posttreatment period. No significant alterations in the concentration of the serum-associated sIL-2Rα (ranging from 290 to 305 pg/mL) were apparent in any of the study groups when examined both at 20 minutes and 2 hours posttreatment.

CONCLUSION

A single spinal manipulation does not alter the state of activation of systemic T lymphocytes. Thus, augmentation of the in vitro synthesis of IL-2 and/or improvement of IL-2-dependent responses following a chiropractic treatment may reflect the therapy-associated "priming" effect associated with improved recognition and response of the immune cells to subsequent activating signals.

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A Pilot Study of the Effects of Instrument-Applied Chiropractic Manipulative Therapy on Postural Control

Rodger Tepe, PhD, **Kristan Giggey**, DC, **Dennis Enix**, DC, and **John Zhang**, MD, PhD, Logan College of Chiropractic

INTRODUCTION

Symptoms related to equilibrium disorders occur in 5% to 10% of all patients seen by general practitioners and account for an estimated 7 million office visits per year in the United States. The ability to maintain balance is essential for mobility and overall functional independence throughout the life span. Equilibrium disorders are frequently due to problems with proprioception. If afferent signal input can be reduced by spinal dysfunction, then spinal manipulation may improve proprioception and equilibrium.

OBJECTIVE

The purpose of the study was to determine the effects of instrument-applied chiropractic manipulative therapy (CMT) on postural control.

METHODS

This study was designed as a feasibility/pilot-level, double-blind, randomized controlled trial. Approval was obtained from the Logan College Institutional Review Board. A convenience sample of 48 consenting, asymptomatic volunteers was randomly assigned to either the experimental condition, consisting of Pro Adjuster System (PAS) analysis and treatment, or a sham condition, consisting of PAS analysis only. Postural control was measured by sway velocity (SV) scores, which were taken before and after intervention using a NeuroCom Balance Master. Participants and examiners were masked to intervention status. Interventions were provided by a Pro Adjuster certified, licensed DC.

RESULTS

Participants receiving PAS treatment had statistically significant improvement in postural control ($p < .05$). The sham treatment participants had no improvement.

CONCLUSION

In this study, a single PAS treatment resulted in significant increases in postural control in a sample of asymptomatic participants. Continued study in this important topic should include longitudinal designs, different types of spinal manipulation, and symptomatic participants.

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Developing Case-Based Assessments to Integrate Basic and Clinical Sciences

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INTRODUCTION

Students find it difficult to see the relevance of, and have trouble integrating, some of the basic science course material when taught in isolation from the clinical courses. This problem is compounded by assessments in which a single discipline is tested at a time—mostly in a multiple-choice format. This paper describes the development of integrated assessment theory papers in an extended-matching and short-answer format.

METHODS

Three theory papers are written at the end of each module. Each paper includes questions from all courses taught during the relevant weeks of the module and consists of at least 100 questions. The number of questions assigned to each course on a paper is prorated to the instruction time of that course during the weeks covered by the paper, and faculty have to submit three to four questions per lecture hour. The group responsible for developing the exam papers consists of all faculty teaching in a particular module. Common cases are developed and faculty members then develop and link their question to these "real-life" cases. The results of the three papers are averaged and the students receive a single theory mark per module.

RESULTS

The pass rate was consistently over 90% and the averages varied between 70% and 75%. An internal consistency (Cronbach's alpha) of between 0.75 and 0.89 was reached and the split-half reliability was between 0.74 and 0.89 for each individual paper.

CONCLUSION

The integrated assessments had large resource implications. However, no complaints regarding relevance or integration were received. Some of the students indicated that the new format of assessment helped them to see the larger picture of why they had to learn certain basic sciences.

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Feasibility of Muscle Strain Imaging During Therapeutic Body Movements

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BACKGROUND

Many tissues respond to manual treatments. There is little information on the mechanotransduction of loads or distribution among tissue layers during manual treatments for low back pain (LBP). Information on loads will advance the understanding by 1) informing on the mechanisms of action, 2) identifying the boundaries for safety, and 3) gaining insights on tissue biomarkers and how to improve clinical results (threshold, dosage, and duration).

OBJECTIVE

Feasibility of ultrasound elastography during continuous passive motion (CPM) for LBP to estimate tissue layer thicknesses and strains was studied.

METHODS

B-scan and elastography were used during CPM (0.24 Hz, 15-degree excursion). After informed consent, a volunteer was tested in prone and lateral bending CPM and upright postural tasks. The transducer (Terason 2000, Teratech, Inc; 10 MHz, 24 frames/s) was positioned 3 cm lateral to L2/L3. Metrics included strata thicknesses and cumulative axial strains estimated using cross-correlation techniques.

RESULTS

It would be intuitive for the layered muscles to deform similarly during passive motion. This was observed with erect active flexion and extension, but not with prone CPM where the longissimus increased 16.9% but the multifidus decreased 11.3%. Apparent shearing action between muscle layers and nonuniformity of cumulative displacement and strain were observed. Strain images indicated axial compression and tension in the longissimus muscle during extension and flexion, respectively, while the opposite was seen with the multifidus.

CONCLUSION

Prone CPM shows nonuniform and counterintuitive muscle motions, cumulative strain, and changes in muscle thickness. Lateral bending and upright task were more in agreement with the expectations of uniform muscle deformation. Assumptions regarding muscle loading from postural tasks may not apply to recumbent treatments. Noninvasive elastography appears adaptable to measure tissue strains of CPM maneuvers. Future work will focus on analyses to include lateral strain and tissue behaviors in healthy and unhealthy volunteers.

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Development of a Practice-Based Research Program at a University Health Center
A Pilot Study

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INTRODUCTION

Practice-based research collects information on usual and customary practice and therefore could assist in assessing the disparities in health care quality, outcomes, and access for various segments.

AIMS AND OBJECTIVES

The specific aims of this pilot study are to develop a systematic approach to practice-based research (PBR) and to describe characteristics of chiropractic and acupuncture patients who present to the teaching clinic during the study period. The objectives are to develop the institution's capacity to conduct longitudinal studies and study the feasibility of such protocols.

STUDY DESIGN AND SETTING

A cross-sectional study design was adopted. It was conducted at the University Health Center, Pasadena, California, during September 2005.

STUDY POPULATION

The study included all patients of all ages, both new and established, who presented for care during the designated 1-week data collection period and excluded those who declined to participate in the study and/or were unable to read and write English.

METHODS

The project was approved by the University's Institutional Review Board. Informed consent was obtained from all subjects prior to participation. Participants were asked to fill out a form designed exclusively for this study. Office of data management managed data entry, verification, and analysis and ensured data integrity and confidentiality.

RESULTS

Overall 156 patients filled out the forms. Of this number, 71.4% sought chiropractic care, 18.2% sought acupuncture care, and 8.4% sought both treatments. The majority of the study population was male, with a higher proportion of Whites (46.1%) than other ethnic groups. Pain was reported as the main concern for visiting the health center by many patients. Other patient characteristics are similar to those reported elsewhere.

CONCLUSION

The University has successfully developed a systematic approach to conduct practice-based research. The investigators intend to replicate this study with a longer data collection period.

Sacroiliac Subluxation Following Ankle Sprain Mimicking Sciatica

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INTRODUCTION

Lateral ankle sprain (LAS) is a common injury in sport, often with residual symptoms. Sacroiliac dysfunction can be precipitated secondary to abnormal biomechanical stress application to the joint due to muscular dysfunction and altered arthrokinetic reflex.

CASE REPORT

A 52-year-old male presented with complaints of right-sided low back and hip pain with paresthesia in the right leg and foot of gradual onset, which had been previously diagnosed as sciatica by a medical doctor and a chiropractor. The treatment by each resulted in temporary relief but not resolution of the symptoms. Past history was significant for severe right LAS 15 years prior. Examination revealed positive findings in static posture, palpation, active and passive range of motion, manual muscle testing, and orthopedic and single-leg balancing testing.

DIAGNOSTIC IMPRESSION

Findings indicated a right sacroiliac subluxation, gluteal myofascial trigger points (MTrPs), and adverse neural tension of the superficial peroneal nerve, secondary to LAS. Management included chiropractic adjustments, neuromuscular therapy, postisometric relaxation, neurodynamic mobilization, and functional orthotic fitting. Active care included posture instruction and therapeutic exercise. After 5 weeks, the average pain reported was 1 out of 10 with no pain or paresthesia in the leg. The patient was discharged after week 8.

CONCLUSION

This case demonstrates the importance of examining the kinetic chain to determine precipitating and perpetuating factors in neuromusculoskeletal pain. Because an intact afferent nervous system is important in providing feedback for effective motor control, LAS may influence afferent feedback affecting stability and muscle function both locally and regionally in the lower extremity. Sacroiliac subluxation with MTrPs demonstrate pain patterns similar to that of sciatic neuritis. Clinicians must be aware of kinetic chain implications of injury and direct their treatment to address local, regional, and global dysfunction.

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A Review of Magnetic Resonance Imaging and Magnetic Resonance Arthrography in the Evaluation of Structures Comprising the Temporomandibular Articulation in the Open and Closed Mouth Position in Cadaveric Specimens

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OBJECTIVE

This study reviewed MR imaging (MRI) and MR arthrography (MRA) in the evaluation of structures comprising the temporomandibular articulation (TMA) in the open and closed mouth position in cadaveric specimens.

METHODS

MRI followed by MRA was performed in 10 fresh frozen cadaveric TMAs in the open and closed mouth positions. Each imaging method in each mouth position was evaluated by the consensus of two readers with specific attention to the following parameters: disc visualization and character, anterior and posterior capsule visualization, integrity and attachment sites, and condylar morphology. After imaging, specimens were sectioned (5 sagittal, 4 coronal) and correlated with imaging findings. Open dissection of one TMA was performed.

RESULTS

Among the 10 TMAs evaluated by MR and MRA imaging, closed and open mouth, a disc was visualized in all specimens but evaluation of its morphology was very different between the two methods ($p > .05$). In MR imaging with closed and open mouth, eight discs were visualized and not analyzable, and two discs were visualized and analyzable. In MRA with closed and open mouth, the disc had an excellent visualization in nine joints and was visualized and analyzable in one case. All the parameters analyzed had similar ranks of visualization between groups 1 and 2. All parameters analyzed had statistical significant differences between groups 1 and 3 and 2 and 4. The statistical test used was Wilcoxon signed rank test, and the significance value was $p < .05$.

CONCLUSION

MR and MRA provide diagnostic evaluation as well as a means to detail its intricate anatomy. A tailored examination of the TMA combining MRA with closed and open mouth positions may prove helpful in the assessment of the intracapsular structures of the TMA.

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Striving for Transparency
Development of an Evidence-Based Application and Rubric for Evaluating Applicants' Qualifications for Promotion to Professor

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INTRODUCTION

A challenge for every promotion committee is to make value judgments on the quantity and quality of peer work. Decisions based on a purely subjective assessment of applications may not do justice to either the applicant or the needs of the institution.

METHODS

In 2005-2006, the Professor Promotion Committee met weekly to develop a more objective evidence-based method with which to evaluate professorial work. The process required members to negotiate their value system toward consensus. The focus for evaluation was evidence-based productivity. Categories representing faculty work were identified by a faculty member's primary responsibility, scholarship, service, and professional development, and were then weighted. Evidence-based activity within a category was divided into four levels of accomplishment to which a numerical rating was assigned for each level. A composite score was calculated based on the evidence, and the score was used to generate discussions on promotion worthiness.

RESULTS

The Committee's work culminated in the development of four electronic applications (e-applications) soliciting specific evidence aligned with faculty work and four rubrics tied directly to the e-applications. The Professor Committee used the rubric scores as a general indicator of productivity toward promotion.

DISCUSSION

The Professor Promotion Committee used these instruments in the 2006 promotion process and found that these tools facilitated their work and resulted in recommendations which were well supported by evidence. Surveys that were

administered to applicants for promotion suggest that the applicants found the process superior to that used in previous promotion cycles.

CONCLUSION

The Committee believes that the online application aids applicants in recognizing the breadth and depth of promotable work and provides them the opportunity to structure their work in ways that enhance their chances for promotion, while the rubric helps to reduce subjectivity in the evaluation of applicants for promotion.

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Development and Implementation of Faculty Portfolios at Northwestern Health Sciences University

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BACKGROUND

In 2004, in an effort to standardize and improve faculty assessment, the Performance Evaluation Committee (PEC) was formed and charged with developing and implementing a new performance evaluation system at Northwestern Health Sciences University (NWHSU). A portfolio is a factual description of a professor's teaching strengths and achievements, including documents and materials that collectively suggest the scope and quality of teaching performance. It includes the curriculum vitae (CV), documenting the faculty member's developments and achievements. The second part includes the Faculty Performance Appraisal (FPA), and the Annual Performance Plan (APP). The purpose of this paper is to describe the development and implementation of faculty portfolios at NWHSU.

METHODS

The portfolio envisioned for a NWHSU faculty member is a combination of a learning/teaching portfolio and an assessment portfolio. Part I of the portfolio is the CV. Part II includes the FPA and the APP, which will function as an assessment and a planning tool. The faculty member documents his or her performance and goals. The effectiveness of each faculty member is reviewed using the documentation provided for the FPA. In the FPA, each faculty member provides a self-evaluation with supporting documentation, student evaluations with a written summary, peer review evaluations, previous supervisor evaluations, publications, and outside community and professional activities.

RESULTS

In 2005, 10 training sessions were held and the final faculty portfolio template was distributed to faculty. In year 1, 27 portfolios were reviewed by the PEC, and in year 2, 70 portfolios will be reviewed. The portfolios have provided the PEC with a systematic form of documentation that enables more consistent decision making, improving the performance evaluation process.

DISCUSSION

Even though every faculty member will be following a prescribed format for the CV and portfolio, the final product illustrates a unique pattern of professional growth and contribution.

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Effect of Fruit and Vegetable Powder Mix on Hypertensive Subjects

John Zhang, MD, PhD, and **George Oxinos**, Logan College of Chiropractic

This research was designed to study the effects of fruit and vegetable powder mix on cardiovascular health determined by blood pressure and heart rate variability (HRV) in a chiropractic college faculty and student population.

METHODS

Forty subjects were recruited in the study via a schoolwide e-mail notification and through personal contacts. All study procedures were approved by the Institutional Review Board (IRB) at a chiropractic college and explained to each subject prior to testing. NanoGreens vegetable supplement drink was tested to document its effect on the blood pressure and HRV in relation to cardiovascular health.

RESULTS

After taking the supplement for 90 days, both the systolic and diastolic blood pressure decreased significantly. The systolic blood pressure decreased from 140.4 ± 17.7 mm Hg to 128 ± 14.2 mm Hg, and the diastolic blood pressure decreased from 90.2 ± 7.7 mm Hg to 83.1 ± 7.4 mm Hg. No significant blood pressure decrease was observed in the control group (systolic blood pressure from 130.8 ± 16.3 to 131 ± 16.1 mm Hg and the diastolic blood pressure from 83.6 ± 9.6 to 83.1 ± 7.9 mm Hg). Subject's body weight did not change significantly in the experimental group from 193.5 ± 31.1 to 194 ± 31.3 lb. The body weight in the control group showed an increase from 175.9 ± 27.4 to 178 ± 29.9 lb, but it was not significant. The heart rate did not show any statistically significant changes. Time domain analysis of HRV showed an increase in SDNN and RMS-SD but did not reach statistical significance. Frequency analysis of HRV found an increase in the Total Power, but it did not reach a significant level.

CONCLUSION

It was concluded that taking the green vegetable drink for 90 days reduced blood pressure. The HRV was not affected by the supplement over the 3-month period.