Poster Presentations

The Chiropractic Care of Pregnant Patients: Results from a Survey of Chiropractors in a Practice-Based Research Network

Joel Alcantara, **Jeanne Ohm**, **Kurt Kunz**, and **Derek Kunz**, International Chiropractic Pediatric Association

Purpose: The purpose of this study was to characterize the chiropractic care of pregnant women in a practice-based research network.

Methods: The study utilized a descriptive survey to characterize provider demographics, patient sociodemographics (ie, age, educational level, and ethnicity) and clinical variables (ie, effectiveness of care and treatment-associated changes) as well as treatment-related improvements, aggravations (ie, worsening of symptoms) and complications (fractures, dislocations, stroke, etc.).

Results: The findings of the initial survey involve 389 pregnant patients of mostly white ethnicity (ie, 88%). The average patient age was 31.0 years presenting at an average of 26.9 weeks of gestation. The mean parity was 0.90. The patients were highly educated with 91% having a college education. The average number of office visits attended was 9.38, for a total of 3648 visits. The primary pregnancy provider was an obstetrician. Nineteen percent presented for "wellness care" along with pregnancy-related musculoskeletal complaints ($n = 274$) and nonmusculoskeletal pregnancy-related complaints. Common chiropractic techniques rendered by the chiropractor responders were Diversified ($n = 450$), Webster technique ($n = 386$), Thompson ($n = 241$), Activator ($n = 179$), and Gonstead technique. There were 16 reported treatment-associated aggravations and no treatment-associated complications. A large number (545) of treatment-associated improvements were reported, while 89 patients reported "no change."

Conclusion: Pregnant patients seek chiropractic care for wellness care and for pregnancy-related musculoskeletal complaints. Few and minor adverse events were reported. We encourage continued research in this field.

The Safety and Effectiveness of Pediatric Chiropractic: Results from a Practice-Based Research Network

Joel Alcantara, **Jeanne Ohm**, and **Derek Kunz**, International Chiropractic Pediatric Association

Introduction: The scientific literature documents high utilization of complementary and alternative medicine (CAM) for children. Chiropractic is the most popular practitioner-based CAM therapy for children. Safety and effectiveness are a priority for both CAM and conventional therapy providers.

Objective: To describe the chiropractic care of children with a focus on treatment-associated aggravations, complications, and improvements.

Methods: A cross-sectional survey was performed in a practice-based research network. Participants were chiropractors caring for pediatric patients (≤18 years of age) with pediatric visits ranging from 1 to 12.

Results: The data were derived from 77 chiropractors contributing 1733 pediatric cases. All patients received chiropractic spinal manipulation therapy at each visit ($N =$ 16,747 office visits). "Wellness care" was the most common reason for clinical presentation. Condition-based presentations include musculoskeletal complaints along with nonmusculoskeletal conditions of childhood (ie, digestion/elimination problems; ear, nose, and throat problems; neurological problems; and immune dysfunction). A vast majority received full-spine care. The responders indicated16 separate reports of treatment-associated aggravations reported as soreness or pain ($n = 10$), fever ($n = 1$), increased irritability ($n = 2$), headache ($n = 1$), increased spitting ($n = 1$), and increased motor tic ($n = 1$). This provides a

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prevalence of <1% of the 1733 patients or 1 in 1046 pediatric visits of minor adverse events. Eighty-one percent ($n = 1402$) reported improvements in their clinical presentation or clinical problems not initially reported during consultation.

Conclusion: This study contributes to documenting the safety and effectiveness of pediatric chiropractic. We advocate continued research in this area with larger prospective cohorts incorporating the covariates of safety and effectiveness of pediatric spinal manipulation therapy.

A Preliminary Investigation into Using Rhyme and Performance in Active Learning

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Background: Frequently, if not daily, people are exposed to verse or song, and songs oftentimes contain rhymes. Rhyme has been linked to memory and learning, while focused learning has been associated with teamwork. Combining rhyme with the collaboration of teamwork may have positive outcomes.

Objectives: This study's purpose was to evaluate first-term chiropractic students in a terminology course in a timed, small-group exercise of composing and performing a rhymed review of body systems to determine whether enough information could be collected to further explore the topic.

Methods: The activity took place during winter and spring terms of 2009. Students attending class formed groups and developed five- to eight-verse rhymes in 30 minutes (±5 minutes) and subsequently performed them. Credit was distributed for working together, performance, and electronic copy submission.

Results: In the winter term, 78/84 enrolled students collaborated, composed, and performed, and 49 submitted e-copies. In the spring, 39/50 collaborated, composed, and performed, and 38 submitted e-copies. Compositions and performances were completed within allotted times.

Discussion: There are many studies that address active learning, student collaboration, cooperative environments, and outcomes of these methods. Although integrating these tasks into the chiropractic health care curriculum can be challenging, with proper strategies these tasks appear to be both achievable and beneficial to instructors and students.

Conclusion: Small groups within a larger class can work together toward common goals and produce acceptable results within time limits. Outcomes from this pilot study can be used for survey development to determine student perceptions of the task and effectiveness of the exercise.

Temporomandibular Joint Disorders and Forward Head Posture Secondary to Airway Compromise: A Case Report

Charles Blum, Sacro Occipital Technique Organization–USA

Introduction: Obstructive sleep apnea associated with airway compromise has far-reaching social implications. Forward head posture (FHP) also affects a large aspect of the population and typically is considered associated with the aging process.

Case Report: A 58-year-old female was referred for chiropractic care for severe chronic migraine headaches, low back pain, and associated disabilities. She had a history of chronic obstructive sleep apnea, FHP, and temporomandibular joint (TMJ) dysfunction, with decades of dental treatment including two full-mouth reconstructions.

Treatment/Intervention: Treatment involved sacro occipital technique management of the patient's primary TMJ dysfunction while stabilizing whole body dynamics and function. Also a referral for Alexander technique, home traction, and rehabilitative exercises was implemented.

Results: Improved pelvic balance and strength, reduced temporomandibular tension, and reduced nighttime apnea episodes associated with reduced FHP were noted by the patient, dentist, and chiropractor. Within 3 months she had eliminated all medications except for occasional flare-ups occurring four to five times per year.

Discussion: Patients with mixed presentations (ascending or descending postural influences) can be best treated utilizing chiropractic and dentistry comanagement to improve patient outcomes. Typically patients who need chiropractic dental cotreatment will have a low pain threshold, low physiological adaptive range, and a history of musculoskeletal joint pain or injuries.

Conclusion: Greater research is indicated into the relationship between the various components of FHP to determine if this condition is associated with quality of life and if improvement of the condition will assist the patient with greater function and well-being.

Arnold Chiari Malformation and Chiropractic Care for Headaches: Two Cases

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Background: Arnold Chiari malformation (ACM) patients have reported headaches as one of the presenting symptoms for this condition. The use of manipulation in the past has been by clinician experience; literature reviews did not reveal many articles on the topic of ACM and manipulation of the cervical spine. The lack of evidence has made deciding the proper course of care difficult. These two cases showed that with modification of adjusting the patients reported symptomatic relief.

Clinical Features: The first case was a 25-year-old female who presented postsurgery for expansion of the foramen magnum to reduce her headaches. She subsequently was still experiencing the headaches. The second case is a 23-year-old female presenting with chronic headaches over 5 years attributed to ACM. Both had previously received chiropractic care and have reported symptomatic reduction with this care.

Intervention and Outcome: The management plan was to proceed with manipulation that reduced and/or eliminated the rotational component, reducing torsion that could increase pressure temporarily in the upper cervical spine and foramen magnum.

Discussion: These cases could bring the clinician to the literature for guidance. With the current literature lacking information, a clinician needs to make the best judgment possible as how to proceed with management of the condition. With a better understanding of ACM, the clinician may deliver a conservative management plan.

Conclusion: Two cases do not make this a course of care that should be strictly followed but give insight to the condition and rationale for the care. A retrospective study of patients with the condition who have undergone conservative manipulative therapy is needed to help determine safety and validity of this management of the patient.

Full Kinetic Chain Manipulative Therapy with Rehabilitation for the Treatment of Hip Osteoarthritis: A Case Series

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Introduction: Osteoarthritis is the fifth most reported and treated disorder in general medical practice and is commonly treated by chiropractors. Osteoarthritis of the hip (HOA) affects 12 to $\geq$30 million Americans and is a leading cause of disability, suffering, and pain. Standard treatments (such as nonsteroidal anti-inflammatory drugs) are, at best, minimal to moderately effective, but dangerous. Improved, safe conservative treatments are needed.

Methods: Twenty-seven participants, who did not qualify for currently running HOA randomized controlled trials (RCTs), were included. RCT criteria included American College of Radiology guidelines for HOA diagnosis, joint dysfunction, and a Kellgren x-ray score of 0–3. Treatment protocol (B from the RCT) consisted of axial elongation manipulation to the affected hip with modified Thomas stretch prior to adjustments and active assisted stretch between adjustments combined with lower full kinetic chain manipulation as indicated.

Results: Descriptive and statistical analysis of the primary outcome measure, the overall therapy effectiveness tool, was significant and clinically meaningful, with 83% of participants improved after the ninth visit and 73% at the 3-month follow-up, with a chi-square of 13.370 ($p = .001$) and 8.333 ($p = .004$) at the ninth treatment and 3-month follow-up, respectively. Descriptive and statistical analyses (using Wilcoxon signed ranks) were performed for secondary outcome measures, WOMAC, Harris hip scale, and range of motion, with all being statistically significant and clinically meaningful ($p \leq .05$).

Conclusion: There was marked improvement in the vast majority of participants with no serious adverse side effects reported. Further research is merited due to the trends signaled in this case series and two RCTs are currently underway.

Use of Expressive Writing to Improve Clinical Outcomes in Chiropractic Patients with Low Back Pain

Sharon Callcott and **Christina Cunliffe**, McTimoney College of Chiropractic

Rationale: The socioeconomic burden of low back pain (LBP) makes its treatment of importance to both the individual and society. This study investigated the effects on clinical outcome when expressive writing was used in conjunction with chiropractic treatment for patients with LBP.

Method: After institutional research and ethics approval, participants were assessed using the Bournemouth pain questionnaire. The control group had chiropractic treatment, the second group had chiropractic treatment and kept a pain diary, and the third group had chiropractic treatment, kept a pain diary, and wrote for 10 minutes a day on a positive subject for 3 consecutive days after each treatment.

Results: Twelve patients suffering from LBP were recruited from the student clinic of a chiropractic college. The emotional writing group demonstrated the greatest improvement in reduction of pain interference with daily activities, work effect on pain, and ability to control or cope with the pain compared with the control group. In terms of patient satisfaction with clinic visits, the emotional writing group reported greater satisfaction than either of the other two groups. All three groups demonstrated the same level of improvement in general health and well-being.

Conclusion: The results identified a potential link between expressive writing when used together with chiropractic treatment on some specific outcomes measured. The small sample size and limitations of the study indicate that further investigation into expressive writing as a valid tool to assist recovery for patients with LBP would require a larger study population and better standardization of procedures.

The Short-Leg Question in Chiropractic: Qualitative Clinical Research on the Significance of the Type of "Short Leg"

Robert Cooperstein, Palmer College of Chiropractic, San Jose

Introduction: Several primary studies have shown that an anatomic short leg predicts an anterior rotation of the ipsilateral ilium and posterior rotation of the ilium on the long-leg side. This is opposite the pattern of pelvic torsion commonly thought to be associated with a (functional) short leg. It is necessary to explore the consequences of this paradox for the manual therapy professions, including chiropractic.

Methods: Chiropractic technique systems are identified that treat patients according to the "short leg = PI ilium rule." Taking into account the incidence of anatomical short leg, making some assumptions as to what proportion of patients are symptomatic versus asymptomatic, and another assumption on how often leg checking is accurate, an inference may be drawn on how often appropriate mechanical vectors are used for sacroiliac adjusting.

Results: With perfectly accurate leg checking, in a patient population evenly divided between symptomatics and asymptomatics, a manual therapist uses an appropriate line of drive less than half the time. Paradoxically, the more accurate leg checking is, the more often an inappropriate vector is used.

Discussion and Conclusions: It is necessary to use a mix of physical examination methods (radiological, tape measure methods, block indirect method, and sitting-standing indirect method) to distinguish anatomical from functional short leg to derive appropriate mechanical vectors for sacroiliac interventions. Other physical examination methods may be preferred to leg checking to derive appropriate vectors.

Upper Cervical Chiropractic Care for Juvenile Myoclonic Seizure Disorder: A Case Report

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Objective: To describe the upper cervical chiropractic management of a 25-year-old female diagnosed with juvenile myoclonic epilepsy (JME).

Clinical Features: The study involved a 25-year-old white female with a history of JME, diagnosed at the age of 14. Her seizure episodes began shortly after trauma to the cervical spine and the start of her menstrual cycle.

Intervention and Outcome: The patient received high-velocity, low-amplitude chiropractic spinal manipulation to her upper cervical spine using the Blair upper cervical chiropractic technique protocol. There was improvement in her seizure episodes and menstrual cycles following 12 weeks of chiropractic care.

Conclusion: This case study suggests the need for more research in the link between upper cervical specific chiropractic care and seizure disorders.

Prevalence of Low Back Pain in Public Workers from a Southern Brazilian City

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Introduction: The present study was a retrospective descriptive research which aimed at verifying the prevalence of low back pain in public city workers who sought treatment at a chiropractic clinic, as well as determining age, sex, and profession of these individuals.

Methods: The data for this project were collected from the patients' files and only patients treated from August 1007 to October 2008 were included. Individuals who were not public city workers and did not indicate low back pain as chief complaint were excluded from the research. The total number of workers treated at the clinic during the period for data collection was 435 individuals.

Results: Prevalence of low back pain among these workers was 19% (83 individuals) versus 81% (352 individuals) with other chief complaints. The average age of patients with low back pain was 40.81 years, with a higher prevalence of low back pain in women (74.1%). The most referred profession was teaching (36.1%).

Conclusion: Results show a low prevalence of low back pain in the population studied. However, the results suggest that more studies are needed to determine the most common musculoskeletal complaints for this population.

Alterations of Dyspeptic Signs and Symptoms in Patients Presenting with Gastroesophageal Reflux Disease Following Chiropractic Treatment

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Introduction: An important aspect of gastroesophageal reflux disease (GERD) is how it can compromise the patient's quality of life. Recently there has been some research indicating that chiropractic treatment can affect the function of internal organs through autonomic nervous system stimulation. The objective was to investigate the alterations of dyspeptic signs and symptoms in patients presenting with GERD following chiropractic treatment.

Methods: This was a pilot study with a sample composed of 10 individuals. High digestive endoscopy exam was performed on all individuals before and after eight sessions of chiropractic treatment. The treatment was a sacro occipital technique-based viscerosomatic technique called chiropractic manipulative reflex technique (CMRT). A gastroesophageal reflux disease symptom's questionnaire was used to evaluate dyspeptic signs and symptoms.

Results: At the end of chiropractic treatment, a statistically significant global reduction of GERD symptoms was observed ($p = .0002$), especially on the evaluation of pre- and posttreatment postprandial pyrosis data ($p = .000004$). Through endoscopic examinations on the 10 patients, the findings noted a 58% improvement of esophagitis caused by GERD.

Discussion: There is some research to suggest that chiropractic treatment can improve visceral conditions, possibly affecting various visceral systems. The stimulation of spinal structures may have a connection with reflex responses of the autonomic nervous system.

Conclusion: At the end it was concluded that in these 10 cases chiropractic treatment (CMRT) was efficient in improving symptoms caused by GERD, as well as improving esophagitis signs secondary to GERD, shown by a high digestive endoscopy exam.

The Efficacy of Chiropractic Treatment in Reducing Back Pain in Patients Who Have Had Bariatric Surgery

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Introduction: Obesity is currently one of the biggest world public health problems and is associated with various factors such as age, sex, color, and socioeconomic status. Obesity results in mechanical overload, which can cause joint pain, as well as degenerative alterations of the spine. Nowadays, due to overweight-related problems, bariatric surgery, which results in substantial weight loss in a short period of time, is being performed on obese patients. Along with rapid weight loss, the individual undergoing bariatric surgery starts a process of organism and functional readaptation, which causes musculoskeletal pain.

Methods: The purpose of this study was to verify reduction of pain due to great weight loss in late bariatric postsurgery using chiropractic treatment, as well as to determine how long after surgery the pain symptoms started. Two distinct groups were used: a control group and an experimental group. The experimental group underwent chiropractic treatment in eight

visits, while the control group was only present in two visits, was not submitted to chiropractic treatment, and served as a comparison parameter between both groups. Visual analog pain scale was used to assess patients' symptoms.

Results: A significant improvement in back pain symptoms was observed for the individuals in the experimental group ($p = .002$), while no improvement was noticed for the control group regarding pain referred in the beginning of the research. Research shows the efficacy of chiropractic in treating patients with back pain and other neuromusculoskeletal disorders. It was also observed that the pain started at an average of 5.8 months after bariatric surgery. Some studies state that due to great weight loss in a short period of time, the prevalence of musculoskeletal pain is 70% after 6 months of gastric reduction.

Conclusion: The study concludes that chiropractic treatment offered the patients in the experimental group a significant reduction of pain after excessive weight loss in comparison to the patients in the control group.

Subjective and Objective Analysis of the Singing Voice Before and After Chiropractic Manipulation

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Introduction: Use of voice for singing or speaking varies regarding initiation in the central nervous system, use of phonetic apparatus, and intention. This paper compares subjective and objective evaluations of the singing voice before and after chiropractic manipulation.

Methods: Participants were members of a Catholic group that uses singing as an instrument of evangelization. All participants were healthy male subjects who practiced singing daily and had no respiratory problems or clinical conditions affecting the vocal system. Each subject was initially recorded singing a part of the music *Ave Maria*. Participants were then randomly assigned to high-velocity, low-amplitude chiropractic manipulation of the neck, thoracic spine, and ribs, or to a transcutaneous electric stimulation application (TENS) tuned to a nontherapeutic frequency. A second recording was made immediately after the treatment. Fifteen days later, the procedure was repeated with alternation of treatment groups. Changes of quality of voice were analyzed by three speech therapists blinded to treatment procedure and chronological order of the recordings, with decisions reached by consensus. Computer-assisted voice analysis was also used to verify voice changes.

Results: Recordings of 29 subjects were evaluated by speech therapists, and computer-assisted analysis was performed on recordings of 21 subjects (quality of recording did not allow for evaluation of 8 cases). Subjective evaluation by speech therapists indicated an improvement of voice quality for 15 participants after manipulation (51.7%) and for 15 participants (51.7%) after TENS ($p = 1.0$). Computer-assisted analysis showed variations in pitch, F3, F4, and F5 patterns after manipulation and TENS application ($p > .05$).

Conclusion: No changes were observed in the quality of the singing voice after a single session of chiropractic manipulation.

Intra- and Interexaminer Reliability of Mastoid Fossa Thermal Readings Using Chiropractic Instrumentation

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Introduction: Mastoid fossa differential (MFD) analysis can be used as a tool to assess the neurological component of the vertebral subluxation. The present study assesses the reliability of mastoid fossa differentials using the Tytron thermographic instrument.

Methods: The study received approval from the Institutional Review Board at Sherman College. A convenience sample of participants was obtained for student and staff volunteers ($n = 28$) and for three examiners. Each examiner scanned each participant twice using the Tytron thermographic instrument. The data were analyzed for agreement using appropriate statistics.

Results: A mean standard deviation for the 28 participants of 0.40° was observed. There were three participants who revealed SDs that were greater than 2 SDs (>0.80). Without these three, the SD was 0.33. Intraexaminer reliability of direct temperatures for two examiners was good-to-high (ICC >0.900), while the third examiner showed poor-to-fair reliability. Interexaminer reliability of direct temperatures was high (ICC > 0.950) for all three examiners. Intraexaminer

reliability of MFDs was high for examiner 1 and poor for examiners 2 and 3. Interexaminer reliability of MFDs was good (ICC = 0.801).

Discussion: Direct temperatures revealed greater reliability than MFDs. However, in practice, the MFDs are used for pattern analysis.

Conclusion: For this population, a margin of error of 0.33–0.40 could be allowed. Intraexaminer reliability for MFDs varied considerably, but interexaminer reliability for MFDs was acceptable. Further study, using a random sample of participants and examiners with comparable experience, is indicated.

Restructuring of the Jurisprudence Course at a Chiropractic College

Brian Gleberzon, Canadian Memorial Chiropractic College

Introduction: The process by which the jurisprudence course was restructured at a chiropractic college is chronicled.

Method: A Delphi process used to restructure the course is described, and the results of a student satisfaction survey are presented.

Results: When asked "I think this material was clinically relevant," over 81% of the 76 students who responded strongly agreed or agreed with this statement; 100% of students agreed or strongly agreed that scope of practice; marketing, advertising, and internal office promotion; record keeping; fee schedules; malpractice issues; and professional malpractice issues and negligence were clinically relevant. When asked "I think this material was taught well," a minimum of 89% of students agreed or strongly agreed with this statement.

Discussion: This is the first article published that described the process by which a jurisprudence course was developed and assessed by student survey.

Summary: Based on a survey of student perceptions, restructuring of the jurisprudence course was successful in providing students with clinically relevant information in an appropriate manner. This course may serve as an important first step in development of a "model curriculum" for chiropractic practice and the law courses in terms of content, format, and assessment strategies.

Cerebrovascular Risk Factors and Prevention from a Nutritional Perspective

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Introduction: More than 700,000 North Americans are afflicted with strokes, the third leading cause of death and leading cause of disability in the United States. Definitions include disturbance of cerebral function greater than 24 hours and sudden onset of neurologic deficits due to brain circulation loss. They are typed as due to hemorrhage, infarct, or vasospasm. Other related entities are transient ischemic attacks (TIAs) and silent strokes (SS).

Signs and Symptoms: They range from mild to death, from gradual to rapid onset. Variable pains and neurologic deficits are typically observed.

Risk Factors: Smoking, aging, obesity, hypertension, atherosclerosis, stenosis, carotid intimal thickening, and metabolic syndrome are implicated. Laboratory parameters include fibrinogen, factor VIII, CRP, and homocysteine.

Treatments: Medical care evolves around dissolving clots and controlling clotting factors. Nutritional preventive care relates, partly, to dilating vessels, controlling blood pressure and body weight, and reducing the laboratory factors that relate to stroke.

Discussion: Due to the high incidence of SS and TIAs, there are many more people in earlier stages of cerebrovascular risk than the statistics indicate. It seems imperative that we develop a strategy for early prevention of mortality and reduction of morbidity. Numerous nutritional entities show promise in this regard, notably resveratrol, nattokinase, L-arginine, n-3 fatty acids, gamma-linolenic acid, and others. These substances help increase cerebral blood flow, prevent abnormal clotting, and minimize peroxidation of lipids in the body.

Student Injuries Sustained During Undergraduate Training at a Chiropractic College

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Objective: The purpose of this study was to develop an online survey to characterize injuries sustained by chiropractic students during their undergraduate training at a chiropractic college.

Method: All students at a chiropractic college were invited to respond to an online survey which sought to characterize any injuries they may have sustained during their undergraduate training. The survey used addressed deficiencies identified

during similar studies conducted at this college and at other chiropractic colleges.

Results: A total of 173 completed surveys were utilized in our study. Forty-six percent of respondents were female. The injury rate among respondents was 53.3%, with the most injuries affecting the cervical spine (42%) followed by the thoracic spine (30%), lumbar spine (12.4%), and upper limb (11%). In contrast to previous studies, 81% of respondents indicated that they had sustained an injury while acting as the "patient." Of the 18 reported injuries during lumbar spine directed adjustments, 27% experienced an upper limb injury while performing the adjustment; 86.5% of those injured experienced symptoms, most commonly local pain, stiffness, and headache on the day of the adjustment. Fifty-four percent experienced symptom relief within 3 days of onset of symptoms. Diversified technique was used in 95.8% of cases.

Conclusion: In contrast to previously published studies that surveyed students from this college, the majority of student injuries were reported by the person receiving the adjustment. The rate of injury among students at this college remains in the 50%–55% range, which is similar to previously published data.

Establishing Functionally Based Goals in a Chiropractic Practice

Joseph Guagliardo, Life University

Introduction: It is a well established fact that the ability to effectively communicate the patient encounter in clinical documentation is a needed tool of all clinicians. One of these tools is to establish your patient's care plan. There is much information in the literature stating that care plans and treatment goals are needed in the health record. The purpose of this article is to evaluate the information on the topic of how to write a patient-centered functional goal.

Methods: A literature search in MEDLINE was conducted to determine the information that currently exists in the literature. Manual searches of textbooks were utilized as well with focus on chiropractic and physical therapy from 2000 to the present.

Results: The literature search revealed two processes for establishing functional based goals for patient care plans. The first utilizes the acronym "ABCDE," which represents actor/audience, behavior, condition, degree, and expected time. The other utilized the acronym SMART, which represents specific, measurable, attainable, realistic, and timely components.

Conclusion: The ability to establish patient-centered care plans is crucial to the adequate documentation of a patient case file. It is essential that chiropractors be able to clearly communicate their goals to their patients as well as to third-party payers. Given the methods that currently exist, based on the literature search, these methods will give the chiropractor a model in which to base the functional goals.

Effectiveness of HIPAA Training for Clinical Faculty and Staff at a Chiropractic College

Tim Guest, Life University

Introduction: The purpose of the paper is to demonstrate the outcomes effectiveness of a mandatory training of the HIPAA Privacy Rule required of all faculty and staff in the clinic system of a chiropractic college.

Methods: The examinees were selected from the faculty clinicians and staff of the student clinic, outpatient clinic, and the college-supported community outreach clinic. The participants had the option of participating or declining. Eleven faculty clinicians and six staff were selected for the study. The selected group was administered a multiple-choice assessment to determine their knowledge of the HIPAA Privacy Rule approximately 1 week prior to a scheduled mandatory training. Approximately 2 weeks after the training, the examinees were administered the same multiple-choice assessment.

Results: The staff showed an average improvement of their scores by 36 points. The faculty showed an average improvement of their scores by 15 points.

Discussion: This study would suggest that any dissemination of information, even if it were considered a review by some, would have a beneficial effect on a person's knowledge level of a subject.

Conclusion: There is some credibility to the effectiveness of group learning in the traditional style of having an authority lecturing from the front of the class. There is also evidence in this study to support ongoing training even for those already knowledgeable about a subject.

Patterns of Prenatal Maternal Stress Predict Outcomes in the Unborn Child: A Case Series

Laura Hanson and **Morgan Handt**, Life University

Objective: The objective of this review is to support a possible correlation between maternal stress during pregnancy and/or the birth as a marker for increased risk of altered postnatal development.

Methods: Seventeen pediatric chiropractic cases entering the clinic for various chief complaints, medical diagnoses, or revealed chiropractic diagnoses were reviewed. Each case was evaluated for historical indicators during pregnancy, birth, and postnatal development. The case histories were evaluated for maternal, fetal, or infant stressors. The data were divided into three categories of stress: mechanical, chemical, and emotional. A literature search revealed a correlation between maternal stress and fetal outcome.

Results: The 17 cases involved 14 males and 3 females with ages ranging from 2 weeks to 14 years. Three children were diagnosed as autistic and two were diagnosed with progressive developmental delay. Twelve were seen for a specific chief complaint and five for wellness. The pregnancy and birth case histories have 15 entries for chemical stress, 12 entries for mechanical stress, and 8 entries for emotional stress. The infant case histories have 9 entries for chemical stress, 7 entries for mechanical stress, and 2 cases of emotional stress.

Conclusion: A correlation is suggested between prenatal maternal stresses and fetal and offspring neurodevelopment and behavior. Studies suggest that physiological stress response to exogenous challenges appears to be attenuated during pregnancy.

Asymmetry in Atlas Bone Specimens: A Pilot Study

John Hart, Sherman College of Straight Chiropractic, **Matthew Christopher**, Private Practice, and **Ralph Boone**, Sherman College of Straight Chiropractic

Introduction: Vertebral asymmetry can affect measurement analyses of the misalignment component of vertebral subluxation. The present study's objective is to determine the extent of asymmetry among 10 natural bone atlas specimens.

Methods: The study was approved by the Institutional Review Board at Sherman College. Ten natural atlas bone specimens were independently analyzed by two blinded examiners using digital x-ray software for various measurements of the specimens. Mean differences, standard deviations, and agreements were evaluated in regard to bilateral differences from a center point.

Results: The mean bilateral difference for both examiners was 0.96 mm, with a standard deviation of +0.67 mm. There were no statistically significant differences between the means for left and right measurements.

Discussion: The mean of 0.96 mm + 0.67 mm indicates that measurements up to 1.63 mm (one standard deviation) are clearly within a normal range of variation for this sample. Although not addressed in this paper, normal variations in symmetry found in the occipital condyles should also be taken into consideration when determining lateral misalignment of atlas when atlas is assessed in relation with the occiput.

Conclusions: On average for these 10 vertebra specimens, a lateral disposition of 1.63 mm, on either side, could be allowed when arriving at a conclusion for lateral displacement of the atlas. Further research should 1) determine to what extent asymmetry is present in the occipital condyles and 2) seek to develop a method that practitioners can use and apply to the individual patient.

Chiropractic Manipulation Combined with Auxiliary Spinal Adjusting for the Odontoid–Lateral Mass Asymmetry: A Time Series Study

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Objective: This study aimed to review clinical cases of odontoid–lateral mass asymmetry in patients with traumatic subluxation of the atlanto-axial complex following chiropractic manipulation combined with an auxiliary spine adjuster and to outline guidelines for treatment of patients of different age groups.

Methods: A retrospective review of eight cases (seven males and one female, including two children) was carried out. Most of the patients had a history of injury and presented clinical symptoms. The odontoid-lateral mass asymmetry was confirmed by radiographs. All patients underwent chiropractic manipulation on C1–C2 combined with an auxiliary spine adjusting therapy. X-ray was used to reassess the correction of asymmetry correlated with the clinical presentation and outcomes. Paired *t* tests were used to compare the results before and after application of manipulations.

Results: All patients stated great relief of symptoms after chiropractic manipulation with spine adjuster. Radiographic images showed the correction of asymmetrical odontoid–lateral mass interspace, although such improvement varied from patient to patient. The statistics also showed a significant improvement of asymmetry of odontoid–lateral mass interspace on a percentage scale when compared with the x-ray presentation prior to the manipulation ($p < .05$).

Conclusions: It is the authors' conviction that attention should be given to odontoid–lateral mass asymmetry patients who present symptoms. Chiropractic manipulation is an effective therapy for the treatment of odontoid–lateral mass asymmetry. The effectiveness of manipulation could be enhanced by auxiliary spine adjusting therapy. The authors also recommend different treatment intensity of the manipulation when dealing with patients of different ages.

Reflex Effects of a Spinal Adjustment on Blood Pressure

Kelly Holt, New Zealand College of Chiropractic, **Randy Beck**, Murdoch University, **Stephen Sexton**, Carrick Institute for Graduate Studies, and **Heidi Haavik Taylor**, New Zealand College of Chiropractic

Objective: The aims of this study were to investigate whether an adjustment to any segment in the spine resulted in a blood pressure change and whether this blood pressure change was influenced by the region of the spine adjusted.

Methods: Participants included 70 patients attending the New Zealand College of Chiropractic Student Health Centre. Blood pressure was recorded by a blinded examiner before and after either a single Diversified chiropractic adjustment (experimental) or an adjustment setup with no thrust (control). Participants were randomly allocated to groups. Each trial was allocated to a subgroup based on the spinal region involved. A total of 118 trials were included. Ethics approval was granted by the Northern Y Regional Ethics Committee (Ref NTY/07/07/083).

Results: There was a statistically significant decrease of 3.9 mmHg (±10.4 mmHg) in systolic blood pressure in the combined adjustment group. When blood pressure readings were analyzed based on the spinal level that was adjusted, the only significant findings were for reductions in systolic blood pressure in the cervical and lumbar adjustment groups ($p > .05$). No other statistically significant changes in blood pressure were found.

Conclusion: This study revealed that a significant decrease in systolic blood pressure occurred following a chiropractic adjustment. When the results were analyzed based on the region of the spine adjusted, significant decreases in systolic blood pressure occurred following cervical or lumbopelvic adjustments but not thoracic adjustments. These changes may be due to reflex effects of spinal adjustments on the autonomic nervous system.

The Creation and Utilization of Online Videos to Support Classroom Learning of Chiropractic Clinical Skills

Laura Huber, Life University

Introduction: In an effort to support in-class presentations, digitized videos demonstrating clinical skills were created and uploaded to an online website.

Methods: Twenty-five clinical skills were videotaped and then edited down to 12 short video clips. The video clips were then uploaded to www.Youtube.com for student viewing. The students were surveyed to determine the use of the videos and their attitudes toward the videos.

Results: The number of respondents was 157 out of 235 students. The clips of the difficult skills had 822 viewings, the less difficult skills had 200 hits, and there was an average of 345 hits for the remaining clips. Forty-one percent of the students viewed the videos one to three times and 18% had viewed them four to eight times. Twenty-one percent viewed them prior to the final practical, 26% prior to both lab practicals, and 32% indicated that they viewed them randomly. Sixty-two percent found the videos very helpful, 15% somewhat, and 21% had never viewed the videos. Fifty-four percent viewed the videos at night, 21% on the weekend, 15% during the afternoon, and 10% just before lab.

Discussion: Students have the expectation that computers are to be part of their educational process. Lab classes are an integral part of the chiropractic curriculum and a 2-hour lab presenting clinical skills may not be conducive for all students. The use of online videos enables the students to view the information at a time more conducive to learning.

Conclusion: The students had a positive attitude toward the videos and the videos were utilized to increase their knowledge.

The Feasibility of Teaching Chiropractic Students Interpretation of Sonography of the Peripheral Nervous System

Laurie Hung, **Calin Lucaciu**, and **David Soave**, Canadian Memorial Chiropractic College

Introduction: In recent years, ultrasound imaging of peripheral nerves started to gain clinical application as a diagnostic tool. Because peripheral nerve pathology is an important part of the scope of chiropractic, diagnostic ultrasound would be a valuable tool for chiropractors.

Method: The investigation site chosen was the upper forearm, because it allows for identification of the median nerve, ulnar nerve, and ulnar artery. By comparing the results between investigators, this study attempts to evaluate the feasibility of teaching students to interpret diagnostic ultrasound imaging based on the anatomical knowledge acquired at our institution.

Conclusion: The anatomical findings as explored by sonography may be useful in neurovascular surgery of the forearm. Based on the agreement between results, assessed with the Bland and Altman design, the authors are confident that ultrasonographic interpretation can be implemented into chiropractic education.

Effect of Instrument-Assisted Soft Tissue Treatment

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Purpose: To compare the use of instrument-assisted soft tissue mobilization (IASTM), specifically Graston technique (GT) utilizing treatment in the static position (GTS) versus treatment with movement (GTM).

Methods: Sixty-nine participants were randomized to receive treatment from one of two clinicians and further randomized to receive one of two forms of IASTM treatment (GTS or GTM). Participants completed a pre- and posttreatment form in which they described their chief complaint, their perceived pain, range of motion (ROM), and functioning using a visual analog scale (VAS). Data gathered included age, gender, time of day when treatment was provided, and specific body part treated. A brief physical examination was performed prior to the administration of therapy to identify any contraindications. Outcome measures included patient perceptions of pain, ROM, and function each using a VAS.

Results: Repeated measures analysis of variance (R-ANOVA) with time (prior to and following treatment), treatment variation (GTS vs. GTM), and the interaction of these two main effects were used to address the purpose of the study. Analysis indicated that the group who received GTS significantly reduced their perceived pain and significantly improved their perceived functioning with no change in their reported ROM. Patients receiving GTM perceived a significant increase in their perceived ROM and no changes in their perceived pain or functioning.

Conclusion: GTM may be appropriate when the focus of therapy is increasing ROM, while GTS may be the appropriate therapy when the goal of therapy is to reduce pain and/or increase functioning.

Health Promotion in Chiropractic Practice: 2003 and 2009 Practice Surveys

John Hyland, **Mark Christensen**, and **Martin Kollasch**, National Board of Chiropractic Examiners

Objective: To determine how frequently doctors of chiropractic provide health promotion, disease prevention, and self-care advice to their patients and to compare the current results with a previous survey.

Methods: Recurring profession-wide surveys attempt to summarize the practice of chiropractic in the United States based on the responses of a sample of chiropractors from all 50 states and the District of Columbia. Survey respondents report information on their daily tasks and professional responsibilities. Seven items were added to the questionnaire in 2003 inquiring about the provision of health promotion and wellness care procedures. Six years later, the 2009 survey included these same seven questions and added one more regarding smoking cessation counseling. These reports of survey data without linking identifiers were not subject to IRB review.

Results: Return rates for both surveys were good: 21% of total sent in 2003, and 24% in 2009. In 2003, all seven health promotion/wellness care procedures investigated were routinely performed by more than 90% of responding chiropractors, and the majority (>50%) of their patients received six of the seven procedures. Although the

response choices were slightly different, the 2009 survey found similar results and provided additional insight into the frequency of smoking cessation counseling by chiropractors.

Discussion: As is true with all self-report surveys, socially desirable behaviors may have been overreported.

Conclusion: Doctors of chiropractic report that they frequently provide health promotion services and wellness care advice, thereby addressing many of the preventable health conditions associated with personal decisions and lifestyle choices.

Neuro Emotional Technique (NET) for Precompetitive Anxiety in Power Lifters: Two Case Studies

Anne M. Jensen, Parker Research Institute, University of Oxford, UK

Introduction: Optimal athletic performance requires the ability to control anxiety levels during competition. The aim of this paper is to report how Neuro Emotional Technique (NET), a stress-reduction intervention, was used to control precompetitive anxiety in two power lifters: one elite athlete and one novice athlete.

Methods: Two power-lifting athletes agreed to take part in this report. Both athletes were participating in major competitions within 2 weeks of testing and both reported precompetitive anxiety. The elite athlete was competing in the upcoming world championships and the novice athlete was competing for the first time. Both subjects were assessed for both cognitive and somatic anxiety levels pre- and postintervention. The following assessments were used to measure mental state (cognitive anxiety): 1) Sports Competitive Anxiety Test (SCAT), 2) State-Trait Anxiety Inventory (STAI), 3) Depression Anxiety Stress Scales (DASS), and 4) SF-36 Health Survey. To assess somatic anxiety (via adrenal function), salivary cortisol and salivary dehydroepiandrosterone (DHEA) samples were collected on four occasions: upon waking on the 2 days prior to the intervention and on the 2 days following intervention. The intervention consisted of a single 30-minute session of NET.

Results: For both athletes, all psychological inventories showed less reported anxiety, salivary cortisol levels were reduced, and DHEA levels were increased (improved) following intervention.

Discussion: The reduction in reported cognitive anxiety levels and the change in somatic anxiety markers may be the result of the NET intervention.

The Effects of Neuro Emotional Technique (NET) Treatment on Short-Term Rowing Performance (Power Output)

Anne M. Jensen, Parker Research Institute, University of Oxford

Introduction: At the elite level, the sport of rowing is an exact science, depending heavily on timing, balance, power, and endurance. If an athlete can improve even one of these factors by merely a few percentage points, across an entire boat over 2000 m, it may mean the difference between an Olympic medal and not even making the finals. Neuro Emotional Technique (NET) is a stress-reduction technique that has previously been shown to enhance performance in other arenas. The aim of this paper was to report the impact that a single session of NET had on rowers' average power output as tested using the Max Power Test on a rowing ergometer.

Methods: The Max Power Test is a simple test which is well familiar to rowing athletes and which is used regularly in rowing sport. Seven national-level rowers were tested using the Max Power Test, 1 week before and 1 week after a single 30-minute session of NET.

Results: The results showed that five of the seven athletes performed better following NET. The average change in power output was +13.8 W, or +2.2% (range, −0.2 to +48.5 W, or −0.74% to +6.58%).

Discussion: The increase in power output may be attributed to having had the NET intervention, or to learning to perform the test better, or to other variables. A randomized clinical trial is now needed to determine the effectiveness of NET in enhancing power output of rowing athletes.

The Clinical Response of Facial Palsy and Balance Deficit to Vojta/Dynamic Neuromuscular Stabilization Therapy: A Case Study

Dave Juehring and **Michael Tunning**, Palmer College of Chiropractic

Introduction: Vojta/Dynamic Neuromuscular Stabilization (DNS) is a therapy utilized in Europe for a variety of neuromusculoskeletal conditions. This particular case study describes its use in a single treatment for a 53-year-old female patient with traumatic facial paralysis and balance deficit.

Methods: Objective and subjective baseline measures performed included facial movements of elevating brow, eye movements in the cardinal planes, reported pain and numbness, speech ability with pronunciation of the words "lovely" and "clearly," modified get-up-and-go test, and sway rate during standing. An 8-minute treatment utilizing Vojta/DNS therapy was performed and the previously mentioned tests were repeated.

Results: Subjective and objective changes were recorded in the baseline measures of facial movement, eye movement, pain and numbness, phonation, modified get-up-and-go test, and sway rate.

Discussion: The single treatment of this therapy appears to have made improvements in the patient's subjective and objective issues. Although this therapy is relatively new to North America, Votja therapy has been utilized in Europe for over 50 years. The Votja theories and clinical approaches have recently been introduced in the past decade to chiropractors and physical therapists in the United States under a new coined named of DNS through the Prague Rehabilitation School.

Conclusion: In this clinical case, an 8-minute Votja/DNS treatment has demonstrated changes in both subjective and objective baseline measures with a clinical case of facial palsy and decreased balance. We feel this warrants further testing utilizing Vojta/DNS therapy.

2008 Olympic Tae Kwon Do Athlete Profile

Mohsen Kazemi and **Giovanni Perri**, Canadian Memorial Chiropractic College

Introduction: The purpose of this study was to identify characteristics of Tae kwon do winners (gold, silver, and bronze medal winners) who competed in the Beijing 2008 Olympic Games ($N = 124$) and to compare these characteristics to those of nonwinners.

Methods: Data for this study were obtained from the official website of the 2008 Olympic Games (http://en.beijing2008.cn/), a public domain website. STATA software was used for data analysis.

Results: No statistically significant differences exist between winners and nonwinners with respect to age, height, weight, gender, and body mass index (BMI). Average age for male winners was 25.06 years versus 24.81 for nonwinners; average age for female winners was 22.81 versus 22.91 for nonwinners. The average height for male winners was 1.83 m versus 1.79 m; average height for female winners was 1.68 m versus 1.70 m for nonwinners. The average weight for male winners was 74.92 kg versus 73.13 for nonwinners; female winners had an average weight of 59.85 kg versus 60.73 kg. The average BMI for male winners was 22.01 versus 22.46 for nonwinners. Female winners had a BMI of 21.00 versus 20.69 for nonwinners. For all athletes, offensive one- and two-point kicks accounted for at least 39.02% of techniques used to score for male winners and 38.09% of techniques used to score for female winners.

Discussion: Our study did not find any statistically significant differences between winners and nonwinners with regards to average age, weight, height, and BMI.

Conclusion: Although not statistically significant, male winners were slightly older and taller, with lower BMIs versus nonwinners. Female winners were slightly younger and shorter, with greater BMIs versus nonwinners.

A Survey on the Performance of Chiropractors Graduated from Brazilian Universities in the Role of Practice Managers

Choo H. Kim, **Márcia D.C. Almeida**, **Eduardo S.B. Bracher**, **Ana Paula A. Facchinato**, and **Djalma J. Fagundes**, Universidade Anhembi Morumbi

Objective: To study chiropractors who graduated in Brazil in the role of practice managers.

Methods: A standardized questionnaire with 31 multiple-choice questions and one open-end question was created, with a focus on understanding the factors that interfere with the opening of a chiropractic practice and challenges faced by those professionals to keep their practice active, as well as to verify possible factors related to a successful practice. This instrument was formatted to the program Google Docs and sent by electronic mail to the total population of chiropractors graduated from Brazilian university-level chiropractic courses ($N = 341$). Further electronic messages and telephone calls were made to ensure the largest response rate possible.

Results: A total of 215 persons responded (63% response rate). One hundred and ninety-six (91%) were practicing

chiropractic at the time of the survey. Of those, 181 (84%) reported no difficulties or mild difficulty in keeping their business and 163 (76%) advertised their practice in the media. Fifty-six (75%) of the professionals who used advertisements reported that their income was sufficient to cover all their personal expenses. Use of advertisement was significantly associated with a larger average number of patients weekly ($p < .001$). The majority (77%) of participants who shared office space with health care professionals of other specialties reported that the income from their practices was total or partially sufficient to cover the expenses of their livelihood. The same was reported by only 57% of the participants who did not share office space with other professionals ($p = .008$). Most participants (80%, $n = 217$) reported that they missed some training on managerial techniques during their chiropractic courses.

Conclusion: More than 90% of the sample is practicing chiropractic professionally. Most of those professionals are able to sustain themselves completely or partially with chiropractic.

Feasibility of Using the Tissue Ultrasound Palpation System (TUPS) to Measure Elasticity of Segmental Lumbar Multifidus

Terry K. Koo, New York Chiropractic College, **Yongping Zheng**, Hong Kong Polytechnic University, **Andrea A. Nalli**, New York Chiropractic College, and **Edward F. Owens, Jr.**, Northwestern Health Sciences University

Background: Paraspinal soft tissue compliance is widely used by manual therapists to indicate muscle status. Current methods are considered subjective and unable to discriminate muscle layers. We have developed a clinical tool, the tissue ultrasound palpation system (TUPS), to measure the intrinsic properties of muscle tissue in vivo.

Objective: To test the feasibility of using TUPS to measure the Young's modulus of segmental lumbar multifidus in vivo.

Method: The system uses a force-sensitive probe with a tip-mounted ultrasound transducer to measure applied load and tissue displacement. The protocol involves locating the probe directly over a lumbar mammillary process and indenting the soft tissues with manually applied forces. The Young's modulus of the multifidus muscle results from the stress-strain relationship calculated using a mathematical model. The repeatability of the measurement was tested using multiple trials on a single subject. Participant signed a consent form approved by the institutional review board of the recruiting institution.

Results: Well defined, consistent echoes corresponding to boundaries of the lumbar multifidus were reliably tracked with the TUPS system. The coefficient of variation (CV) of the measurements based on the first cycle and rest of the cycles was 4.5% and 20.7%, respectively, showing that the measurement based on the first cycle is more repeatable. Young's moduli at two different loading rates and after subject repositioning ranged from 33.0 to 37.6 kPa.

Discussion: The TUPS system shows promise as a potential clinical tool to evaluate lumbar muscle function. The protocol for assessing the multifidus muscle will be further refined and tested.

Attitudes Toward Philosophy Among Chiropractic Students: A Questionnaire-Based Study

Dries Lambrichts and **Michelle Wessely**, Institut Franco-Europeen de Chiropratique

Introduction: Chiropractic education is provided internationally, as a structured institution-based education. The degree of interest, understanding, and assimilation in the subject is influenced by a wide variety of factors.

Methods: A questionnaire-based method was opted to determine whether current chiropractic students possess a basic knowledge of chiropractic principles and chiropractic philosophy.

Results: A total of 326 questionnaires were completed. Of the participants, 55.93% were 21–24 years old (151 students); 61.85% of the participants were female. When asked if the student felt that there was a chiropractic philosophy, 96.32% responded positively. When asked if chiropractic was differentiated from other health care professions in part by their philosophy, 83.13% responded positively.

Discussion: A wide range of student demographics results in a diverse range of knowledge and principles among the population studied. In general, the level of knowledge was adequate, and the fundamentals of the profession were on the whole well explored by the individual. With a sense of personal philosophy, conceptualization of differing classes may be easier for students, although this was not studied in this project.

Conclusions: The results of this study provide data regarding the diversity of knowledge base and individual philosophies of the student in one chiropractic institution. The general knowledge was adequate and increased as the students progressed through their education. Individual philosophy regarding health care illustrated the diversity of approaches which was also reflected, though not directly, with the individual's chiropractic approach.

Attitudes, Skills, and Knowledge of Student Club Leaders and Their Faculty Sponsors Toward Evidence-Based Practice: Report of a Focus Group

Dana Lawrence, Palmer College of Chiropractic, and **Kristi Ferguson**, University of Iowa

Objective: To determine general attitudes, knowledge, and skills of student leaders in evidence-based practice (EBP) as well as the challenges of educating faculty sponsors and club/organization members about EBP.

Methods: A convenience sample of leaders from student organizations was chosen to participate, along with their faculty sponsor. Five leaders came from technique-related organizations, while one came from the student newspaper and one from a student-alumni organization. The focus group used a series of open-ended questions to probe student and faculty attitudes toward EBP, looking at introductory questions concerning definitions and familiarity, transitional questions about the application of EBP principles to clinical care and potential use once the student graduates, and closing questions about whether EBP would help the organization or club be better accepted.

Results: Common themes that emerged included noting that some college departments were more involved in the use of EBP; that there was a fear that it would create impediments to reimbursement; that while students felt they could critically appraise journal articles, they also felt that they had had little exposure to the principles and precepts of EBP; and that the sheer volume of literature that is available for use is in itself an impediment. Faculty sponsors were open to obtaining additional training in EBP and to having formal presentations made to the organization with which they work.

Conclusion: Students were open to the use of EBP methods but had concerns about how EBP would affect them in practice. Sponsors were open to learning more.

Information Mastery for the Chiropractic Profession: Are We Ready?

Michele Maiers, **Roni Evans**, and **Barry Taylor**, Northwestern Health Sciences University

Introduction: Information mastery (IM) is a concept coined to guide busy clinicians through the task of prioritizing and effectively locating useful research information. The purpose of this paper is to explore sources of research available to the chiropractic clinician and to evaluate their usefulness according to the principles of IM.

Methods: While developing a new course on the foundations of evidence-informed practice (R-25 AT003582), several sources for research-related information were assessed for their "usefulness," according to the principles of IM. Relevance was considered high if the source carried information important to the average chiropractic practice and focused on patient-oriented outcomes. Validity was evaluated for the level of transparency and methodological rigor was used to summarize or include research information and limiting potential sources of bias. Ease of use and access determined the work burden.

Results: Several resources, including the Cochrane Database, Natural Standard, PubMed, and Google Scholar were identified as central to accessing useful research information. The absence of a vehicle for sustainable, easily accessible, critically evaluated summaries of research specific to chiropractic practice was noted.

Discussion: As a push toward evidence-informed practice continues to drive chiropractic education and clinical care, practical resources for high-quality research information must be accessible to the majority of the profession. An absence of these resources could dissuade chiropractors from accessing important research necessary for improved patient outcomes.

Conclusion: Useful tools for information mastery must be identified and developed for chiropractors to effectively and efficiently deliver evidence-informed patient care.

Student Perception of a Mock Patient Practical in a Pelvic Technique Classroom

Barbara Mansholt, Palmer College of Chiropractic

Objective: To assess student comprehension of a new practical testing method introduced in a pelvic technique classroom. This method expanded upon the traditional setup practical (during which students are given a listing and pose) by simulating a patient scenario, requiring the students to synthesize specific findings and make appropriate adjusting decisions according to their chosen named technique.

Methods: A cross-sectional survey was conducted of 28 students from a recent chiropractic college term. Questions included the student's perception of his or her specific technique understanding, his or her ability to determine what to adjust, rating of psychomotor skills, the effectiveness of the mock patient evaluation (MPE), and recommendation for continuation of the evaluation method in technique-oriented classes. The information was summarized using descriptive statistics.

Results: Sixteen of 28 surveys were returned. Thirty-one percent of the respondents rated the effectiveness of the MPE as "extremely effective," while 69% concluded the effectiveness as "fairly effective." One hundred percent of the respondents recommended this type of testing be used on a regular basis in technique-oriented classes. These students also rated their own ability to synthesize patient examination findings to determine pelvic adjusting as excellent (25%), above average (69%), or average (6%).

Conclusion: Students understand the benefit of a mock patient evaluation testing method. Individual confidence may be increased from feedback received in the encounter. Continued or expanded use is recommended. To complement this pilot study, a larger sample size and comparative surveys would reveal more decisive information about students' acceptance of a different testing method.

The Chiropractic Comanagement of Asthma: A Clinical Research Approach

Sue-Ellen McElvey and **Peter Bull**, Macquarie University

Purpose: The purpose of the research was to examine the benefits of chiropractic in the individual asthma sufferer within a concurrent medical management model. The aims of the research were to establish a number of outcome measurements that were patient-centered individually based recordings of health changes within asthma.

Methods: There were a total of 19 participant chiropractors and their "live" practice settings where the clinical research was conducted; there were four groups involved as research subject asthma participants (in total 142 involved in the clinical trial). The benefits of the comanagement of asthma with a chiropractic program of care were measured by changes in a set of clinical outcomes. The clinical trial used a set of outcomes measurements to show changes in the individual health status of the asthma sufferer. First, there were patient-centered questionnaires: disease specific, individual environmental factors, SF-36 (quality of life), and emotional well-being (Depression and Anxiety Stress Scale). Second, a set of laboratory-based physiological markers of immune responsiveness (IgA) and stress response levels (cortisol) were used to assess any physiological changes that may contribute to any measurable benefits of the chiropractic clinical applications. The clinical trial also encouraged patient involvement with self-managed recordings of hand-held peak flow meter readings to monitor lung function.

Results/Discussion: The results of this clinical trial indicate that a time-dependent physiological factor may be involved in some of the therapeutic benefits observed in this clinical trial of asthma and chiropractic comanagement.

Development of Core Competencies for Chiropractic Students Rotating Through a Department of Veterans Affairs Medical Center Chiropractic Clinic

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Introduction: As chiropractic education has evolved, there has been an effort to create a clinical experience that exposes chiropractic students to a variety of patient presentations and clinical opportunities. VA medical centers (VAMCs) have also begun to pursue academic affiliations with chiropractic institutions, establishing formal training for chiropractic students as part of their clinical education during the final year of their education. As these affiliations expand, it is important to consider the opportunity this presents to shape the future of chiropractic education. It is also equally important that a structured program be designed and implemented at these facilities to increase the ability for students to learn and develop critical thinking skills.

Methods: To develop and design the focused curriculum, the authors met as a group to establish competencies as well as conducted a literature review to discover educational best practice in clinical education.

Results: Competencies were developed that were consistent with the academic institution and the VA medical center. The literature search provided specific delivery methods that would be beneficial for the reinforcement of the above competencies.

Conclusion: The focused curriculum we have created uses a variety of means of delivery through direct observation or experiential learning, small group discussion, and critical appraisal of evidence in an effort to enhance the quality, critical thinking, and knowledge of chiropractic students using the complex patient presentations found within veteran patient populations.

Prevalence of Musculoskeletal Complaints in Primary Education Teachers in Southern Brazil

Thais Menezes Nunes, Private Practice, and **Thiana Paula Schmidt dos Santos**, Centro Universirário Feevale

Purpose: The present study aimed at verifying the prevalence of musculoskeletal complaints among elementary education teachers from elementary schools in a city from the Vale do Sinos Valley/RS.

Methods: The sample was composed of 155 teachers. For data collection, the teachers answered questionnaires and through the data collected, it was possible to verify that 71.61% of the teachers presented with musculoskeletal complaints, with most complaints related to the lumbar region of the spinal column (17%). In regards to frequency of pain symptoms, 55% of the participants reported pain in the past 12-month period and 45% in the past 7-day period. Moreover, 64% of the teachers sought professional health care help at any given moment; 10% looked for chiropractic help.

Results/Discussion: The results show a high prevalence of musculoskeletal complaints and that chiropractic care was not one of the most sought after health care options. Even though chiropractic is a fairly new health care profession in the present health care scenario, the results from the research indicate the need of conquering new areas for work development of chiropractic, with the objective of trying to reach a higher proportion of the population, making chiropractic care available and emphasizing its proposal of better quality of life for those who look for the profession's help.

Lumbar Extension Traction and Disc Herniation/Sequestration: A CBP Case Report

Paul Oakley and **Deed Harrison**, Private Practice

Objective: To present the outcomes of a patient with chronic low back pain, recent sciatica, and MRI-verified disc herniation and sequestration who underwent Chiropractic Biophysics (CBP) protocol designed to correct postural distortions.

Clinical Features: A 56-year-old male suffered from low back pain and recent sciatica due to lumbar disc herniation being under continuous chiropractic care from three practitioners. Radiographic analysis revealed a lumbar hypolordosis and MRI revealed disc herniation and sequestration at L4–5. Generalized decreased lumbar range of motion and multiple positive orthopedic and neurologic tests were present.

Intervention and Outcome: The patient initially received 26 treatments of CBP extension lumbar traction over 9 weeks with improvement in magnitude of a L4–5 disc herniation and sequestration concomitant with alleviation of positive neurologic tests. Postexamination at 6 months indicated a further improvement of symptoms and a return to normal activities including cross-country running.

Conclusion: A patient with lumbar disc herniation/sequestration was successfully treated with CBP technique procedures, achieving a significant healing of herniation and significant reduction in symptoms not obtained following traditional chiropractic procedures. Correction of the lumbar lordotic curve and healed herniation resulted in the elimination of positive orthopedic and neurologic tests and a return to well-being. The reduction in lumbar disc herniation would appear to be related to a segmental distraction force produced during extension traction loading for increasing the lumbar curvature.

Multilevel Cervical Spine Chordoma: A Case Report

Edward Olff, Private Practice, **Jean-Nicolas Poirier**, New York Chiropractic College, and **Chad Warshel**, New York Chiropractic College

Objective: To report on a retrospective educational case study of a patient suffering from a multilevel cervical spine chordoma successfully treated with multiple surgical interventions and radiotherapy protocols.

Clinical Features: A 48- year-old man presented with neck pain and left upper extremity paresthesia of 2 weeks' duration. Examination localized the symptoms at C3–C4. Pain was aggravated by left active rotation and lateral flexion and by passive lateral foraminal compression. A radiographic examination demonstrated an expansile lytic lesion involving the vertebral body of C3 and permeative bone destruction at C4. MRI examination displayed an expansile multilevel marrow lesion involving the vertebral bodies of C3 and C4. Soft tissue extension was seen involving the anterior epidural space, leading to neural foramina and spinal canal stenosis. Biopsy revealed a chordoma.

Intervention and Outcome: The patient underwent surgical resection of the lesion and reconstruction using autogenic bone from the iliac crest followed by a period of conventional radiation therapy. The tumor later recurred and a second surgery followed by photon/proton beam therapy proved to be curative. The patient remained tumor-free 10 years after the last surgery.

Conclusion: Chordomas are locally aggressive malignant bone tumors that arise from remnants of the embryonal notochord. The diagnosis is made by a combination of diagnostic imaging and histochemical procedures. Effective treatment requires complete surgical removal of tumoral cells with or without adjuvant radiation therapy. The 5-year survival rate is currently at 65%. The prognosis is heavily affected by the appropriateness of the first treatment.

Functional Anatomy of Human Scalene Musculature: Rotation of the Cervical Spine

Anthony Olinger, Kansas City University of Medicine and Biosciences, and **Betsy Mitchell**, Western States Chiropractic College

Introduction: The actions of the scalene muscles include flexion of the cervical spine, lateral flexion of the cervical spine, and elevation of the first and second ribs. The cervical rotational qualities of the scalene muscles remain unclear. Textbooks and recent studies report contradictory findings with respect to the cervical rotational qualities of the scalene muscles. The present study was designed to take a straightforward, mechanical approach to determining whether the scalene muscles produce rotation of the cervical spine.

Methods: The scalene muscles were isolated, removed, and replaced by a durable suture material, with a length of suture to represent each distinct tendinous origin. The suture was then passed through a hole on the corresponding rib near the central point of the insertion. The suture material was pulled down through the corresponding costal insertion hole to mimic flexion of each muscle.

Results: The anterior, middle, and posterior scalene muscles, working independently and jointly, produced a slight ipsilateral rotation of the upper cervical spine and a slight contralateral rotation of the lower cervical spine.

Discussion: The findings of this study support the accepted main actions of the scalene muscles. The clinical applications for an understanding the cervical rotational properties of the scalene muscles include the diagnosis, management, and treatment of cervical pain conditions as well as thoracic outlet syndrome.

Conclusion: The anterior, middle, and posterior scalene muscles are capable of producing a slight ipsilateral rotation of the upper cervical spine and a slight contralateral rotation of the lower cervical spine.

Chiropractic Insertion in the Family Health Program of the Socialized Health System of Brazil

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Introduction: The Brazilian Health System (SUS) was created from new concepts of health promotion, in which illness prevention and health maintenance became a priority. The current study was undertaken with the objective of verifying the importance of chiropractic as an organized profession and its insertion into municipal health care councils and programs such as family health programs to amplify its importance and necessity in aspects such as health promotion and illness prevention.

Methods: For this, a bibliographical research was carried out, with the purpose of executing a literary revision regarding the convergent objectives between family health programs and chiropractic.

Results: Brazil's health system is widely elaborated and its results become more and more apparent. However, the principals are still not reached in totality; this assertion can be attributed to the deficit of generalist professionals, high health costs, and difficult public access.

Discussion: The insertion of chiropractic in the SUS program, in the city health councils, and in programs such as the family health program represents an important strategy for the implementation of a basic care model centered on health, once chiropractic understands the individual in its biopsychosocial dimensions and its proposals complement SUS's direction and objectives, principally the integration of services.

Conclusion: The integration of chiropractic in the health system has the potential to reduce costs, improve public access, and qualify the services. The efficacy and the cost–benefit relationship of chiropractic for the population's health and for health service operations have been demonstrated in other countries.

Job Analysis of Chiropractors with a Diplomate in Pediatrics

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Introduction: There are two postgraduate pediatric diplomate programs in chiropractic. We conducted a comprehensive cross-sectional job analysis survey for this population.

Methods: Two hundred and seventeen chiropractors with a pediatric diplomate were invited to take part in our survey, using both web-based and mailed survey methods. The survey was designed to compare our data with the job analysis of all chiropractors performed by the National Board of Chiropractic Examiners (NBCE) and with a National Health Statistics Report (NHSR).

Results: A total of 135 chiropractors responded (62.2% response rate) and were predominantly female (74%) and white (93%). Techniques most commonly used were Diversified, Activator, cranial, extremity adjusting, and Thompson. Adjunctive therapies commonly provided to patients include activities of daily living, corrective or therapeutic exercise, ice pack cryotherapy, and nutritional counseling. Thirty-eight percent of respondents' patients were private pay and 23% had private insurance that was not managed care. They also reported that 63% of their work time was in direct patient care. Pediatric conditions reported being treated include back or neck pain, asthma, birth trauma, colic, constipation, ear infection, head or chest cold, and upper respiratory infections.

Conclusion: The majority of chiropractors with a pediatric diplomate were females with >30% of their patient base <12 years of age. They were more likely to use cranial adjusting techniques and treated young patients with back or neck pain, head or chest colds, colic, constipation, ear infections, and upper respiratory infections. They often referred patients to massage therapy, but did not typically refer to midwives, pediatricians, or family physicians.

Effects on Postural Control with a Sacroiliac Belt and 10 Chiropractic Treatments on 11 Random Fibromyalgia Subjects: A Pilot Study

Stéphane Provencher, Sacro Occipital Research Society International Inc., and **Joseph F. Unger, Jr.**, Logan College of Chiropractic

Background and Objectives: The sacroiliac belt, also known as a pelvic belt, helps to reduce hypermobility and limit laxity. Compression has been found to stabilize the sacroiliac (SI) joint. The fibromyalgia syndrome (FMS) patient has been reported to have generalized joint hypermobility. The purpose of this study was to determine the effects of a Serola sacroiliac belt in 11 random fibromyalgia subjects on postural control as measured by a MIDOT unit.

Methods: Eleven FMS subjects, between the ages of 22 and 55, were randomly chosen from the population. An inclusion and exclusion questionnaire was filled out. Subjects were measured on the MIDOT balance scale with and without SI belt with eyes open and closed before and after 10 chiropractic treatments using sacro occipital technique.

Results: The MIDOT unit measured the proprioceptive balance input of the body via lateral and anteroposterior (AP) sway velocity, offset, and stability pre- and post-SI belt. The sacroiliac belt improves significantly ($p < .05$) lateral (by 13 points) and AP (by 18 points) stability and lateral sway velocity (by 5 points) with eyes closed compared to treatments alone. The belt and treatments improved significantly the lateral and AP stability and lateral sway, but none was found to be significantly better than the other during the eyes-opened testing.

Conclusions: The Serola sacroiliac belt improved the postural control during eyes-closed testing compared to control but did not make significant postural changes compared to the control with eyes-opened testing. The current pilot study, while giving interesting information, indicates that further studies are needed with a larger sample of subjects.

Environmental Hazards of Formaldehyde in the Gross Anatomy Laboratory

Dewan Raja and **Bahar Sultana**, Palmer College of Chiropractic Florida

Formaldehyde has been a well established preservative for cadavers in the anatomy laboratory for years. However, the smell of formaldehyde is an uncomfortable experience for many anatomy students. Anatomy faculty and students, embalmers in funeral homes, histopathology laboratory workers, and other biological researchers are continually exposed to the toxic fumes of formaldehyde. The immediate effect of formaldehyde is irritation to the eyes with watering, a burning sensation of the throat, nausea, and headache. In time, formaldehyde exposure may cause contact dermatitis, congenital defects, and cancer formation. This article aims to discuss the adverse health effects of formaldehyde vapors and explore the possible precautionary measures that prevent the harmful effects of formalin.

Chiropractic Management of a 9-Year-Old Child with Klippel-Feil Syndrome: A Case Study

Robert Rectenwald and **Laura Hanson**, Life University

Objective: To describe the chiropractic management and outcome of a pediatric patient with Klippel-Feil syndrome.

Clinical Features: A 9-year-old male patient was presented by his parents for chiropractic evaluation. He was diagnosed at 4 years of age with Klippel-Feil syndrome. Examination revealed spinal subluxations and problems with balance. Radiographs revealed multiple malformations in the cervical, thoracic, and lumbar spine, consistent with a type III Klippel-Feil syndrome.

Intervention and Outcome: The patient received care consisting of chiropractic adjustments utilizing Activator methods technique and sustained pressure contact. Functional balance training was provided and prescribed for home use. After 34 visits the patient had measurable improved balance and improved coordination per parent observation.

Conclusion: The results in this case suggest that chiropractic care had a positive effect on the patient's balance. This may contribute to the patient's safety and well-being in the prevention of falls.

Chiropractic Management of a 9-Month-Old Infant with Constipation: A Case Report

Milagros Rosado and **Robert Rectenwald**, Life University

Objective: To describe the chiropractic management and outcome of a 9-month-old child with chronic constipation. A high percentage of constipation cases can become chronic in patients when the onset is within the first year of life.

Clinical Features: A 9-month-old child was presented by her mother for chiropractic evaluation. The patient was constipated for up to 2 days at a time since the cessation of breast-feeding at age 4 months. Examination revealed subluxation at the first cervical vertebra and at the sacrum.

Intervention and Outcome: The patient was adjusted utilizing Diversified technique at sacrum and modified to a sustained finger contact at the first cervical vertebra. After 12 visits and 4 months of care, the constipation resolved.

Conclusion: The results in this case suggest that chiropractic care had a positive effect on constipation in this patient. More research is needed in this type of case.

A Comparison of Chiropractic Intern Evaluations of Teaching of Primary Faculty Supervisor, Faculty at Community Rotations, and Private Practitioners

Kevin Rose and **Michael Sackett**, Southern California University of Health Sciences

Introduction: The college rotates its interns through a base clinic with a primary faculty supervisor, community rotation sites, and private practices. It is hoped that interns will best learn about different aspects of chiropractic practices in each setting. We surveyed our interns to help determine if this goal is being fulfilled.

Methods: Interns are required to complete a survey of their perception of what they learned from the doctors with whom they worked during each 6-week module. The survey consists of 15 questions in the format, "During the last module working with Dr.___, my___ skills improved." Individual questions cover various clinical and business skills.

Results: During the 2 years of the study period, 314 interns completed 2219 surveys. Ratings were very high for all groups. Community rotation faculty were rated significantly higher than base clinic faculty in most skills, with the exception of some business skills, and private practitioners were rated higher in almost all skills.

Discussion: Overall these interns seemed satisfied with the education that they received at all sites. The superior results for community rotation faculty and private practitioners need to be interpreted with caution because of various environmental and technical factors.

Conclusion: Chiropractic interns rated their educational experiences in community rotations and private practices as better than at their base clinics. Future studies should seek to compare intern perceptions with objective measurements.

The Infant Toggle Headpiece: Its Use and Applications in Chiropractic Pediatrics

Drew Rubin, Life University, and **Kurt Kunz**, International Chiropractic Pediatric Association

Introduction: The infant toggle headpiece was developed in the 1980s by Dr. Larry Webster as a method to create a gentle adjustive technique of the upper cervical region for infant and toddler-age patients. Its application for the chiropractor in a pediatric practice is discussed, as well as results of an International Chiropractic Pediatric Association e-mail survey regarding use of the headpiece.

Method: Members of the International Chiropractic Pediatric Association (ICPA) were polled via e-mail to determine how many of the members use the infant toggle headpiece, the spinal regions on which the headpiece is used, and the percentage of infant and toddlers who receive adjustments while utilizing the infant toggle headpiece.

Results: Over 70% of those chiropractors surveyed who specialize in pediatrics use the infant toggle headpiece on a regular basis.

Conclusion: The infant toggle headpiece, as developed by the late Dr. Larry Webster, appears to be a valuable adjusting instrument for the pediatric chiropractor.

From Failure to Success: Adapting Academic Support Programs in a Chiropractic Educational Setting

Lisa Rubin, Life University

Introduction: In educational settings that focus on academic support, programs are created to help students achieve their scholastic goals. Some programs may look good on paper and get through the approval process; however, when put into practice, complications can occur. How an educational environment adapts to these challenges is what makes them successful.

Methods: A specific program called Structured Learning Assistance (SLA) was selected because of its success rate in other programs on increasing certification scores.

Results: The university attempted to incorporate an academic support program that would conceptually contribute to students being life-long learners and improve academic performance while in school. It focused on higher failure rate first-quarter classes so students could be prepared for the future educational fast-paced environment of a science-focused curriculum and licensing exams. However, the SLA program was not successful on this campus.

Conclusion: When this program was removed from the curriculum, a learning lab was incorporated to still offer the students the same benefits, but on a nonmandatory basis.

Measurement of Lordosis by the Spinal Mouse as Compared to Lateral Lumbar Radiographs

Brent Russell, **Kim Muhlenkamp**, and **Kathryn Hoiriis**, Life University

Introduction: In an earlier study we used a Spinal Mouse (SM) to evaluate lordosis on a group of participants. In this study we compared the SM measurements to lordosis measured on lateral lumbar x-rays (XR). We hypothesized that there would be a high enough correlation that the SM could be used as a substitute for XR for lordosis assessment.

Methods: Sixteen of our earlier participants had digital films in our campus clinics. Two examiners each performed two XR analyses on each participant's film, using the Harrison posterior tangent method, and calculated a mean for each participant. Our study was approved by the Life University Institutional Review Board.

Results: We found a correlation coefficient (Pearson r) of 0.80 and a coefficient of determination of 0.64 between the SM and XR measurements. For our XR analysis, we found high intraexaminer reliability (0.977 and 0.971, examiners 1 and 2, ICC) and high interexaminer reliability (0.982, ICC).

Discussion: We feel there is a high degree of correlation between these two quite different assessment methods (skin surface contour for SM vs. vertebral body alignment for XR). Our study is limited by small size ($N = 16$) and passage of time between SM scans and XR exams. Also, the SM has been found to be reliable but validity has not been shown.

Conclusion: The Spinal Mouse appears to be an acceptable method of lumbar lordosis assessment. However, we recommend further study of a larger number of participants in a clinical setting.

Perceptions of Chiropractic Students and Faculty to Students' Performance in Academic and Practical Skills Modules

Elise Shepherd and **Christina Cunliffe**, McTimoney College of Chiropractic

Objective: Chiropractic colleges place increasing emphasis on academic abilities, but there is little evidence to correlate academic ability with manual skills acquisition. This study aimed to establish any perceived correlation between academic and technique ability by chiropractic students and that of their technique tutors, together with any real correlation between the two abilities.

Method: A descriptive, questionnaire-based, cross-sectional study of the undergraduate student population of a chiropractic college and their technique tutors was undertaken to test the perception that students who did well academically also performed well in technique skills modules. This was compared with a retrospective, observational, correlation study of the same students' grade point average (GPA) for academic summative assessments and chiropractic technique examination grades.

Results: Approximately two thirds of students expressed an opinion regarding a perceived link between academic and chiropractic technique ability, while just over one third of students, and all technique tutors, did not feel that they had an opinion in that area. There was no clear trend for agreement or disagreement with any one particular perception. When assessment grades were pooled, a weak, but significant, positive linear correlation was found ($r = 0.27$; $p < .01$), such that students with higher GPA of academic subjects also got higher grades for their chiropractic technique.

Conclusions: On the basis of this study, better academic students also seem to do better at chiropractic technique, when the summative assessment grades for each were correlated. No such correlation, nor indeed any other correlation, was perceived by the majority of students and technique tutors.

The Influence of Students' Participation in Curricular and Extracurricular Learning Activities on Their Choice of Chiropractic Technique

David Sikorski, **Gene Tobias**, and **Anupama Kizhakkeveettil**, Southern California University of Health Sciences/Los Angeles College of Chiropractic

Introduction: National Board of Chiropractic Examiners surveys indicate that Diversified is the most commonly utilized technique in practice. We investigated the influences of our Diversified core technique curriculum, a technique survey course, and extracurricular technique activities on students' future practice technique preferences.

Methods: We conducted an anonymous, voluntary opinion survey (with institutional IRB approval) of 1st-, 2nd-, and 3rd-year chiropractic students.

Results: Diversified was the most preferred technique for future practice by all 3 years of students surveyed. More than half of students who completed a chiropractic technique survey course reported changing their future practice technique choice. All of the students surveyed agreed that the chiropractic technique curriculum and their experiences with chiropractic practitioners were equally the two greatest bases for their current practice technique preference and that their participation in extracurricular technique clubs and seminars was much less influential.

Discussion: Our students, like currently practicing doctors of chiropractic, similarly prefer Diversified technique over all others, and they indicate that our core technique curriculum and their experiences with chiropractic practitioners are the two greater bases influencing their technique practice choices.

Conclusions: 1) The chiropractic technique curriculum and the students' experience with chiropractic practitioners have the greatest influence on their choice of chiropractic technique for future practice. 2) Extracurricular activities, including technique clubs and seminars, although well attended, have a lesser influence on students' practice technique preferences.

Reliability of Digestive Disorders as Compared to the AcuGraph: A Pilot Study

Brian Snyder, Logan College of Chiropractic

Purpose: The purpose of this pilot study was to determine the reliability of an AcuGraph through analysis of subjects with reported digestive disturbances compared to subjects without reported digestive disorder symptoms. Bilateral readings in 12 main acupuncture meridians were measured and recorded as normal, high, low, or split. Stomach (ST), large intestine (LI), and small intestine (SI) meridians were then evaluated for imbalances between symptomatic and asymptomatic subjects.

Methods: Thirty-six subjects (21 asymptomatic and 15 symptomatic individuals) participated in the study; 19 males and 17 females were evaluated one time by AcuGraph analysis. The points analyzed were SI 4, LI 4, and ST 42. Subjects were distributed into asymptomatic and symptomatic groups.

Results: Chi-square analysis was used to evaluate the statistical significance of the data of normal and split readings between asymptomatic and symptomatic participants. Statistical analysis suggested a significant difference ($p = .048$) in the normal readings as recorded by AcuGraph in the SI meridian between asymptomatic and symptomatic individuals. There was also a percentage change difference between the symptomatic and asymptomatic subjects in the SI meridian. The asymptomatic showed that 25% were normal compared to only 5.5% of the symptomatic subjects showed a normal reading.

Conclusion: The data appear to support the reliability of the AcuGraph instrument, in one of the three acupuncture meridians investigated. The SI meridian seemed to show the greatest effect on the AcuGraph readings.

"So You're Graduating. . .Now What?" Can the Use of Web 2.0 Tools Be an Effective Way to Push Quality Information to Alumni and Field Doctors?

Janet Tapper, Western States Chiropractic College

Introduction: We spend many years with our chiropractic students developing their information literacy skills and abilities to use quality resources for finding the evidence they need for clinical decision making, offering access to exceptional databases and hundreds, if not thousands, of full-text journals. Then on graduation day, explaining our license agreements, we abruptly end their access to our resources. In anticipation, we have begun a class that systematically teaches the use of free and ubiquitous Web 2.0 tools such as search alerts, RSS feeds, My NCBI, and Loansome Doc to keep alumni informed and up to date, with access to critical literature.

Methodology: The Web 2.0 Tools for Professionals class takes place in the computer lab of the library. All of the tools demonstrated are free and web-based. The class is completely hands-on and is intended to develop comfort with the tools and concepts quickly.

Results: The course has been given to 45 Q11 students over three terms. Student assessment of the course has been consistently high, with 98% stating they will definitely use what they have learned.

Discussion: This particular interaction with students leverages their already developed comfort with Internet usage and illuminates the nature of publishing and associated subscription issues in an atmosphere that is personally relevant to them.

Conclusion: Student response to the course indicates that the students accrue tangible benefits via creation of customized and customizable, efficient information-gathering engines using free web tools readily available that help them succeed when they graduate and enter practice.

Sacro Occipital Technique: Occipital Fiber Technique on Equine

Jean Thompson, Options for Animals College of Animal Chiropractic, **Heidi Bockhold**, Options for Animals College of Animal Chiropractic, and **Charles Blum**, Sacro Occipital Technique Organization–USA

Introduction: Integrative health for animals is increasing, yet there is limited research specifically identifying the use of chiropractic in the equine and canine. In this case report we utilized a chiropractic technique called occipital fiber analysis and treatment (OFT), used within sacro occipital technique to analyze and treat thoracic, lumbar, and sacral segments. This study investigated whether the OFT could be found in equines and whether a treatment based on OFT would yield any response.

Case Report: A 10-year-old gelding quarter horse presented with symptoms of anxiety and stress-induced behavior changes described by the owner.

Methods and Intervention: OFT was applied to a female 10-year-old quarter horse and treatment consisted of chiropractic manipulative reflex technique (CMRT). The procedure was performed at the main campus of Options for Animals College of Animal Chiropractic, with the owner's consent.

Results: Following the occipital analysis and treatment procedure, the reflex pain areas were significantly diminished and the horse was very relaxed, calm, and more tolerant during the postexam. Bowel sounds were now more progressively motile.

Discussion: Of interest is whether OFT reflexes could be found in quadrupeds. It did appear from the animal's response that there was a positive correlation between OFT and CMRT, typically applied to humans, when applied to the horse in this study.

Conclusion: This case report had limitations because it is based on the owner's interpretation; however, due to these findings further investigation into the use of OFT and CMRT for equines is warranted.

Students' Attitudes Toward Health Care Professions Derived from Eastern and Western Medical Traditions

Gene Tobias, **Anupama Kizhakkeveettil**, and **David Sikorski**, Southern California University of Health Sciences/Los Angeles College of Chiropractic

Introduction: Integration of our Doctor of Chiropractic (DC) and Acupuncture and Oriental Medicine (AOM) programs is an institutional goal. Challenges to integration include the differences between Western and Eastern medical traditions, in treatment modalities and in scope of practice. We assessed integration by performing a qualitative study of each programs' students' understanding of the two professions.

Methods: We conducted an anonymous, voluntary opinion survey (with IRB approval) of 133 DC and 62 dual-enrolled (DUAL) students.

Results: DC students agreed that DC practitioners have the broader scope of practice, while DUAL students agreed that AOM practitioners have the broader scope. Most of the DC and DUAL students agreed that DC practitioners practice primary care. DC and DUAL students agreed that DC practitioners treat neuromusculoskeletal conditions and that AOM practitioners treat pain and systemic conditions. All students learn more about the treatment modalities utilized by both programs' practitioners as they progress through their education.

Discussion: Students develop progressively more understanding of both professions during their education. The DUAL students develop different opinions regarding the scope of practice and the ability of practitioners to treat systemic conditions compared to DC-only students. These student opinions generally indicate that our integration efforts to date have been succeeding.

Conclusions: 1) As students progress through a professional degree program, they gain more knowledge about their own and other professions. 2) Integration of professional degree programs promotes more understanding of the professions.

Chiropractic Care in a Case with Chronic Trigeminal Neuralgia: A Case Report

Michael Tomasello and **Joseph Guagliardo**, Life University

Introduction: Trigeminal neuralgia (TN), a chronic pain condition, causes extreme, sporadic, sudden burning or shocklike face pain within the fifth cranial nerve. TN occurs most often in people over age 50. The purpose of the case report is to demonstrate a correlation between specific chiropractic cervical adjusting and the favorable outcomes in a patient with TN symptoms.

Methods: A literature search was conducted though PubMed utilizing the keywords trigeminal neuralgia, chiropractic care, and conservative management. The literature did not demonstrate cases in which chiropractic care was utilized with TN patients.

Case Study: The patient in this report is a 76-year-old male who presented to an outpatient chiropractic clinic with a chief complaint of TN facial, gums, and teeth pain. The TN episode frequency at the time of the physical was 15–20 times per day with brief stabbing bursts. The patient was adjusted with specific cervical manual adjustments over a period of 6 months. The patient demonstrated favorable outcomes with the use of specific chiropractic adjustments in the upper cervical region. After 4 weeks of chiropractic care, he was pain free and remained so for 61/2 weeks of care.

Discussion: It is important for the chiropractor to be able to recognize the presentation of TN and that facial pain may be due to a neurological relationship that can benefit from specific chiropractic care. It is the authors' opinion that, based on this case, patients with TN would benefit from chiropractic care.

Inter- and Intraoperator Patient Positioning Repeatability in Pre- and Postradiographic Studies Using a Novel Positioning Device and a Phantom Mannequin

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Introduction: The precision of patient positioning repeatability has been called into question by chiropractic radiologists. The objective of this study was to use a proprietary positioning device to obtain sets of pre/post lateral cervical and nasium films using a phantom mannequin as the subject. The purpose was to measure reproducibility in mannequin positioning and to refine the protocol for application to human subjects.

Methods: The protocol for utilizing the device was followed by two operators to obtain sets of pre/post digital radiographs representing the following positioning methods: two operators, a single operator, and two exposures of a single

positioning instance. Six chiropractic radiologists were tested to ascertain the positioning method used in a given set. The difference in displacement and rotational deviation between films in a set was also determined from these data.

Results: Expert testing in both cases indicated that despite genuine attempts to identify the method of positioning, less than half (on average) of the examiners were able to do so correctly when given the same pair of films. Actual difference measurements regardless of positioning method indicated that (on average) the coordinate displacement and rotational deviation in a given film pair was less than 5 mm and less than 4 mm, respectively.

Discussion/Conclusion: Initial testing of the positioning device for pre- and postradiography demonstrated that patient placement reproducibility may be possible within a reasonably narrow margin of error. Interoperator reliability studies are in design for the near future.

Ischial Apophysis Avulsion Associated with Sciatic Symptoms

Michelle Wessely, Institut Franco-Europeen de Chiropratique

Introduction: A 27-year-old male patient presented to the chiropractor with low back pain that extended in to the left buttock region. The pain had started during the rugby season and was gradually worsening. The pain traveled down his leg to his toes initially on occasion and now more constantly. The patient, a medical student, wished not to have surgery.

Case Report: Imaging performed demonstrated a focal region of abnormality noted about the left ischial tuberosity. The final diagnosis was given as a chronic avulsion injury to the left ischial tuberosity, with the possible development of a pseudo-articulation and compression of the sciatic nerve.

Discussion: Avulsion injuries occur either in the acute or, less commonly, in the chronic setting. The mechanism of injury is that of a forceful muscular contraction which may be associated with injury to the tendon of the muscle involved. Following clinical examination, a variety of imaging tools are available to assist in confirming the diagnosis, including radiography, MRI, CT, and ultrasound. The management of ischial apophysis avulsion injuries depends on several factors, including the degree of displacement, injury to tendinous structures, or the presence of neural compromise. Chiropractic management literature is rather limited, but an article published illustrates a chiropractic management plan.

Conclusions: Ischial apophyseal injuries initially occur during adolescence, more commonly in male patients, but this depends on the sport activity that induces the injury. Imaging is useful to determine the injury and the potential associated injuries. Treatment may be conservative, using chiropractic manipulative therapy and soft tissue techniques.

Efficacy of Hands-on Instructional Training for the Supine Leg Check: A Feasibility Study

H. Charles Woodfield III and **Kim Khauv**, Life Chiropractic College West

Introduction: The hypertension study utilizing the National Upper Cervical Chiropractic Association (NUCCA) procedure screened potential subjects for study inclusion using supine leg check (SLC). There is interest in using the SLC to determine prevalence of atlas misalignment in the US population with hypertension. This feasibility study examined a course of SLC instruction to determine if it effectively trained examiners to perform at a high level of agreement.

Methods: A cohort of four untrained examiners participated in training. Before training, examiners were tested in their ability to utilize the SLC to agree in identifying a perceived short leg. After the 7-hour training, the testing procedure was repeated to ascertain if the course increased examiner agreement in identification of the short leg.

Results: Increased examiner percentage agreements indicate improvement in the examiners' performance after being trained. Before training, untrained examiners agreed with themselves an average of 66% of the time, increasing to 77% after instruction. Interexaminer agreement before training weighed in at 60%, increasing to 70% after training.

Discussion: Overall improvement of 10% intra- and interexaminer agreement is not adequate to use this course as developed for certification training of examiners using the SLC for screening. Results of course evaluations provided insight for course improvements to increase examiner agreement.

Conclusion: Experience from this study will assist protocol design of a pilot study with a larger subject pool to determine inter- and intraexaminer reliability of the SLC procedure after an improved instructional hands-on training.