EDUCATION
RESEARCH SERVICE

Association of Chiropractic Colleges Research Agenda Conference 2019: Peer Reviewer Acknowledgments and Abstracts of Proceedings

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ABSTRACTS OF ACC CONFERENCE PROCEEDINGS

PLATFORM PRESENTATIONS

Demographics of patients referred for chiropractic care within one Federally Qualified Health Center

Ahmad Abdella, Patrick Battaglia

Objective: Describe demographics and presenting complaints of patients referred for chiropractic care within one Federally Qualified Health Center (FQHC). Methods: Descriptive data was collected from clinic inception (April 15, 2017) to June 30, 2018 and ranked by frequency. Results: 912 unique patients were seen. 66% were Female. 91% were at or below poverty level. 70% were African America, 27% White. 49% were uninsured, 18% Medicaid, 16% had a bridge-type of insurance unique to the area, 11% commercial insurance, and 6% Medicare. English (85%) and Spanish (7%) were most common languages. Comorbidities include obesity (69%), depression, other mental health disorder excluding drug or alcohol dependence, and anxiety (61%), hypertension (57%), asthma or COPD (28%), diabetes mellitus (20%). Reasons for chiropractic referral were low back pain (44%), neck pain (16%), mid back pain (12%), shoulder pain (8%), hip pain (6%), and knee pain (6%). Conclusion: Knowledge of patient demographics, comorbidities, and presenting complaints informs appropriate development of chiropractors operating within FQHCs. Awareness of cultural differences, appropriate co-management of listed comorbidities and mental health diagnoses, and expertise level understanding of non-specific spinal, shoulder, hip, and knee complaints is apparently warranted to best serve this patient population. (This is a conference presentation abstract and not a full work that has been published.)

Change in sense of coherence in patients attending chiropractic care in a practice-based research network

Joel Alcantara, Andrew Whetten, Jeanne Ohm, Joey Alcantara

Objective: To determine changes in patients' sense of coherence (SOC) with chiropractic care. Methods: In addition to socio-demographic data and clinical covariates, baseline and comparative SOC was measured using the SOC-29 survey. Statistical analysis utilized a bootstrap paired t-test with a linear mixed model approach with practitioner as random blocking factor to examine the effects of a number of covariates. Results: A convenience sample of 1419 responders (1060 females; mean age =40.96 years) comprised our study population. They were highly educated with 87% (N=1240) attaining "some college education" or higher. The majority (N=720; 51%) indicated an MD/DO as their primary care provider. Wellness care and to improve symptoms were the major motivation for care (N=963; 68%). Baseline/comparative SOC scores were 148 (SD=22.19) and 150.70 (SD=23.59) with the observed mean for the bootstrap sample having a difference of 1.989 (95% CI:1.299, 2.759) at p=0.005 of the detected difference. We found minimal evidence ($p>0.05$) that covariates (i.e., age, gender, visit number, patient status, educational level, primary provider, motivation for care and duration of pain complaint) played a role in SOC change. Conclusion: The SOC of patients significantly increased with a course of chiropractic care. (This is a conference presentation abstract and not a full work that has been published.)

Improvements in quality of life of patients under chiropractic care in a practice-based research network

Joel Alcantara, Andrew Whetten, Jeanne Ohm, Joey Alcantara

Objective: To determine changes in patients' global physical health (GPH) and global mental health (GMH) following a course of chiropractic care. Methods: In addition to socio-demographic data and clinical covariates (i.e., motivation for care), baseline and comparative GPH and GMH were measured using the PROMIS global health survey. Statistical analysis utilized a bootstrap paired t-test with a linear mixed model approach with practitioner as random blocking factor to examine the effects of a number of covariates. Results: A convenience sample of 1419 responders (1060 females; mean age =40.96 years) comprised our study population. The mean number of visits between measures was 4.15 (SD=4.24). Baseline/comparative scores were: GPH (49.52/50.73) and GMH: 50/52.41. The observed mean for the GPH bootstrap sample had a difference of 1.117 (95% CI:0.88, 1.405) with p=0.0071. The observed mean for the GMH bootstrap sample had a difference of 1.453 (95% CI: 1.122, 1.751) with p=0.0128. Increases in GPH and GMH were statistically significant. We found minimal evidence ($p>0.05$) that covariates (i.e., age, gender, educational level and motivation for care) played a role in the observed improvement in QoL. Conclusion: The quality of life of patients improved with a course of chiropractic care. (This is a conference presentation abstract and not a full work that has been published.)

The predictive relationship between quality of life domains and sense of coherence among chiropractic patients presenting for care in a practice-based research network

Joel Alcantara, Andrew Whetten, Jeanne Ohm, Joey Alcantara

Objective: To assess the predictive relationship between various quality of life (QoL) domains and sense of coherence (SOC). Methods: We measured the SOC and QoL of patients using the SOC-29 and the Patient Reported Outcomes Measurement Information System, respectively. Predictive relationships utilized random forest regression analysis. Results: Our convenience sample consisted of 1980 responders (average age=40.72 years; 1494 females). The mean SOC score was 148.3 (SD=22.37). The mean PROMIS T scores were: physical functioning (50.97), anxiety (52.03), depression (47.47), fatigue (51.15), sleep disturbance (49.85), ability to participate in social roles and activities (54.44), pain interference (51.27), global physical health (GPH) (49.34) and global mental health (GMH) (50.7). The variable importance plots indicated that GMH, anxiety and depression were several magnitudes higher as predictors for SOC compared to physical domains (i.e., physical functioning, pain interference). However, multi-dimensional partial dependence plots demonstrated interaction between physical domains such as fatigue and sleep disturbance to SOC. Therefore, physical domains of QoL cannot be discredited as nonessential in the prediction and understanding of a person's SOC. Conclusion: Despite the strong predictive relationship of mental health domains to SOC, physical domains cannot be discounted as playing a role. (This is a conference presentation abstract and not a full work that has been published.)

Bilateral hip cam-deformity and early-onset osteoarthritis

Daniel Ault, Ashley Ruff, Stacey Cornelson, Aimee Jokerst, Norman Kettner

Objective: To describe a patient with bilateral femoral head cam-deformity, early-onset osteoarthritic (OA) changes, and clinically correlated femoroacetabular impingement (FAI) on the left. Clinical Features: A 25-year-old male presented with left deep groin pain. The onset of provocation occurred while performing squat exercises. Left hip pain, reduced flexion range of motion, and positive orthopedic FAI tests were identified at examination. Interventions and Outcome: Following the radiographic diagnosis of bilateral cam-deformity and early-onset OA changes, an ultrasound (US) examination was performed, which showed real-time dynamic FAI. For further evaluation of acetabular labral pathology, a magnetic resonance imaging (MRI) examination was recommended. At last follow-up, the patient elected to pursue an orthopedic consultation. Conservative care included Class IV therapeutic laser, soft tissue manipulation, assisted stretching, and psoas trigger point therapy. The patient reported no alleviation of symptoms. Conclusion: This case demonstrates the clinical manifestation and radiologic diagnoses in a rare presentation of early-onset bilateral hip OA changes. We present the efficacy of US in the diagnosis of FAI, but emphasize the value of

MRI for labral pathology. To our knowledge, this is the first case demonstrating real-time impingement with a femoral head cam-deformity using US. (This is a conference presentation abstract and not a full work that has been published.)

Implicit bias among doctor of chiropractic students and program faculty

Jeffrey Baier, Mark Pfefer, Rebecca Wates, D'sjon Thomas

Objective: To investigate whether negative implicit racial and obesity attitudes and beliefs exist among chiropractic students and faculty at an academic institution, and to compare these findings to the implicit bias evident in the general population. Methods: Students and faculty participants (n=88) completed a series of implicit attitude and belief measures. Results were compared to normative population values. Participants completed attitude- and belief-based Implicit Association Tests based on race- or obesity-based implicit biases. This reaction time measure of automatic memory-based associations asked participants to classify words into category pairs: good versus bad (attitude measure) and motivated versus lazy (stereotype measures). Results: Clear evidence for implicit negative racial and/or obesity bias was found in this group of participants. Compared with findings from the general public (race: 3,725,723 respondents; obesity: 334,135 respondents), respondents trended towards having more negative implicit biases concerning both race and weight. Conclusion: Future health care providers and faculty in this sample have strong negative racial and obesity bias, indicating pervasiveness of stigma toward racial minorities and obese persons. Additional research is needed to investigate how these attitudes and beliefs impact delivery of care. (This is a conference presentation abstract and not a full work that has been published.)

Reliability and validity of orthopaedic tests to assess low back pain patients: a systematic and critical review

Florian Barbier-Cazorla, Hainan Yu, Pierre Cote, Paula Stern, David Cote, Anne Taylor-Vaisey, Chelsea D'silva, Nadege Lemeunier

Objective: To study the reliability and validity of orthopaedic tests used in the assessment of Low Back Pain adults (LBP). Data Sources and Selection: We conducted a systematic and critical review searching on three databases from 2000 to 2017. Paired reviewers screened and critically appraised studies using the modified QUAREL and modified QUADAS-2 checklists. We used best evidence synthesis evidence from studies with low risk of bias and classified validity studies following Sackett and Haynes system. Results: We screened 1646 articles, 15 were low risk of bias. Twenty orthopaedic tests were studied. These studies reported: 1) modified Schobert test may be reliable [0.91<ICC (CI95% not reported)<0.97] but couldn't distinguish low back pain patients than controls; 2) hip extension test reliability [k=0.76 (IC 95 % : 0.57-0.95)] with validity phase II findings; 3) active straight leg raise reliability [0,53 (IC 95 % : 0,20-0,84) <k< 0,76 (IC 95 % : 0,57-0,96)] with phase I/II validity findings. Conclusions: Evidence is too preliminary to support reliability and validity of orthopaedic tests. More research (phase III) is needed to conclude on their clinical utility. (This is a conference presentation abstract and not a full work that has been published.)

Point of care ultrasound in a chiropractic clinic: a case series demonstrating value added

Patrick Battaglia

Objective: To describe a series of cases where the availability of diagnostic ultrasound at the point of care was indispensable in providing an accurate diagnosis without delay or need for more expensive imaging, such as MRI. Clinical Features: This series highlights the following cases: rib fracture (negative radiographs), bilateral de Quervain stenosing tenosynovitis, gouty arthritis (negative radiographs), carpal tunnel syndrome with severe median nerve compression, and finger extensor tendon dislocation. Intervention and outcome: With an accurate diagnosis established, each patient received appropriate care. Patients with rib fracture and de Quervain stenosing tenosynovitis were managed conservatively. The patient with gouty arthritis was referred to primary care for medical management. Patients with carpal tunnel syndrome and extensor tendon dislocation were referred to orthopedics. Conclusion: Modern high frequency ultrasound transducers and systems can resolve musculoskeletal anatomy with superb resolution. As this case series demonstrates, making ultrasound available at the point of care may improve patient outcomes by establishing a correct diagnosis with minimal increase in cost. (This is a conference presentation abstract and not a full work that has been published.)

Spinal epidural hematoma in a patient on chronic anticoagulation therapy performing self-neck manipulation: a case presentation

Patrick Battaglia, Jesse Cooper, Todd Reiter

Objective: To present a case report that highlights the risks of self-neck manipulation and describe a clinical scenario in which practitioners of spinal manipulation therapy (SMT) should exercise appropriate caution with patients undergoing anticoagulation therapy. Clinical Features: A 63-year-old man presented to the emergency department with worsening interscapular pain radiating to his neck 1 day following self-neck manipulation. He was found to be coagulopathic upon admission secondary to chronic warfarin therapy. The patient subsequently developed quadriparesis. Magnetic resonance imaging revealed multilevel spinal epidural hematoma (SEH) from the lower cervical to thoracic spine. Intervention and Outcome: The patient underwent emergency laminectomy for evacuation of SEH with placement of an epidural drainage catheter. He was admitted to an acute inpatient rehabilitation center for 2 weeks of physical and occupational therapy. The patient ultimately made a complete recovery. Conclusion: To the best of our knowledge, we present the first case of a patient with an underlying coagulopathy performing self-neck manipulation, which resulted in SEH and subsequent quadriparesis. The relationship between SEH and SMT warrants further investigation. Until then, anticoagulation therapy or known coagulopathy should be considered a relative contraindication to SMT. (This is a conference presentation abstract and not a full work that has been published.)

Vibratory stimulation of cervical vertebrae modulates the discharge activity of ventral tegmental area neurons and dopamine release in the nucleus accumbens

Kyle Bills, Scott Steffensen

Objective: Very little is known about the extra-somatosensory effects of spinal mechanoreceptor-based therapies on the supraspinal central nervous system. We examined changes in firing rate and neurotransmitter release in the mesolimbic system, an area highly involved in addiction, induced by activation of spinal mechanoreceptors at the cervical spine in a rodent model. Methods: We utilized single-cell in vivo electrophysiology, fast-scan cyclic voltammetry and microdialysis to measure changes in neuron firing rate and dopamine (DA) release. Spinal mechanoreceptors were activated by microcontroller driven implanted motors. Results: We show that spinal mechanoreceptor activation transiently depresses GABA neurons and excites DA neurons in the ventral tegmental area while increasing DA release in the nucleus accumbens. These effects are frequency and anatomically dependent and driven by endogenous release of opioids. Conclusion: Spinal mechanoreceptor activation modulates neuron firing and neurotransmitter release in the mesolimbic system. This study demonstrates that peripheral stimulation at the spine is sufficient to alter supraspinal neuronal function at the cellular level. Further, that spinal-based therapies carry potential as adjunctive treatments for drug-abuse disorders. (This is a conference presentation abstract and not a full work that has been published.)

Effect of Biofreeze®, TheraBand Kinesiology Tape, or the combination of products on acute low back pain and disability

Barton Bishop, Jay Greenstein, jena Etnoyer-Slaski, Robert Topp

Purpose: To compare the effect of Biofreeze and TheraBand Kinesiology Tape (TBKT) to advice on acute low back pain (LBP) pain, disability and fear avoidance over 1-week. Methods: Participants completed informed consent, Numeric Pain Rating Scale(NPRS), Roland-Morris LBP and Disability Questionnaire(RMDQ), and Fear Avoidance Beliefs Questionnaire(FABQ). Subjects were randomized into 1 of 4 at-home pain management groups, [Group 1 (Biofreeze+Tape), Group 2 (Tape), Group 3 (Biofreeze), Group 4 (Advice)]. The groups followed the same protocol, rating their pain at 2nd (T2) and 3rd (T3) office visits. At one week(T4) participants completed the NPRS, RMDQ, and FABQ. In addition to pain and outcomes, at

home pain management compliance and pain medication were documented on a daily basis. Results: A total of 106 participants completed the study (Group 1 = 25, Group 2 = 28, Group 3 = 26, Group 4 = 27). Group 1 significantly changed their for FABQ-PA score over time (p=0.000) from T1(x=19.2) to T2(x=14.2). There was also a significant decrease in FABQ-Total score over time (p=0.002) for all groups except Group 4. All groups except Group 4 also significantly improved (p=0.000) RMDQ scores from T1 to T4. Pain significantly declined (p=0.000) in all groups over time. Conclusion: The use of TBKT, Biofreeze, or combination improved pain and function in participants with acute, non-complicated LBP. (This is a conference presentation abstract and not a full work that has been published.)

Chiropractic care for a patient suffering a slip and fall and craniofacial trauma: a case report

Thomas Bloink, Charles Blum

Objective: This case presents novel care for a 65-year-old female patient presenting subsequent to a slip and fall accident. Clinical Features: The patient fell and struck her left-zygoma (zygomatic-nasomaxilla region), which was fractured and lost consciousness due to the head trauma. Following the accident she received physical, vestibular, and chiropractic spinal therapies for approximately three-months with no relief or change in symptomatology. Three-months post-trauma she presented to this office with chronic symptoms (VAS 8/10): pelvic pain, upper-cervical spine pain, difficulty swallowing due to supra/infrahyoidal myofascial disorder, pain in the left-maxillozygomatic joint (radiated into her nose), numbness to region of facial trauma, vertigo and tinnitus. Intervention/Outcome: In the first four-weeks at this office (seen twice-a-week) she received sacro occipital technique (SOT), cranial manipulative care, TMJ care, and co-treated with dentist (lower dental splint therapy) with marked improvement (VAS 3-4/10). In the ensuing four-months she was seen twice-a-month with steady improvement following each office visit. By the 5-month mark her symptomatology had predominately resolved (VAS 1/10), with only mild intermittent brief pains in the cervical spine and ear. Conclusion: Further research is indicated to determine if other patients with similar presentations might benefit from these chiropractic methods. (This is a conference presentation abstract and not a full work that has been published.)

Mal de Debarquement Syndrome an atypical vertigo: a case report

Thomas Bloink, Charles Blum

Objective: Mal de Debarquement syndrome (MdDS) is an atypical vertigo related to the continued sensation of movement after a subject may have finished boating, surfing or taking a sea voyage. MdDS's underlying pathogenesis is poorly understood and therefore, treatment options are limited. Clinical Features: For 4-years, prior to being seen at this office, the patient had chronic atypical vertigo with 2-3 flareups per year with durations lasting 3-4 months. A brain MRI was unremarkable though a cervical MRI revealed spondolytic and discogenic degenerative changes. She reported that prior to 4-years she traveled on approximately 20-cruise ship vacations. Intervention and Outcome: The patient was treated for eight-visits over a 6-week period of time. SOT and cranial/TMJ care was rendered with adjustments to the cervical/thoracic spine. She also received cranial/dental co-treatment with a lower occlusal splint and seen at this office once-a-week for three-weeks in a row, with her splint being dentally equilibrated immediately following cranial treatment. After the eighth-visit she experienced complete relief of symptoms. A year following her 8th-office-visit her condition has remained stable. Conclusion: Conservative care for complex patient presentations are always an optimal option and further study in chiropractic care of MdDS might be warranted. (This is a conference presentation abstract and not a full work that has been published.)

A chiropractic and dental perspective the three faces of forward head posture: differential diagnosis is the key for optimal outcomes

Charles Blum

Objective: Ideally chiropractic seeks to optimize patient care collaboratively working within interdisciplinary relationships. One condition discussed in both dental and chiropractic arenas involves the ramifications of forward-head-posture (FHP) positioning. Determining causation is a crucial part of the differential diagnostic process since misdiagnosis can lead to poor patient outcomes. Data Sources and Selection: A selective search of PubMed was performed to assess both chiropractic and dental perspectives of FHP. Results: Chiropractic studies tended to focus on FHP as related to a spinal curve that needed to be "corrected," secondary to poor posture/ergonomics. Dental studies tended to focus on FHP as being an adaptation secondary to airway compromise, related to craniomandibular joint disorders (CMD). Yet another group of studies determined that FHP conversely leads airway compromise. Conclusion: Airway compromise and apneas have drastic long-term effects on patient mortality and morbidity. Chiropractic care needs to take into account possible adaptive FHP positioning, since "correcting" a spinal curve may aggravate airway compromise. Likewise dentistry treating CMD may need to consider co-treatment with chiropractors since FHP may contribute to a patient's airway compromise. Therefore obstructive sleep related apneas related to FHP might require dental/chiropractic interdisciplinary care for optimal patient outcomes. (This is a conference presentation abstract and not a full work that has been published.)

Food for thought: a pilot study of the effectiveness of an eating disorder training workshop

Ron Boesch, Misty Stick, Elissa Twist, Dustin Derby, Kimberly Merchant, Stephanie Burrough

Objective: Describe pre- and post-training knowledge of eating disorders (ED) for clinical faculty and interns 4 months post training. Methods: Investigators developed an ED training session for teaching clinicians and interns in a DC program. Pre- and post-training surveys captured long-term knowledge retention. The surveys contained a 20 items centered on respondents' self-perceptions of their ED knowledge (1 = minimal, 5 = extensive), ability to identify ED, and common clinical signs / symptoms of ED. Investigators used cumulative scores ranging from 0 (no correct responses) to 17 (all correct responses) to assess respondent understanding. Results: The study had 107 pre- and 96 post-training respondents (83/77students, 24/19 instructors). Chance differences occurred for pre- (M=13.63) and post-training (M= 13.71) and mean cumulative scores ($t(153) = -1.399$, $p = .164$). Significant pre- (M=2.73) and post-training (M=3.11) differences occurred for respondents' knowledge ($t(196) = -2.951$, $p < .01$). Respondents' confidence in ED patient identification rose from 2.7 to 3.1 post-training. Conclusion: Although the training did not significantly impact respondents' cumulative scores, it did seem to impact their perceptions of knowing more about ED and slightly increased their confidence in identifying patients with ED. (This is a conference presentation abstract and not a full work that has been published.)

Gender differences in income expectations of doctor of chiropractic students

Scott Carpenter, Elissa Twist, Judy Bhatti

Objective: To examine if differences exist in projected income expectations between male and female Doctor of Chiropractic (DC) students in their final term of chiropractic college. Methods: Gender and projected income of 1, 5, and 10 years as well as a calculated break-even month was extracted from class business plans of end-of-term 9th trimester students. Change in income was computed based on expected income from month 1 to 10 years. Projected income was adjusted for the median income of the practice location. Non-parametric tests were run in SPSS V25. Results: 123 (80 male) cases were examined. Males reached a break-even point median at month 7, females 5 months. Median projected income year 1 males n=74 (19811.5) females n=40 (11581.0) p=.7, year 5 males n=80 (63300.0) females n=43 (34813.0) p=.003 and year 10 males n=80 (150699.0) females n=43 (305039.44) p<.001. Change in adjusted income males n=74 (210842.00) females n=40 (130913.5) p<.001. Conclusion: In this population of DC students, women have lower projected income expectations by five years and ten years in practice than their male colleagues. Women also have lower expectations of income increase over 10 years. Males expect an earlier projected break-even point than females. (This is a conference presentation abstract and not a full work that has been published.)

Collaborative management of idiopathic Scoliosis: a case study of chiropractic care and vision therapy

Cynthia Chapman, Barclay Bakkum, Lisa Barker

Objective: The purpose of this case report is to describe the co-management of a 9-year-old with idiopathic scoliosis and headaches using chiropractic care and optometric vision therapy. It was hypothesized that the combined care could impact the vestibulocollic reflex pattern and thereby address the scoliosis and headaches. Clinical Features: Optometric diagnoses included convergence insufficiency and significant visually-guided body movement (gross motor) deficits. Initial chiropractic exam findings were 4° right thoracic and 9° left lumbar curvatures along with multiple levels of vertebral joint dysfunction. Her headaches were rated as moderate and frequent. Outcome measurements included: Neck Index, Back Index, Berg Balance Scale, Timed Up and Go Test, and International Co-operative Ataxia Rating Scale. Intervention and Outcome: The patient received therapeutic glasses with mild prisms and underwent standard optometric vision therapy for a year. During that same time, she was assessed and received monthly manipulative therapy. At the conclusion of therapy, headaches were moderate and occasional with 3° thoracic and 3° lumbar curvatures. At 3-month follow-up her headaches were moderate and frequent with 3° thoracic and 5° lumbar curvatures. Conclusion: No statistically significant changes in outcome measures were found, showing that the scoliosis had not progressed. (This is a conference presentation abstract and not a full work that has been published.)

Factors associated with post-traumatic stress disorder prevalence among veterans of recent wars receiving Veterans Affairs chiropractic care

Brian Coleman, Kelsey Corcoran, Eric DeRycke, Lori Bastian, Cynthia Brandt, Anthony Lisi

Objective: This study examined factors associated with post-traumatic stress disorder (PTSD) prevalence among Veterans of Operation Enduring Freedom/Iraqi Freedom/New Dawn (OEF/OIF/OND) who receive Veterans Affairs (VA) chiropractic care. Methods: A cross-sectional analysis of administrative data from a national cohort study of OEF/OIF/OND Veterans with at least one visit to a VA chiropractic clinic from 2001-2014 was performed. The prevalence of PTSD was modeled by logistic regression using covariates of sex, race, age, body mass index (BMI), pain intensity, alcohol and substance use disorders, and smoking status. Results: We identified 14,205 Veterans who received chiropractic care, with a mean age of 38 years, 15.8% women Veterans, and 54.24% having a diagnosis of PTSD. On multivariate analysis, significant association was found between PTSD prevalence and male sex, younger age, BMI $\geq$ 30, moderate to severe pain intensity, alcohol and substance use disorders, and current smoking status. Conclusions: PTSD among OEF/OIF/OND Veterans receiving VA chiropractic care is common and associated with several patient demographic and clinical factors. Recognition of these factors is important for appropriate diagnosis and management of Veterans with PTSD who seek chiropractic treatment for pain conditions, given the biopsychosocial model of pain. (This is a conference presentation abstract and not a full work that has been published.)

Chiropractic care for low back pain among veterans of recent wars receiving Veterans Affairs primary care

Kelsey Corcoran, Lori Bastian, Eric DeRycke, Cynthia Brandt, Sally Haskell, Anthony Lisi

Objective: This study aims to examine patient factors associated with the use of chiropractic services among Operations Enduring Freedom/Iraqi Freedom/New Dawn (OEF/OIF/OND) Veterans with low back pain (LBP). Methods: This was a cross-sectional analysis of a cohort of OEF/OIF/OND Veterans with a primary care visit associated with an ICD-9 code for LBP from 10/01/11 to 09/30/14 at Veterans Affairs (VA) facilities that also offered on-station chiropractic services. Chiropractic service use was defined as $\geq$1 chiropractic visit associated with a LBP diagnosis within a year after the primary care visit. Bivariate analyses were used to compare patient factors between recipients of chiropractic care and nonrecipients. Results: There were 72,810 OEF/OIF/OND Veterans with a primary care visit for LBP and 8.8% used chiropractic services. Compared to nonrecipients, Veterans who received chiropractic services were more likely to be female, white, and an Officer during military service ($p<0.05$). Chiropractic users were also more likely to have moderate to severe pain, prescriptions for opioids and/or benzodiazepines, a diagnosis of Posttraumatic Stress Disorder, and a lower body mass index ($p<0.001$). Conclusions: This study outlines several patient factors associated with receiving VA chiropractic services for LBP among Veterans of recent wars. (This is a conference presentation abstract and not a full work that has been published.)

Is the use of chiropractic care associated with the receipt of opioid prescriptions? A systematic review and meta-analysis

Kelsey Corocran, Catherine Steffens, Alexandria Brackett, Craig Gunderson, Lori Bastian, Anthony Lisi

Objective: To conduct a systematic review to investigate whether the use of chiropractic care is associated with opioid receipt. Data Sources and Selection: The protocol for this review was registered on PROSPERO (CRD42018095128). The MEDLINE, PubMed, EMBASE, AMED, CINAHL, and Web of Science databases were searched for relevant articles from first record through April 19, 2018. Controlled studies, cohort studies and case-control studies including adults with non-cancer pain were eligible for inclusion. Studies reporting opioid receipt for both subjects who used chiropractic care and nonusers were included. Data extraction and risk of bias assessment were completed independently by pairs of reviewers. Meta-analysis was performed and presented as a risk ratio (RR) with 95% confidence interval (CI). Results: In all, 874 articles were identified and 6 met the inclusion criteria. The proportion of patients receiving an opioid prescription was lower for chiropractic users (range 12.3-57.6%) compared to nonusers (range 31.2-65.9%). In a random effects analysis, chiropractic users were 49% less likely to receive an opioid prescription (RR=0.51, 95% CI 0.44 to 0.59, $p<0.001$, I2=94.9%). Conclusion: The results from this meta-analysis demonstrate a decreased risk of opioid receipt for chiropractic users compared to nonusers. (This is a conference presentation abstract and not a full work that has been published.)

Anatomic variation of the sciatic nerve utilizing sonography

Stacey Cornelson, Norman Kettner

Objective: Variant sciatic nerve anatomy in the thigh occurs in about 2% of cadaveric specimens. Its significance is relevant in both clinical and surgical settings. This case described an asymptomatic split of the sciatic nerve in the thigh utilizing sonography. Clinical Features: A 27-year old male presented as a participant in a sonography research study. He was a healthy control subject without low back pain or radicular symptoms. A bilateral sonographic examination was performed to assess the sciatic nerve in the long (sagittal) and short (axial) planes. Intervention and Outcome: Incidentally demonstrated was a split of the sciatic nerve occurring approximately 8 cm distal to the ischial tuberosity. The finding was symmetric and bilateral. The split was maintained for 12 cm, reuniting proximal to the sciatic nerve bifurcation. Conclusion: Sciatic nerve variants are often described at the level of the piriformis. In contrast, there are few studies that describe variant anatomy of the sciatic nerve in the thigh. Sonography provides an easy and available resource for depicting anatomic morphology of the sciatic nerve. (This is a conference presentation abstract and not a full work that has been published.)

Dynamic vascular thoracic outlet syndrome: a case report

Stacey Cornelson, Forrest Allen, Mero Nunez, Norman Kettner

Objective: Arterial thoracic outlet syndrome (TOS) is 1-5% of all TOS. This case described the clinical and imaging presentation of a dynamic arterial TOS. Clinical Features: A 23-year-old male presented with right lower cervical pain with left arm and hand erythema and ulnar paresthesia upon retraction and depression of the right shoulder. Vital signs were within normal limits. Inspection, palpation, and auscultation of the upper extremities and cardiopulmonary system were normal. A duplex diagnostic ultrasound demonstrated diminished arterial flow of the subclavian artery under the clavicle and pectoralis minor, provoked by shoulder retraction and depression. The remaining examination was normal. His diagnosis was consistent with dynamic arterial TOS. Intervention and Outcome:

He was treated with cervical spine manipulation, myofascial release of the right sternocleidomastoid muscle, and dynamic neurostabilization prone exercises for 7 weeks. There was no improvement. The patient was referred to a vascular specialist and was lost to follow-up. Conclusion: TOS can be subcategorized into true neurogenic, disputed neurogenic, venous or arterial. Imaging of dynamic TOS includes duplex ultrasound. Ultrasound provides a non-ionizing and functional examination for evaluating dynamic vascular TOS. (This is a conference presentation abstract and not a full work that has been published.)

A real pain in the groin: a case series of chronic pain following surgical hernia repair

Jena Crumpacker, Nathan Hinkeldey, Heather Meeks, Kristin Freitas

Objective: To report a case series of chronic groin pain resolution following treatment using instrument assisted soft tissue mobilization (IASTM). In addition, to report an innovative care pathway highlighting collaboration between general surgeons and the chiropractors. Clinical Features: In all cases, patients reported to the chiropractic clinic as referrals from general surgery. Patients had a combination of chronic anterior pelvic wall and groin pain following hernia surgery, and they had been evaluated post-operatively without recurrent or new hernia. There was no indication for further surgical intervention; however, debilitating pain persisted. Intervention and Outcomes: Myofascial release in the form of IASTM was performed in all cases over the anterior pelvic wall and over the surgical scar. Stretching of the anterior fascial line was also incorporated in addition to patient education related to the difference between hurt and harm. Patient outcomes included the PROMIS Pain Interference 6B, FABQPA, Pain Catastrophizing Scale, pain intensity, and patient reported improvement. Conclusion: Following Treatment all cases reported the ability to return to normal pain free function, and complete improvement in ADL's. (This is a conference presentation abstract and not a full work that has been published.)

A survey of current chiropractic practice for patients with prior lumbar spinal fusion in the United States Department of Veterans Affairs

Clinton Daniels, Jordan Gliedt, Edward Bednarz, Pradeep Suri, Anthony Lisi

Objective: To evaluate the frequency and characteristics of Department of Veterans Affairs chiropractic services for patients with prior surgical lumbar fusion. Methods: This was an electronic survey of chiropractic providers working within the Department of Veterans Affairs (VA). Questions were informed by a prior survey and piloted on chiropractic providers outside of VA. Statistical analysis included respondent background information, and quantitative and qualitative analysis of chiropractic referral patterns and practices. Results: There was a moderate response rate of 46.3% (62/134). The respondents were representative of the VA chiropractic field in age, gender, and years in practice. The majority of respondents (90.3%) reported seeing at least 1 post-fusion patient in the past month. VA chiropractic providers do not use specific guidelines or protocols to guide their care of post-fusion patients. Treatment practices trended towards exercise, manual therapy, and mobilization techniques. A third of providers reported performing manipulative therapy to a spinal region that included a fusion. Conclusion: This survey provides preliminary data on VA chiropractic services in the management of patients status post lumbar fusion. These patients regularly present for chiropractic care and the data support the need for further study. (This is a conference presentation abstract and not a full work that has been published.)

Therapeutic horticulture for veterans with chronic musculoskeletal pain

Paul Dougherty, Susan Taylor-Brown

Chronic musculoskeletal (MSK) pain is a significant issue for Veterans. A plethora of treatments are available, yet there remains frustration over the lack of significant improvement. One potential confounder to treatment responsiveness is over medicalization of the condition. The use of functional activities may serve as a potential option to address chronic pain issues. Therapeutic Horticulture (TH) is a process that uses plants and plant-related activities to improve well-being through active or passive involvement. We present data for a 10-week TH program that consists of three components: Didactic, Experiential and Life Skills. Preliminary Data: Four cohorts (31 Veterans – 18 males, 13 female) have participated in TH. Participating Veterans have demonstrated improvement in their pain, self-efficacy and quality of life. Qualitative program improvement measures identified impactful program components including; improved health through the physical activity, improved sleep, learning new skills, nutritional awareness and mental health indicators including a decrease in social isolation, thoughts of suicide, a gain in self-confidence and sense of purpose. Conclusion: In a limited number of Veterans TH has shown effectiveness in improving pain and psychosocial factors. Functional activities such as TH may provide a viable option for chronic MSK pain patients. (This is a conference presentation abstract and not a full work that has been published.)

Case report of an adult with prior concussions utilizing sensory integration therapy with the SAVE program (a follow-up)

Emily Drake, Angela Seckington, Stephanie Sullivan

Objective: Document changes of a post-concussive male receiving a follow-up session of sensory integration care using the SAVE Program. Clinical Features: A 43-year-old male presented with a history of concussions, most recent in 2013. Results from first SAVE Program intervention showed substantial improvements in the symptom survey (81% change), peripheral color detection (2cm), and auditory functioning (10dB decrease). Post SAVE session, some self-reported deficits persisted, so a second session was scheduled. Given observed improvements following first session, quantitative electroencephalograms (qEEG) were conducted to evaluate brain activation patterns. Intervention and Outcome: The SAVE Program is a sensory integration therapy stimulating touch, sound, sight, and proprioception systems. Similar to first session, treatment consisted of two, one-hour sessions per day for five consecutive days. Most self-reported symptoms remained improved from first session. Additional self-reported deficits in reaction time and speed of information processing resolved following second session. The qEEG showed a decrease in frontal relative theta and theta/beta ratio, which have been associated with improved cognitive functioning. Improvements were also noted in peripheral color detection (2.5cm). Conclusions: A follow-up session of the SAVE Program may benefit patients who have suffered a concussion and continue to experience deficits. (This is a conference presentation abstract and not a full work that has been published.)

Fascial release techniques complement usual Webster care in a patient with persistent fetal malposition

John Edwards, Allison Union, Joel Alcantara

Objective: To describe the chiropractic care of a patient desiring a trial of labor after cesarean (TOLAC) at home with persistent breech fetal presentation during her third trimester. Clinical Features: A 33-year-old Caucasian female presented for chiropractic at 30-weeks of gestation with moderate mid-and low-back pain. Palpation of the uterus aligned the axis to the left shoulder and restrictions were found in the diaphragmatic and sacral fascia. At 32-weeks, the on-premise midwife palpated the fetus in the breech-presentation. By 35-weeks she palpated fetal-lie alternatively between breech and transverse. On the 16th visit at 38-weeks, ultrasound confirmed vertex fetal-positioning. Intervention and Outcomes: The chiropractor provided Webster sacral-analysis care via drop technique twice-a-week for 4 weeks with a trial of side-posture at the 6th visit. Two visits later with lateral-uterine-tilt still present, the chiropractor employed side-posture sacral adjustments, fascial-release techniques to the sacrum and diaphragm, and a combination of PNF and manual gamma-motor-neuron stimulation to the gluteal muscles and deep-six lateral hip rotators. The 14th visit included Logan Basic contacts to the sacrotuberous and sacrospinous ligaments. Fetus remained vertex for successful TOLAC. Conclusion: This case describes the addition of fascial-release techniques to usual Webster-protocol with persistent breech-presentation. (This is a conference presentation abstract and not a full work that has been published.)

Photogrammetric investigation of sagittal pelvic alignment and potential influencing factors during the 3rd trimester of pregnancy

John Edwards, Allison Union, Joel Alcantara

Objective: This study compares photogrammetric sagittal pelvic-translation (SPT) in the 3rd trimester of pregnancy with a non-pregnant reference value and investigates the correlation between SPT, presenting condition (PC), and body-mass index (BMI) in a single chiropractor clinic. Methods: While lumbar studies and anecdotal presumptions exist, few papers or psychometric analyses have utilized photogrammetry to describe pelvic alignment in pregnancy despite its inherent relevance. An IRB-approved review of 21 records (May 2013-June 2014) included lateral digital photographs of 3rd trimester women using a reference marker at the posterior-aspect of the greater-trochanter. Investigators followed the software's procedures for calibrating and reducing image distortion to measure SPT. Results: Student t-test for +z SPT demonstrated the pregnant sample mean (x =0.357") to be several standard deviations from the mean of a published non-pregnant sample (μ=2.142", t=-31.944) yet compared favorably ($p<.01$) with the gravity line (μ=0.00", t=5.025). Lumbo-pelvic/hip pain (n=16) and fetal malposition (n=13) were most frequently reported, although SPT (R=-0.057, -0.188 respectively) held negligible Pearson's correlation to PC and BMI ($R<+0.30$). Conclusion: 3rd trimester SPT for this sample, independent of BMI, pain or fetal-malposition, suggests the reference might be closer to the gravity line than in the non-pregnant model. (This is a conference presentation abstract and not a full work that has been published.)

The effect of Theraworx Relief on night-time leg cramps and associated symptoms

Jena Etnoyer-Slaski, Robert Topp

Objective: To determine the effect of Theraworx Relief™ (TR) compared to placebo on frequency and severity of night-time cramps (NLC), sleep quality, quality of life (QoL) and depression. Methods: Subjects who experienced NLC >3/week participated in a 4-week double blind trial. Sleep quality, QoL and depression were reported at Baseline, after 2 weeks of no treatment (Wk2) and after 2 weeks of applying TR or placebo (Wk4). Subjects completed a daily diary indicating the frequency and severity of NLC. The assigned topical was applied to both legs before retiring to bed and additional amounts of the topical if leg cramping occurred. Results: Following the trial, 60% of the TR claimed a benefit, while 41% of the placebo claimed a benefit ($\chi 2 = 1.65$, p=20). TR significantly declined the frequency and severity of NLC between week 1 and 4. Subjects receiving TR exhibited significant($p<.05$) improvements between Baseline and Wk4 and Wk2 and Wk4 on sleep quality, QoL and depression. The placebo did not significantly change on any measures over time. Conclusions: Individuals who experienced NLC >3/week reported a significant reduction in NLC and improved quality of life, depression and sleep quality with nightly use of TR. (This is a conference presentation abstract and not a full work that has been published.)

Chiropractic student attitudes, skills, and knowledge of evidence-based practice: EBASE survey tailored to students in preclinical and clinical chiropractic training

Sergio Fernando, Joel Alcantara

Objective: Examine the attitudes, skills, knowledge, and barriers regarding evidence-based practice principles and implementation by students in our chiropractic college. Methods: We made minor wording changes in the widely used self-report instrument, Evidence-Based Practice Attitude and Utilization SurvEy (EBASE) to make it relevant to chiropractic students. The questionnaire was distributed using the Qualtrics web-based platform. EBASE subscales (attitudes, skills, knowledge, and barriers) were summarized and reported. Results: Of a potential 246 respondents, 163 (66%) completed the EBASE survey. Respondents were representative of our college population: male (60%), age 20-29 yrs. (74%). Curriculum distribution was: year-1 (34%), year-2 (17%), year-3 (31%), and year-3 and above (18%). Health-center student clinicians constituted 48% of the sample. Respondents generally favored EBP (82-93%) and reported above average EBP skills (25-50%). However, only 24% considered themselves adequately trained in EBP and only 45% of the student-clinicians expressed confidence in applying evidence to clinical practice. Students frequently cited lack of time" and "lack of evidence" as barriers to applying EBP. Conclusion: EBP attitudes, skills, knowledge, and perceived barriers were consistent with that published for other health-professional students. We also conclude that additional EBP training and implementation within the curriculum is needed. (This is a conference presentation abstract and not a full work that has been published.)

Hidden in plain sight: a case series of chronic pain improvement with treatment of post-surgical scar

Kristin Freitas, Nathan Hinkeldey

Objective: To add to the body of literature related to the treatment of post-surgical active scar pain and to remind manual therapists to assess scars for mobility and pain generating potential before excluding them as a pain generator. Clinical Features: The case series is unique in that it illustrates use of Instrument Assisted Soft Tissue Manipulation (IASTM) to treat three different chronic scar presentations. Patients were all greater than 4 years post-operative and presented with chronic pain with functional and recreational limitations that were recovered. Intervention and Outcomes: All scars were inspected and classified by the mobility, discoloration, and type of scar that had been formed post-surgically. Myofascial release in the form of IASTM was performed along the periphery of the scars as well as over the scars to promote improved scar motility and elasticity. In addition, cupping was added periodically. Patients completed the PROMIS Pain Interference 6B, Pain Catastrophizing Scale. Subjective report included improvements to their activities of daily living and pre and post photographs were taken illustrating noticeable visual morphological changes. Conclusion: In three cases IASTM resulted in marked improvement in patient's ability to perform daily tasks and return to recreational activities. (This is a conference presentation abstract and not a full work that has been published.)

Interdisciplinary care of a 44-year-old male patient with obstructive sleep apnea (OSA) secondary to a class two division two malocclusion

Richard Gerardo, Charles Blum

Objective: A 44-year-old male patient presented for dental care for treatment of long-term OSA. Clinical Features: He had been using an APAP (Automatic-Positive-Airway-Pressure) device though still had signs of sleep apnea: heavy snoring, afternoon sleepiness, waking up tired, TMJ disorders, and Apnea-Hypopnea Index (AHI) of 31. Dental examination revealed a "Class-II, division-2" malocclusion with an over-closed vertical dimension, CBCT imaging revealed compromised pharyngeal airway, and TMJs. Intervention and Outcome: Dental treatment procedures focused on correcting mandibular posture. Patient was referred for chiropractic care due to his complex presentation and to facilitate the effects of dental orthopedic appliance used to treat the patient's apnea. Chiropractic treatment consisted of releasing excessive a sacral nutation restriction, sacro occipital technique (SOT) category-two treatment, sacroiliac-joint support belt, foot orthotics, and SOT-TMJ/cranial therapies. The dental care helped reduce any dental stomatognathic contributions and the chiropractic therapy helped recapture the TM-disc and normalize TMJ function. The post-treatment iCAT view demonstrated comparatively greater joint stability and significant improvement in airway and sleep (marked reduced AHI), and less snoring and afternoon fatigue. Conclusion: When instituting dental TMJ care the patient had flare-ups and referral for conjoint chiropractic care was made, which appeared to facilitate patient's recovery. (This is a conference presentation abstract and not a full work that has been published.)

Decreased opioid intake utilizing kinisiotape on a comminuted closed clavicle fracture

Michelle Gingras

Objective: Discuss decreased use of opioids for pain management in a patient with fracture awaiting surgical intervention. Clinical Features: Comminuted closed left clavicle fracture of a 41 year old female post motorcycle accident. Intervention & Outcome: Patient

rated pain at a constant 5 at rest and 8 with movement in the ER. She was prescribed a brace and hydrocodone 30 mg/day. That day, and the eleven days awaiting surgical intervention, her care consisted of kinisiotape on the area of the fracture and surrounding structures, intermittent bracing, and hydrocodone. The patient's comfort improved to 2 with rest/4 with movement and utilizing 7.5 mg/day of hydrocodone. Prior to surgery, tape was removed to prepare the skin. On the hour and a half ride home without tape, while braced and with medication, her pain increased to a constant 7. In the two remaining days without tape before surgery, she increased to 30 mg/day and the pain level persisted. Conclusion: Further research is needed in this area. However, utilizing kinisiotaping could possibly decrease volume of and possible dependency on opioids in pre-operative fracture care. (This is a conference presentation abstract and not a full work that has been published.)

PROMIS®-29 outcomes of U.S. military personnel with low back pain adaptively allocated to usual medical care alone versus usual medical care plus chiropractic care

Christine Goertz, Zacariah Shannon, Cynthia Long, Robert Vining, Ron Hays, Karen Spritzer, Ian Coulter

Objective: PROMIS®-29 outcomes are reported from a clinical trial comparing usual medical care (UMC) alone to UMC plus chiropractic care for active-duty U.S. military personnel with low back pain. Methods: 750 participants were allocated in equal proportions across 3 U.S. military treatment facilities to receive up to 6 weeks of UMC plus chiropractic care or UMC alone. PROMIS®-29, domains including physical health (physical function, pain intensity, pain interference, fatigue, sleep disturbance), mental health (anxiety, depression), and social health (social participation), was administered at baseline and at 6- and 12-weeks post-baseline. Linear mixed-effects regression models were estimated for each domain. Results: At baseline, both groups had worse mean scores than the general U.S. population for all physical and social health domains and better than average mental health. At both 6 and 12 weeks, participants receiving UMC plus chiropractic care had statistically significantly better outcomes in all physical and social health domains than UMC alone, with no between-group differences for mental health. Conclusion: The addition of chiropractic care to UMC led to greater improvement in PROMIS®-29 physical and social health, including some domains, such as fatigue and sleep disturbance, which are not captured by traditional outcome measures. (This is a conference presentation abstract and not a full work that has been published.)

TMJ trauma as a cause of lingual nerve impingement: a case report

Paul Gold, Nadine Ellul

Objective: To chronicle a rare presentation of post-traumatic TMJ dysfunction with reports of facial pain and metallic taste intra-orally. Early recognition of TMJ dysfunction as well as lingual nerve impingement is highlighted and paramount to effective chiropractic intervention. Clinical Features: An 85-year-old female patient with a history of left mandibular fracture subsequent to a fall presented with facial pain and a constant metallic taste in the mouth for over three years. Of note was a left anteriorly dislocated condyle which, unexpectedly, did not alter the patient's mandibular gait. Examination of the TMJ revealed hypertonicity of intra-oral muscles of mastication. Examination of the cervical spine was unremarkable. Intervention and Outcome: Symptoms were resolved using intra- and extra-oral manual soft-tissue and mobilization techniques, electrical modalities, and laser therapy. Conclusion: It is hypothesized that post-traumatic contraction of the lateral pterygoid muscle compressed the lingual branch of the mandibular nerve. This not only caused hypesthesia to the anterior two-thirds of the tongue but a constant metallic taste in the patient's mouth that was relieved by non-invasive procedures. Although altered taste sensation is a rare presenting complaint, field doctors should consider TMJ dysfunction as causative and resolvable using conservative care. (This is a conference presentation abstract and not a full work that has been published.)

Inflammation and bone health: a novel approach to osteoporosis management and prevention

Kenice Grand, Stephen Grand

Objective: Osteoporosis has become a silent epidemic. Inflammation has been identified as an underlying factor in many chronic diseases, with osteoporosis recently added to the list. The purpose of this narrative literature review was to explore the impact of inflammation on bone health and to identify nutritional and lifestyle strategies that may diminish inflammation and improve bone health. Data Sources and Selection: PubMed, Medline, and CINAHL were the data sources utilized. Articles were limited to those published within the last five years. Review articles and RCTs were utilized preferentially. Only articles in English were utilized. Results: Inflammation has been implicated as a key-contributing factor to many chronic diseases. Some research suggests that inflammation may contribute to accelerated bone loss and, ultimately, osteoporosis. Natural approaches to control inflammation, such as antioxidants, omega-3 fatty acids, and herbal remedies, hold promise for the prevention and management of osteoporosis. Conclusion: Inflammation plays a significant role in the development of osteoporosis. There is an intersection with other chronic diseases via the influence of inflammation, and natural interventions to control the inflammatory process may be helpful in managing and preventing osteoporosis. More research is needed. (This is a conference presentation abstract and not a full work that has been published.)

Herbal topical analgesics: an alternative tool for the management of chronic neuromusculoskeletal pain and inflammation

Stephen Grand, Kenice Grand

Objective: The purpose of this review was to review the evidence for the use of herbal topical analgesics to treat neuromusculoskeletal pain. Data Sources and Selection: The majority of the papers included in this literature review were published from 2012 forward. Only papers written in English were included in this review. The data-bases employed were PubMed, AltHealthWatch, DynaMed Plus, and The Cochrane Library. Results : The results in individual studies as well as Cochrane reviews are somewhat mixed with regard to effectiveness and/or safety. Often studies utilize a mixture of herbal products that make it difficult to relate any individual item with the effects. Some studies combine topical herbals with other treatments, usually showing a better result than without the pairing. Positive results, to some degree, were seen involving use of such plant substances as capsaicin, arnica, comfrey, devil's claw, boswellia, and others. Conclusion: Numerous herbal/plant substances demonstrated varying levels of effectiveness with regard to pain control. There were some mild adverse reactions. More research is needed, but there seems to be a strong potential in this realm. (This is a conference presentation abstract and not a full work that has been published.)

Recommendations for public health and prevention interventions for common spine disorders in low- and middle-income communities

Bart Green, Claire Johnson, Scott Haldeman, Edward Kane, Michael Clay, Erin Griffith, Juan Castellote, Matthew Smuck, Shanmaganathan Rajasekaran, Eric Hurwitz, Margareta Nordin, Kristi Randhawa, Hainan Yu

Objective: To develop prevention intervention recommendations from the Global Spine Care Initiative that may be deployed globally for spinal disorders. Data Sources and Selection: We performed a scoping review using a comprehensive search of PubMed for meta-analyses and systematic reviews of case-control studies, cohort studies, and randomized controlled trials for risk factors of specified spinal disorders. We categorized risk factors using the biopsychosocial theory of Engel, providing a visual map of the risk factors and their relationships. Potential prevention interventions for individuals and communities were identified. Results: Forty-one risk factors, 51 epidemiological associations, and 39 comorbidities were extracted; some were associated with more than one disorder. Public health actions included screening for osteopenia, avoiding exposure to certain substances associated with spinal disorders, ensuring adequate dietary intake for vitamins and minerals, smoking cessation, weight

management, injury prevention, adequate physical activity, and avoiding harmful clinical practices. Conclusion: Prevention principles and health promotion strategies were identified. Interventions should encourage healthy behaviors of individuals and promote public health interventions most likely to optimize physical and psychosocial health of each community. Prevention interventions should be based upon evidence, resources, and selected through group decision-making processes by individuals and the community. (This is a conference presentation abstract and not a full work that has been published.)

Immediate and short-term effect of Biofreeze® versus placebo on acute neck pain and disability

Jay Greenstein, Jena Etnoyer-Slaski, Robert Topp

Objective: To compare the effect of Biofreeze® (BF) versus Placebo on acute neck pain and disability prior to and following cervical manipulation over one week. Methods: Acute neck pain patients with pain for less than 2 weeks and >18 years of age were recruited into a double blind, one week trial. At Baseline(T1) informed consent, Numeric Pain Rating Scale(NPRS) and Neck Disability Index(NDI) were completed. Patients were randomized into either Placebo or BF. Both groups rated their pain 10 minutes after application(T2), received a cervical manipulation, and rated their pain within 5 minutes of manipulation(T3). Next, subjects were given an at-home pain management regimine, applying their assigned topical to the neck 4x/day for one week(T4). At one week, patients complete the NPRS and NDI. Results: 52 patients completed the study(29 Placebo, 23 BF). There was a decline in NDI socres scores (p=0.000) from T1(x=33.217) and T2(x=23.913) within BF. There was a significant decline in pain (p=0.000) from T1(x=6.333) to all other time points (T2=4.524, T3=4.19, T4=4.357) within BF. There were no between group differences. Conclusions: The use of Biofreeze significantly reduced acute neck pain and disability prior to and following cervical manipulation over one week. (This is a conference presentation abstract and not a full work that has been published.)

Step 1 in the validation of a novel technology algorithm's ability to produce likely low back and neck pain conditions

Jay Greenstein, Jena Etnoyer-Skaski, John McNulty, Robert Topp

Objective: To determine the level of agreement between provider and a novel technology used to improve low back pain and neck pain patients' access to guideline concordant care. Methods: A convenience sample of patients from an outpatient chiropractic clinic with neck and/or low back pain were recruited. All patients completed a mobile application about their condition. The technology then produced a list of likely conditions, weighted from 100% likelihood to 15% likelihood. The likely conditions list for each patient was then compared to the doctor's diagnosis. Results: A total of 73 patients (36 Male, 45 Female) completed the study procedures with 46 reporting back pain and 27 reporting neck pain. The novel technology's 100% likelihood matched to the doctor's diagnosis in 30.5% of the patients and 75-100% likelihood matched in 43.9% of the patients. However, regardless of the weighting of diagnosis the technology was able to produce a match to the doctor's diagnosis in 73.2% of the patients. Conclusions: The novel technology algorithm was successful in producing a diagnosis similar to the doctor's in 73.2% of the patients. This is the first time in refining and improving the validity of the algorithm. (This is a conference presentation abstract and not a full work that has been published.)

Osteoporosis and osteopenia in premenopausal women: a review of risk factors and management in a chiropractic setting

Stephanie Halloran, Anthony Lisi, Kelsey Corcoran

Objective: This review aims to provide an overview of current evidence on risk factors and management strategies for premenopausal osteoporosis and osteopenia, with implications for chiropractic practice. Data Source and Selection: A search of the PubMed database from January 1, 2008 to September 6, 2018, was conducted using search terms "osteoporosis", "osteopenia", and "premenopausal women." Data were synthesized based on contributing factors relevant to chiropractic practice and presented as a narrative review. Results: DXA screening is indicated in cases of fragility fracture or significant secondary causes of low bone mineral density (BMD) in the premenopausal population. It is estimated .5% and 15% of women 30-40 years-old have DXA scores consistent with osteoporosis and osteopenia, respectively. Of these cases, 50-90% are influenced by genetic predisposition, increased age, low weight and body mass index, malnourishment, medication use, and related systemic diseases. Management of osteoporosis and osteopenia in at risk premenopausal females includes targeted nutritional treatment and lifestyle recommendations critical to bone health, and referral for DXA screening and pharmacological interventions as indicated. Conclusion: This review presents material pertinent to chiropractors in the diagnosis and management of osteoporosis and osteopenia in premenopausal women. (This is a conference presentation abstract and not a full work that has been published.)

SOT Cranial Therapy for the treatment of pediatric torticollis: a chiropractic case report

Rachel Hamel, Charles Blum

Objective: A 4-month-old infant presented with torticollis and digestion upset, was treated with chiropractic interventions. Clinical Features: The patient reported a 4-month history of right-head-tilt and torticollis, blood in her stool and latching difficulties possibly related to vacuum extraction and C-section birth. Birth interventions included an epidural, Pitocin, and 1-week labor with failure to descend. Intervention/Outcome: Examination revealed a right-head-tilt, with a right-leg shortening, Achilles tendon tension, and an abnormal tonic labyrinth test. Hanging body test was abnormal revealing her body going into extension and head into right-rotation. Suck testing revealed hypersensitive gagging, dysfunctional tongue usage and restricted labile frenum. Right-SCM muscle tension, right-posterior occiput flattening with left-orbital compression and left-ear flare were noted. Tension was noted in the diaphragm and stomach area with apprehension to touch. Treatment consisted of 3-SOT cranial treatment (over 3-weeks) incorporating SOT, CMRT, and craniofacial adjustments, along with probiotics. Gradual improvement was noted each session ending with the patient no longer having any head tilt, latch improvement was noted, no blood is stool, and all orthopedic testing normalized. Conclusion: Greater study is needed to determine if a subset of infant torticollis and digestive issues might benefit from this approach. (This is a conference presentation abstract and not a full work that has been published.)

Manual interventions for musculoskeletal factors in infants with suboptimal breastfeeding: a scoping review

Cheryl Hawk, Amy Minkalis, Carol Webb, Olivia Hogan, Sharon Vallone

Objective: To survey the literature on manual treatments to correct musculoskeletal dysfunctions in infants with suboptimal breastfeeding. Data Sources and Selection: Our research question was, "have manual interventions been used to correct infants' musculoskeletal dysfunctions thought to be linked to suboptimal breastfeeding?" We searched PubMed and Index to Chiropractic Literature, from inception through July 2018, as well as relevant gray literature. We assessed quality of randomized controlled trials (RCTs) and cohort studies using modified SIGN checklists, and the overall strength of evidence using GRADE. Results: The search yielded 461 articles, with a final inclusion of 27: 7 expert commentaries; 1 high-quality RCT; 1 low-quality cohort; 1 pilot study; 2 cross-sectional surveys, 5 narrative reviews and 10 case series/reports. Combining the 10 case series and reports in our search with the 18 from included narrative reviews yielded 201 infants described in case reports and case series alone who received manual therapy for nursing dysfunctions. No serious adverse events were reported and improvement in nursing ability was observed using various outcome measures, usually maternal report. Conclusion: Based on the GRADE criteria, there is moderate positive evidence for the effect of manual therapy on suboptimal breastfeeding. (This is a conference presentation abstract and not a full work that has been published.)

Chiropractic student and new graduate perception of institution versus community based clinical educational experience

Navine Haworth, Keri Moore, Louise Hostmanshof

Objective: Determine final year students' self-perception of preparedness for transition to practice, professional identity and experiences of

interprofessional clinical practice. Compare perceptions after a full year of practice. Findings will inform clinical education curriculum. Methods: Ethics approval granted from all institutions. Repeated measures case studies with multiple allied health professions and Australian universities. Phase 1 Chiropractic interview data collected with 2018 final year students. Phase 2, 2019, interviews with same participants collected after one year of practice. Results: Interviews (n=15) across 2 Australian chiropractic programs. Perceptions indicate the UHC prepares them for transition to practice through scaffolded supervision of their consultations with reasonably healthy patients. Students perceived CCs prepared their readiness for transition to practice substantially better; allowed students to consult people from diverse socio-economic and cultural backgrounds and treat complex health care issues. Students lacked clear understanding of their professional competencies. Interprofessional learning activities were ad-hoc and opportunistic. Conclusion: UHC and CCs prepare students for transition to practice in different ways. Most students feel prepared. A focus on developing students' understanding of chiropractic competencies related to professionalism and interprofessional clinical education in curriculum is needed. Phase 2 data presented at later conferences. (This is a conference presentation abstract and not a full work that has been published.)

Forces associated with cervical stairstep technique

Ned Heese, Mark Pfefer, Jon Wilson, Steve Agocs, Jackson Berg, Rachel Gilmore

Introduction: Sacro Occipital Technique (SOT) is used by greater than 40 percent of U. S. chiropractors. Cervical stairstep technique has been an integral part of SOT since 1971 and is as a low velocity, mobilization intervention applied to the cervical spine to assess and treat joint dysfunction. The purpose of this study is to investigate the force-time profile of this technique. Methods: An experienced SOT practitioner provided two sessions of cervical stairstep technique to two adult participants. The assessment of force-time profiles lasting up to 90 seconds utilized a table outfitted with force sensing equipment (Force Sensing Table Technology, Canada). Force-time profiles, including peak force measurements were obtained. Results: Primary direction of force is caudal. Transmitted forces for participants ranged from 40 to 60 Newtons. Conclusion: Cervical stairstep technique should be classified as an alternative to standard high velocity, low amplitude (HVLA) cervical spine manipulation procedures. Cervical stair step technique is an alternative intervention for various types of neck pain and cervical joint dysfunction when contraindications exist in using standard HVLA procedures. Future research is planned to assess clinical effectiveness of this technique in patients with neck pain and cervical joint dysfunction. (This is a conference presentation abstract and not a full work that has been published.)

A multidisciplinary approach to chronic pain: a pilot of chiropractic inclusion

Nathan Hinkeldey, Jamie Erixon, Jeffrey Kinderdietz

Objective: To report a chiropractor's contribution to an outpatient multidisciplinary chronic pain program. Clinical Features: Participants are Veterans with chronic pain who continue to search for interventions to improve their quality of life. Intervention and Outcomes: Participants volunteered for a 10-week cohort-based chronic pain program. The program consisted of weekly two-hour classes based on cognitive behavior therapy for chronic pain (CBT-CP) and acceptance and commitment therapy (ACT). Two topics were led by the chiropractor, Pain 102 and Understanding Your Imaging. Outcomes measured for this intervention included Pain Catastrophizing Scale, Beck Depression Index, PROMIS pain interference 6b, and SF36. After the 10-week program catastrophizing, depression, body pain and pain interference decreased by 47.69%, 34.43%, 31.74 and 13.86% respectively. Improvements were also noted in role-emotional health by 24% and role-physical health 18.6%. Conclusion: Multidisciplinary chronic pain programs may benefit from the incorporation of a chiropractor. Assisting patients in understanding hurt versus harm and normalizing common imaging findings are within chiropractor's scope of practice and potentially an opportunity for further integration. (This is a conference presentation abstract and not a full work that has been published.)

Pudendal Neuralgia: a case for multimodal chiropractic intervention

Nathan Hinkeldey, Harold Olson, Tiffanee McArthur, Kevin Percuoco

Objective: The purpose of this case report is to describe and discuss the management of pudendal neuralgia utilizing a multimodal chiropractic treatment approach. Clinical Features: A male patient presented to a chiropractic clinic with three years of ongoing left sided medial gluteal pain and genital paresthesia in which he thought to be caused from an intense squatting workout. The patient had remained refractory to prior treatments including a regimen of antibiotics, pelvic floor therapy, conventional physical therapy, and activity modification. Provoking activities included urination, ejaculation, physical activity, sitting, and bowel movements. Intervention and Outcome: Multimodal chiropractic intervention, including spinal manipulative therapy, instrument assisted soft tissue mobilization (IASTM), manual myofascial release, cupping, and an at home stretching program focusing on tension in the obturator internus muscle. The patient reported near resolution of symptoms after seven treatment sessions and complete abolition of symptoms following one month adherence to at home exercises. Conclusion: Conservative management for pudendal neuralgia is not well documented within the literature. This case provides preliminary evidence, at best, for the use of multimodal chiropractic intervention for pudendal neuralgia and suggests that further research is needed in this area. (This is a conference presentation abstract and not a full work that has been published.)

The quality of life and patient satisfaction of pregnant patients under care in a chiropractic teaching clinic: a prospective case series

Sarah Hock, Joel Alcantara

Objective: To prospectively examine the quality of life (QoL) and patient satisfaction of pregnant patients attending care at a chiropractic teaching clinic. Methods: In addition to sociodemographic and clinical covariates, we utilized the PROMIS instruments to measure QoL domains (i.e., physical function, anxiety, global physical health). Patient satisfaction was measured using the RAND VSQ9 instrument. Statistical analysis utilized descriptive statistics and the Wilcoxon- Signed Rank Test (WSR). Results: A convenience sample of 16 pregnant women (mean weeks of gestation=20.75; mean age=30.44) comprised our study population. Mean weeks of gestation at baseline and comparative measurement were 20.75 and 25.69, respectively. Mean T scores were: physical function (47.83/44.88), anxiety (44.98/48.78), depression (45.92/45.26), fatigue (56.54/54.45), sleep disturbance (53.06/53.29), satisfaction with social role (46.21/47.51), pain interference (53.83/54.48), pain intensity (3.63/3.63), global physical health (44.77/44.84) and global mental health (49.44/50.53). Convenience of location scored lowest (73.44) while interpersonal experience scored highest. Changes in mean T scores did not change significantly for the QoL domains ((t[8]>0.05) while the VSQ9 scoring did (t[8]=0.0096). Conclusion: Pregnant patients attending care at a chiropractic teaching were highly satisfied with their visits with no statistically significant change in QoL measures as their pregnancy proceeded. (This is a conference presentation abstract and not a full work that has been published.)

Peer-to-peer instruction in a clinical sciences lab

Ramona Houston

Objective: Describe the academic impact of a peer-to-peer teaching innovation that was developed for an EENT course at our institution. Methods: We compared student behavior, written comments, and aggregated final exam scores in independent, non-concurrent EENT labs using traditional (TT) teaching methods (four quarters, 2016-2017, 146 students) and innovative peer-to-peer (PP) methodologies (four quarters, 2017-2018, 186 students). In TT labs, students practiced in self-selected, "doctor-patient" pairs. In PP labs, the students were randomly assigned to 3-member, "doctor-patient-observer" groups in which the roles rotated. The student observer used a checklist to guide and document student "doctor" performance. Results: Quantitative: Exam scores (max = 100): median (IQR), TT: 90 (83-95), PP: 91 (84-95). Qualitative: Course evaluations and instructor observations revealed that TT

students were inattentive and practice time was ineffectively used. PP students were enthusiastic participants who commented that they appreciated the practice sessions and checklist. Conclusion: Exam scores were equivalent for TT and PP methods, but there were more "A" grades in PP groups. Instructors observed increased student participation and more effective use of class time with the PP method and PP students were more enthusiastic participants. (This is a conference presentation abstract and not a full work that has been published.)

Public health in North American chiropractic journals: analysis of search results in PubMed

Claire Johnson, Bart Green, Kent Stuber

Objective: To analyze PubMed for public health content in North American chiropractic journals. Data Sources and Selection: Four chiropractic journals based in North America actively indexed in PubMed were included: Journal of Manipulative and Physiological Therapeutics (JMPT), Journal of Chiropractic Medicine (JCM), Journal of the Canadian Chiropractic Association (JCCA), and Journal of Chiropractic Education (JCE). PubMed was searched from the inception of indexing to February 20, 2018 using the MeSH term "public health." All languages and article types were included. Results: There were 4468 total articles retrieved. Of these, 115 articles were identified by using the search term "public health" (JMPT 82/3146; JCCA 19/571; JCM 8/544; JCE 6/207). The overall percentage of public health articles was 2.6%. Comparatively, other specialty journals show similar percentages (Spine 1.3% and Manual Therapy 2.9%). Limitations include that it is possible that not all articles on public health-related topics were identified. Conclusion: These four major chiropractic journals in North America publish articles on public health that can be identified in the PubMed search engine and are comparable with other mainstream journals. This publication helps build a body of literature that includes public health for the chiropractic profession. (This is a conference presentation abstract and not a full work that has been published.)

Sonography of asymptomatic ulnar nerve instability

Norman Kettner, Federico Villafane, Stacey Cornelson, Roberta Sclocco

Introduction: Ulnar nerve instability (subluxation/dislocation) from the cubital tunnel may predispose to ulnar neuropathy. Methods: Ulnar nerve was sonographically evaluated in three positions from extension to flexion for measures of ulnar nerve cross sectional area (CSA), elastography (kPa), instability, and mechanical pain threshold in 42 consented asymptomatic subjects. A 2-way ANOVA evaluated the effect of arm position and condition on each measurement. Both main effects and interactions between factors were evaluated, significance set at $p < 0.05$, followed by Bonferroni-corrected post-hoc comparisons. Results: CSA values revealed a significant main effect for condition factor ($F(2,243) = 6.53$, $p = 0.002$). Main effect of position ($F(2,243) = 0.59$, $p = 0.557$) or interaction ($F(4,243) = 0.05$, $p = 0.995$) were not significant. Post-hoc t-tests showed the control group had significantly smaller CSA values (0.057 ± 0.017 cm2, mean $\pm$ SD) compared to subluxation (0.066 ± 0.024 cm2, $p = 0.027$) and dislocation (0.067 ± 0.024 cm2, $p = 0.003$). No significant main effects or interactions for algometry or elastography. Conclusion: Ulnar nerve instability in asymptomatic elbows is accompanied by increased CSA suggesting increased size of the ulnar nerve precedes neuropathy. (This is a conference presentation abstract and not a full work that has been published.)

Spinal manipulation increases cortical salience network connectivity in cLBP

Norman Kettner, Vitaly Napadow, Kylie Isenburg, Dan-Mikael Ellingsen, Ekaterina Protsenko, Ishtiaq Mawla, Matthew Kowalski, David Swensen, Deanna O'Dwyer-Swensen, Robert Edwards, Marco Loggia

Objective: Chronic low back pain (cLBP) is associated with maladaptive brain plasticity. Spinal manipulative therapy (SMT) reduces pain and may modify networks of functional brain connectivity in response to nociceptive input. The salience network (SN) identifies relevant stimuli and coordinates appropriate responses, including attention to pain. Methods: Fifteen cLBP patients and 16 healthy controls were scanned with resting state fMRI before and after a single session of grade III and grade V lumbar mobilization at separate visits. Pain levels (NRS) were recorded pre- and post-therapy. To estimate SN intrinsic connectivity, dual regression, probabilistic ICA, cluster correction and ROI analyses were performed (0.05). Results: Both grades of SMT reduced cLBP measures. High grade (V) mobilization significantly increased connectivity between SN, thalamus and primary motor cortex (M1). A voxelwise regression analysis revealed increased SN connectivity with lateral prefrontal cortex (LPFC). Grade 3 mobilization also revealed a trend (0.1) with SN and LPFC connectivity. Conclusion: High grade (V) mobilization displays more robust brain based changes than lower grade (III) mobilization. Both reduced cLBP. This data suggests SN connectivity with LPFC supports a mechanism for SMT analgesia in cLBP. (This is a conference presentation abstract and not a full work that has been published.)

Perceptions of chiropractic students in years 1, 2 and 3 regarding interprofessional health care teams

Matthew Knieper, Judy Bhatti, Elissa Twist

Objectives: Describe perceptions of knowledge of interprofessional teams and value of IPE among three distinct years of chiropractic students at one chiropractic college. Methods: A 24-item cross-sectional survey was administered to 247 chiropractic students in years 1, 2, and 3. The survey included 5 demographic questions and the 19 item Readiness for Interprofessional Learning Scale (RIPLS). Results: A total of 247 (148 male) students completed the survey from year 1(n=66), year 2 (n=102), and year 3 (n=79). The over-all RIPLS score: (n= 231, M=77.2, 9.1). Year 1 (n=60, M=79.7, SD =7.4), Year 2 (n=95, M=76.9, SD=9.1), Year 3 (n= 76, M=75.4, SD=9.9). Of the 245 students who responded, 39% of the participants affirmed with the statement "I have to acquire much more knowledge and skills than other healthcare students." Another statement, 87% of participants agreed with "shared learning with other health care students will increase my ability to understand clinical problems." Conclusion: The majority of the participants demonstrated a positive response to IPE and collaborating with healthcare teams. While many of the participants demonstrated positive perceptions to IPE there was a lack of knowledge of distinct roles in an interprofessional team. (This is a conference presentation abstract and not a full work that has been published.)

Reliability and validity of muscular endurance tests in low back pain population: a systematic review

Arnaud Lardon, Hainan Yu, Pierre Cote, Anne Taylor-Vaisey, Nadege Lemeunier

Objective: To determine the reliability and validity of muscle endurance tests in low back pain population. Data Sources and Selection: A systematic search of the literature was conducted in four databases from 2000 to 2018. Eligible full texts were selected by pairs of independent reviewers who also critically appraised the relevant studies using the modified QUADAS-2 and QAREL checklist. Only low risk of bias articles were included in the synthesis of results and classified according the Sackett and Haynes validity phases. Results: Among the 2519 citations, 7 articles were included. The intra-rater reliability was reported in one article for Biering-Sorensen ICC=0.88(95% CI: 0.79-0.93), trunk flexor ICC=0.97(95% CI:0.94-0.98), right side bridge ICC=0.95(95% CI:0.91-0.97) and left side bridge test ICC=0.96(95% CI:0.92-0.98). The validity was reported by 4 phase I and 5 phase II studies. The lumbar trunk endurance and abdominal trunk lumbar and bridge tests is inconsistent across the studies. Prone(r=-2.246,p=0.007;r=-0.339,p=0.0002) and supine bridge test (r=-0.307,p=0.0007;r=-0.348,p=0001) were correlated with pain intensity, and disability respectively. Conclusion: There is little evidence about the use of muscular endurance tests to assess non-specific low back pain. Phase III validity studies are needed to judge about the clinical utility of these tests. (This is a conference presentation abstract and not a full work that has been published.)

Chronic elbow pain management using repetitive end-range loading of the shoulder: a case report

James Leonard, Nathan Hinkeldey, Trevor McArthur

Objective: To present the case of a patient with chronic elbow pain classified using mechanical diagnosis and therapy principles and managed using end-range loading of the shoulder. Clinical Features: A 38-year old female presented to the chiropractic office with chronic medial elbow pain following rehabilitation of a biceps tenodesis surgical intervention three years prior. Intervention and Outcome: Initially, the cervical spine was ruled out as a pain generator using end-range loading. Assessment then moved distally to the shoulder and revealed a directional preference of abduction and external rotation. Repeated end-range loading consistent with the patient's directional preference provided rapid resolution of elbow symptoms. Conclusion: The use of mechanical and diagnosis therapy principles assisted in identifying the shoulder as a pain generator. In addition, it provided a directional preference that this patient could reproduce to aid in the recovery. This case is an example of using treatment of a more proximal joint to reduce a distal complaint. (This is a conference presentation abstract and not a full work that has been published.)

Healthcare student knowledge of psychosocial factors associated with low back pain: a narrative review

Kelsey Lewis, Patrick Battaglia

Objective: Report healthcare student knowledge of psychosocial factors associated with low back pain. Data Sources and Selection: A narrative review of the English literature was performed using search terms "psychosocial" AND "students," "chronic low back pain," "low back pain," "chronic pain," "pain education," and "pain." Results: Eight studies were identified, with physical therapy (n=6), medical (n=3), chiropractic (n=1), occupational therapy (n=1), nursing (n=1), pharmacy (n=1), and non-healthcare (e.g. business; n=3) students studied. Healthcare Providers' Pain and Impairment Relationship Scale, Back pain Beliefs Questionnaire, and Objective Structured Clinical Examination were most commonly used for student assessment. Specific variables assessed include depression, fear-avoidance, interference with daily living, and increased healthcare visits. Seven studies provided cross-sectional data relative to the outcomes listed. One study exclusively studied the effect of pain education. In all seven studies, students in every health care discipline failed to demonstrate adequate knowledge of psychosocial factors. In one study, chiropractic and physiotherapy students demonstrated a better understanding of psychosocial factors than medical and pharmacy students. Following implementation of a pain module, students demonstrate better understanding of complicating psychosocial factors. Conclusion: Health science students have a substandard understanding of psychosocial factors associated with low back pain. (This is a conference presentation abstract and not a full work that has been published.)

Menstruation, what a headache: a case report

Morgan Lintz, Nathan Hinkeldey

Objective: To report a case of chiropractic management of menstrual migraines. Clinical Features: 47 year old female veteran reported to a hospital-based chiropractic clinic with three years of headaches present during her menstrual cycle. The presentation was consistent month after month and completely debilitated the patient for two days. Trialed treatments included massage, acupuncture, muscle relaxants, and NSAIDs without benefit. Intervention and Outcomes: Diaphragmatic breathing and Brueggers posture exercises were implemented into the treatment plan on the initial visit. No other interventions were offered. Following four treatments performed monthly, the patient was pain free during her menstrual cycle and lacked any evidence of menstrual migraines. Her PROMIS PI 6B also improved from a 19 to a 8. Following an additional four visits monthly, her results were maintained, and further improvement was noted via PROMIS PI 6B from an 8 to a 6. Conclusion: Diaphragmatic breathing and Brueggers postural exercises eliminated menstrual migraines in this patient. (This is a conference presentation abstract and not a full work that has been published.)

A pulsed electromagnetic field therapy device improves low back function: a pilot randomized controlled trial

Anthony Lisi, Mickey Scheinowitz, Richard Saporito, Anthony Onorato

Objective: To pilot a clinical trial of a portable pulsed electromagnetic field (PEMF) therapy device for subjects with mixed duration mechanical low back pain (LBP). Methods: A randomized, double-blind, sham-controlled, parallel-group study conducted at a chiropractic school outpatient clinic. The primary endpoint was functional capacity measured by the Oswestry Disability Index (ODI) at baseline, 6 weeks, and 12 weeks. Analysis was conducted on the intent-to-treat population and as a trend of change in pain scores over time using repeated measures Analysis of Variance (ANOVA). Results: 42 participants were randomized to receive usual care plus PEMF therapy or usual care plus sham, and 25 completed the study. Significant improvements in ODI scores from baseline to week 6 were reported in the experimental group ($F(2,16) = 23.51$, $p < .001$, effect size = .746) compared to the sham group ($F(2,20) = 4.03$, $p < .05$, effect size = .287). This difference persisted at week 12 follow=up. Adverse events were rare and mild. Conclusion: Preliminary results show a PEMF device is safe and effective in improving function and decreasing pain in patients with mechanical LBP. (This is a conference presentation abstract and not a full work that has been published.)

Can existing complexity measures be used to assess VA chiropractic resident cases?

Vivian Ly, Christopher Coulis, Anthony Lisi

Objective: VA patients generally have poorer health status and more medical conditions than the average population. Consequently, it is expected that chiropractic training at VA exposes residents to complicated patients with multiple comorbidities. Two comorbidity measurement tools developed by Charlson et al and Elixhauser et al are used widely to measure burden of disease and case-mix. Our objective is to test the applicability of the Charlson Comorbidity Index (CCI) and Elixhauser Index (EI) on one resident's case log to assess VA chiropractic resident's case complexity. Method: We performed a word search of one resident's de-identified case log to identify comorbidities categories which comprise the CCI and EI. Results: The case log included 6 of 17 comorbidity categories defined in the CCI and 9 of 30 comorbidity categories defined in the EI. Conclusion: The case log studied did not contain sufficient details to apply CCI or EI comorbidity measures to assess VA chiropractic resident's case complexity. To evaluate a resident's cases using the CCI or EI, further work is needed. (This is a conference presentation abstract and not a full work that has been published.)

Chiropractic co-management of two patients with low back pain and bullets in or near the spine

Ross Mattox

Objective: This case series describes the chiropractic co-management of 2 patients within a federally qualified health center, both with bullets lodged in or near the lumbar spine. Clinical features: Both patients were referred for chiropractic care with chief complaints of low back pain. Patient 1, a 29-year-old male, had been shot in the back 5 years prior. Radiography demonstrated a bullet lodged within the L5 vertebral body. Patient 2, a 41-year-old male, had been shot in the abdomen 10 years prior. Radiography revealed a bullet near the left posterior elements of L2. Neurological exam was unremarkable in both patients. Cross-sectional imaging was not available due to insurance and monetary limitations. Intervention and Outcomes: In both cases, a trial of care consisting of low force chiropractic techniques and other manual therapy was palliative and caused no adverse effects. Conclusion: There are no known published contraindications to chiropractic care relating to bullets lodged in or near the spine. Treatment was guided solely by the clinical judgment of the provider. Chiropractic care is useful for co-management of complex cases in federally qualified health centers such as in these cases, where lodged bullets are a common finding. (This is a conference presentation abstract and not a full work that has been published.)

Auricular acupuncture: a case for using Shen Men as a bridge to movement

Heather Meeks, Nathan Hinkeldey, Jena Crumpacker

Objective: To report a case of increased cervical spine mobility following an auricular acupuncture treatment. Clinical Features: A 27-year-old Veteran reported to a VA chiropractic clinic with 8 years of chronic neck pain. Global loss of cervical ROM was observed, most notably right rotation at 60 degrees with pain. He had trialed stretching from physical therapy and muscle relaxants without benefit. Intervention and Outcomes: During treatment within the chiropractic clinic, cupping, thoracic spine manipulation, and end range loading were trailed without benefit over three visits. Auricular acupuncture in the location of Shen Men resulted in immediate return of full pain free cervical range of motion. Patient outcomes included the neck disability index, PROMIS Pain Interference 6B, Pain Catastrophizing Scale, and FABQPA, cervical ROM, and patient reported improvement. Conclusion: Auricular acupuncture using Shen Men resulted in return of full pain free cervical ROM lasting at least four weeks. (This is a conference presentation abstract and not a full work that has been published.)

Drop foot: a case for enhancing patient outcomes when combining chiropractic and physical therapy intervention

Heather Meeks, Harold Olson, Tiffanee McArthur, Courtney Olson

Objective: To discuss the management of acute unilateral peroneal neuralgia by integrating chiropractic and physical therapy interventions. Clinical Features: 61-year-old male presented to a hospital-based chiropractic clinic with acute unilateral foot drop and paresthesia over the dorsum of the right foot. Symptoms started after sitting with his lateral lower right leg resting along the gunnel of a canoe for extended periods of time. Intervention and Outcome: Multimodal chiropractic care and physical therapy intervention, including extremity manipulative therapy, instrument assisted soft tissue mobilization (IASTM), manual myofascial release, compression flossing, therapeutic exercises and a home exercise program. At time of discharge, patient reported compete resolution of ankle dorsiflexion and near-maximal improvement in sensation over the dorsum of his right foot. His lower extremity functional score (LEFS) improved from 62/80 to 77/80. At a two-month follow-up, patient reported complete resolution of symptoms. Conclusion: Conservative management for peroneal neuralgia causing foot drop is not well documented within the current literature. This report provides a case for the combined use of chiropractic care and physical therapy for peroneal neuralgia treatment and suggests the need for further research in this area. (This is a conference presentation abstract and not a full work that has been published.)

Chiropractic practice in the continent of Africa

Hiwot Melka, Robb Russell, James Whedon, Scott Haldeman

Objective: The purpose of this study was to assess the status, supply, demographics, and characteristics of chiropractic practice in Africa. The results are expected to address the critical need for evidence-based management of spine pain in Africa. Methods: A survey questionnaire was distributed to 608 chiropractors through all known national chiropractic associations in Africa. Descriptive statistics were generated in Microsoft Excel. Information on the status of chiropractors by country was obtained from online resources. Results: 124 surveys were returned for a response rate of 20% from 15 of 54 countries in Africa. Nearly 84% of respondents were between the ages of 26-50. More than 69% reported being a graduate of one of the two chiropractic colleges in Africa. The majority practice in the southern region. Nearly 92% reported using diversified technique for treatment. Evidence-based practice was reported by 81% of the chiropractors. Patients presented with a variety of conditions, predominantly chronic pain (59%). Conclusion: The supply of chiropractic in Africa is sparse and unevenly distributed. Considering the high burden of spine pain, there appears to be potential for growth for chiropractic in Africa. (This is a conference presentation abstract and not a full work that has been published.)

Vertebral artery pseudoaneurysm: a case report

Hiwot Melka, Hector RiveraMelo, Simone jordan, Henry Hwang, James Whedon

Objective: The occurrence of Vertebral Artery (VA) pseudoaneurysm is rare but potentially fatal. There are few reports on pseudo aneurysms of the vertebral artery with bony erosions. We report a case of a female patient in her 90s who was referred for chiropractic care for neck pain. Clinical Features: The patient complained of headaches, left sided neck pain, limited range of motion with radiating pain, and bilateral weakness of the upper extremities. On examination, cervical ranges of motion were decreased with moderate pain, along with sensory, motor and deep tendon reflex deficits. Intervention and Outcomes: Axial T2, sagittal T1, Sagittal T2, Coronal T2, Sagittal STIRR, and axial GE sequences of the cervical spine were submitted for interpretation. The patient had an extra cranial VA pseudo aneurysm with chronic erosion of the C5 vertebral body. The patient was managed with anti-coagulant medication, close monitoring and acupuncture treatment with reduction in intensity of pain. Conclusions: Erosion of the vertebral body and presence of pseudo aneurysm in the cervical spine is a contraindication for chiropractic manipulation. It is important to recognize the features of vertebral artery Pseudo aneurysm on Magnetic Resonance imaging. (This is a conference presentation abstract and not a full work that has been published.)

Conservative chiropractic care for a post-traumatically induced C6/7 intraforaminal disc herniation in a 43-year-old female

Jeffrey Mersky, Charles Blum, Richard Gerardo

Introduction: Cervical spine pain is the fourth leading cause of disability with many episodes of acute neck pain resolving with/without treatment. Yet nearly 50% of individuals continue to experience some degree of pain or frequent occurrences. A 43-year-old female musician suffering from (over 1-year) of an un-resolved post-traumatic intraforaminal cervical disc herniation with radicular syndrome presented for chiropractic-care due to her chronic disabling pain (VAS 8-9/10) and inability to perform with her instrument. Methods and Intervention: The patient was assessed with SOT/cranial techniques and was treated for pelvic torsion/sacroiliac joint hypermobility syndrome with some related lumbar/cervical spinal related discopathy. Treatment also focused to her cervical spine and cranial related imbalance. Results: Patient was seen initially 2-times a week for 3-4 weeks, and then 1-time a week for 6-weeks at which time she reported no upper extremity discomfort (VAS 0-1/10) and was able to return to her work (musician). Brief discomfort might occur (VAS 2-3/10) if she played a particularly stressful piece of music, however it would resolve quickly with rest. Conclusion: Further study is warranted to determine what subsets of patients with intraforaminal disc herniations may benefit from this type of conservative chiropractic care. (This is a conference presentation abstract and not a full work that has been published.)

Empathy and perceived stress of incoming chiropractic students

Lia Nightingale

Objective: To assess empathy and perceived stress of students beginning the doctor of chiropractic program. Methods: Three first trimester cohorts were invited to complete the Toronto Empathy Questionnaire (TEQ) and Perceived Stress Scale (PSS). Data was analyzed for descriptive statistics, ANOVA, independent-samples t-test, and Pearson's correlation coefficient. Results: An 88% response rate was achieved in the cohorts of nearly 300 students assessed. Total Empathy Score and Perceived Stress Score were not significantly different between the 3 cohorts assessed. Stress negatively influenced several empathy characteristics. Female students were more likely to be both empathic and have higher perceived stress. Older students were more likely to feel that responsibilities were piling up and to be upset when others are treated disrespectfully, while younger students were more likely to feel excited when others are excited. Over 70% of beginning students were categorized as moderate stress, while only 7% had high perceived stress. Conclusion: Students beginning the doctor of chiropractic training program have moderate stress and average empathy. (This is a conference presentation abstract and not a full work that has been published.)

Mechanical properties of a thoracic spine mannequin with variable stiffness control

Edward Owens, Ronald Hosek, Brent Russell

Objectives: To test the Posterior-to-Anterior stiffness (PAS) of a new thoracic spine training simulator under different conditions of "fixation."

Methods: We constructed a thoracic spine physical model using plastic bones and ribs mounted in a wooden box. Silicone layers simulate skin and overlying soft tissue. The spine segment is stiffened with tension applied to cords running through the vertebrae and ribs. We tested PAS at 2 tension levels using a custom-built device to apply repetitive loads at the T6 spinous (SP) and over adjacent soft tissue (TP) while measuring load and displacement. Stiffness is the slope of the force-displacement curve from 10-60 Newtons. Results: Stiffness in the unconstrained (zero tension) condition over the SP averaged 11.98 N/mm and 6.72 N/mm over the TP. With tension applied, SP stiffness increased to 14.56 N/mm and TP decreased to 6.15 N/mm. Conclusion: Mannequin compliance is similar to that measured in humans. The tension control system increased stiffness by 21.3%, but only over the spinous process. Stiffness over the TP is dominated by the lower stiffness of the soft tissue layer. The mannequin with these properties is suitable for use in manual training of adjusting or PAS testing skills. (This is a conference presentation abstract and not a full work that has been published.)

Does a pipeline program at a CIM university motivate students for a CIM career?

Tolu Oyelowo

Low back pain is a significant public health issue that affects all demographics. Health disparities exist in terms of access to care and outcomes of care for low back pain. Demographic data of the chiropractic profession does not reflect the demographic breakdown of the United States, and enrollment of minorities in chiropractic programs is not consistent with the projected changes in demographics across the country. Previous research has indicated that science-based pipeline programs increase the roles of students in allopathic health professions. However, there remains an important gap in the current literature regarding the efficacy of pipeline programs for matriculation of minorities into a CIM university. The purpose of this qualitative study was to gain an increased understanding of a precollege science academy experience at a CIM university, and determine whether the experience increased interest in and motivation for a chiropractic career. The results indicated that program participation increased interest in and utility of CIM but did not change preconceived career choices. (This is a conference presentation abstract and not a full work that has been published.)

Academic indicators as predictors of student success

Fiorella Penaloza, Jon Wilson, Mark Pfefer

Objective: To examine the relationship between academic indicators and NBCE part one board exam outcomes for first-time test takers as a method of reviewing the program's curriculum map, as well as exploring the potential for using this information to target academic support mechanisms and interventions. Methods: NBCE part one board exam outcomes data by subsection was compiled for 2016, 2017, and 2018 and combined with academic indicators (i.e. entrance GPAs, first-trimester GPA, and initial course grades for all required courses; i.e. n=211) for multivariate and post-hoc analysis testing. Results: Clear evidence of academic indicators at the time of program entry and academic indicators, along with GPA thresholds, were identified as predictors of NBCE part one board exam outcomes of first-time test takers. Conclusion: Collectively, these indicators can be used to further understand the expected outcome of students based on their academic performance. Furthermore, more analyses of the interactions across these indicators is essential, as there are likely to be co-interactivity between the dependent and independent variables that are additively influencing the NBCE part one board exam outcomes. (This is a conference presentation abstract and not a full work that has been published.)

Pre-participation sports cardiac screening: a review

Mark Pfefer, Jason Qualls, Jon Wilson, Rachel Gilmore, Jackson Berg

Objective: Sudden cardiac death of a young athlete is heartbreaking, but is it possible to prevent or decrease the relatively small numbers of these events from occurring? There is significant controversy over effectiveness and costs regarding the delivery of pre-participation cardiac screening and early identification of asymptomatic structural or electrical abnormalities in the young athlete. The objective of this project is to review recent evidence regarding the most appropriate ways to engage in pre-participation cardiac screening procedures. Data Sources: A literature search was performed using the PubMed, Cumulative Index to Nursing and Allied Health Literature, Index to Chiropractic Literature, and National Guidelines Clearinghouse databases. Results and Conclusion: Evidence demonstrates that exercise is associated with an increased risk of sudden cardiac death for a small number of participants. Risks of cardiac disease are often unknown and sudden cardiac death events in young athletes often lack prior symptoms. Significant debate exists over the best strategy to prevent sudden cardiac death in athletes and the role of the electrocardiogram and echocardiogram in pre-participation screening. Chiropractors performing pre-participation sports screening examinations should have a good understanding of current guidelines which are reviewed in this project. (This is a conference presentation abstract and not a full work that has been published.)

Integrating clinical nutrition into chiropractic college clinics: obstacles and opportunities

Marina Rose

Objective: We do not want chiropractic interns to graduate without having a significant opportunity to put their "posiology" (adjusting technique) into practice under the guidance of trained clinicians; yet we have colleges that teach academic nutrition courses without corresponding guidance of practical application in a clinical setting. Nutrition is part of the chiropractic scope of practice. For field doctors the source of training is often a supplement company or lab test provider. There is a growing body of research identifying medication-induced and diet-induced nutrient deficiencies that are associated with neuromusculoskeletal symptoms. As a result, nutrient deficiencies are becoming a more important consideration in chiropractic education. Data Sources & Selection: Medical databases were searched for English-language publications from 2001 through October 2018 pertaining to nutrient drug interactions, and integrating didactic nutritional information into outpatient clinical encounters. Results & Conclusion: Data exist regarding nutrient deficiencies caused by diet or common medications. Nutrient deficiencies can cause or contribute to a patient's complaints. Identifying and addressing those deficiencies is within the scope of chiropractic practice. Chiropractic clinics are ideally situated for providing the necessary guidance in the clinical application of assessing and addressing these deficiencies. (This is a conference presentation abstract and not a full work that has been published.)

Chiropractic care within medical settings: a scoping review

Eric Roseen, Aisha Kasali, Kelsey Corcoran, Shweta Pallakkode, Anthony Lisi, Lance Baird, Robert Saper, Andre Bussieres, Roni Evans

Objective: To identify chiropractic services successfully integrated within medical settings. Data Sources and Selection: We conducted a scoping review using standard methodology by Arksey (2005) and Levac (2010). We searched for studies published in English between 1998 and 2018 in three electronic databases to identify doctors of chiropractic practicing in medical settings (e.g. hospitals, community health centers). We mapped our findings to the Proctor Conceptual Model for Implementation Research. Specifically, we summarized evidence on characteristics of chiropractic services, implementation strategies (and corresponding facilitators/barriers), and outcome measurement (implementation/clinical outcomes). Results: Our initial search yielded 2,027 records (Medline, n=488; Embase, n=379; and Web of Science, n=1,160), of which we identified 1722 unique studies, and obtained 280 full text articles. Of these, 45 met our inclusion/exclusion criteria. Most of these studies occurred in North America (42, 93%) in primary care (25, 56%) or rehabilitation (11, 24%) settings. Few studies (7, 16%) provided detailed reporting on the development or effectiveness of implementation strategies. Conclusion: While examples of multidisciplinary models that integrate chiropractic care in medical settings have emerged, little is known about implementation strategies and their effect on implementation and clinical outcomes. (This is a conference presentation abstract and not a full work that has been published.)

Neural arch bone marrow edema and spondylolysis in adolescent cheerleaders: a case series

Ashley Ruff, Stacey Cornelson, Courtney Wells, Norman Kettner

Objective: Spondylolysis is one of the most common sources of low back pain (LBP) in children and adolescents. It is imperative for

clinicians to recognize that persistent LBP is strongly indicative of spondylolysis, especially in high performance athletes. Clinical Features: Case 1: A 12-year-old female competitive cheerleader presented with gradual onset of LBP. Comprehensive clinical examination indicated MRI that identified a bilateral L5 Grade 1 stress reaction. Case 2: A 15-year-old female competitive cheerleader presented with insidious low back pain that was provocative with extension. MRI revealed a left L5 Grade 1 stress reaction and 8 months later CT revealed spondylolysis. Treatment for both cases consisted of spinal adjustments and rehabilitation exercises. Intervention and Outcome: Bone marrow edema (BME) and spondylolysis led to temporary cessation of cheerleading activities in both cases. Case 1 self-discharged with rehabilitation exercises and was lost to follow-up. Case 2 returned to sport pain-free five weeks after seeking treatment. Conclusion: Spondylolysis is common in adolescent athletes and the presence of BME antedates spondylolysis. Primary spine providers could consider this diagnosis in any adolescent, especially athletes, who have persistent LBP. Timely diagnosis will optimize treatment outcomes. (This is a conference presentation abstract and not a full work that has been published.)

The effects of chiropractic spinal manipulation on the H reflex and muscle strength in children with spastic diplegic cerebral palsy: a feasibility study

Jenna Salmons, Imran Khan Niazi, Rasmus Wiberg Nedergaard, Kelly Holt, Heidi Haavik, Denise Taylor

Objectives: To assess feasibility aspects of conducting a large-scale randomized, controlled study measuring the effects of chiropractic SM on motor neuron excitability and muscle strength in children with CP. Methods: Children with spastic diplegic CP, aged 8-13, were recruited through the New Zealand CP Registry. Feasibility was assessed in the areas of recruitment strategy(RS) and rate(RR), data collection procedures, equipment, intervention and compliance. Recruited Participants were randomized into either intervention (SM) or control group. Results: Three children completed data collection. RS and RR proved to not be feasible in recruiting enough participants to power a larger study appropriately. All data collection procedures were appropriate and complied with except for the V-wave measurement. H reflex threshold decreased and s50 and slope increased in the participants who received SM intervention. H reflex threshold increased and s50 and slope decreased in the participant who received the passive control intervention. Changes in MVC force were inconsistent between subjects. Conclusions: This study answered some important feasibility questions about conducting a large study Some aspects proved feasible, such as H reflex recordings, and some aspects need to be altered for any future research in this area. (This is a conference presentation abstract and not a full work that has been published.)

Spinal manipulation for complicated spinal conditions: a case series on cervical spinal canal stenosis

Alec Schielke

Objective: To present several examples of safe outcomes following high velocity, low amplitude (HVLA) spinal manipulation therapy (SMT) as conservative management of axial spine pain complicated by moderate to severe spinal canal stenosis (CS). Efficacy of SMT for musculoskeletal axial pain is not in questions, rather, the appropriateness of HVLA SMT in patients presenting with what would normally be considered a SMT contraindication: moderate to severe spinal CS. Clinical Features: Three recent patients from the Palo Alto VA chiropractic clinic were selected; Inclusion criteria was age 18-80, deemed appropriate for HVLA SMT and an MRI finding of moderate to severe cervical CS. Intervention and Outcome: Treatment included (but not limited to) HVLA SMT. Outcomes measured with verbal digital score (VDS), Neck Pain Disability Index, cervical range of motion change and reported adverse events (AE). Conclusion: All three patients had safe and beneficial outcomes with HVLA SMT without any reported AEs. Although these cases demonstrated positive results, more research is needed in this area, ideally to help improve clinical guidelines for chiropractors as well as other multidisciplinary healthcare professionals. (This is a conference presentation abstract and not a full work that has been published.)

Informal, hidden, and null curriculum in chiropractic education

Zacariah Shannon, Kara Shannon

Objective: To summarize the literature on informal information sources in chiropractic education. Data Sources and Selection: Pubmed, CINAHL, MEDLINE, Google Scholar, and the Cochrane Library were searched in July 2018 with the terms chiropract* AND informal curriculum OR hidden curriculum OR null curriculum, and chiropract* students AND information source. Articles were included if they presented chiropractic student response data indicating sources on which they base their views on health topics or professionalism. Results: Of 343 articles retrieved, 3 met the inclusion criteria. Articles not meeting inclusion didn't ask about views on health topics or professionalism, or queried chiropractic practitioners or medical students. Informal sources are an important aspect which shape chiropractic student perspectives. Student response of most important information source (formal vs. informal) was related to holding evidence-based beliefs. 30% of students who regarded informal sources as most important held non-evidence-based beliefs, compared to 5% who regarded formal sources as most important. Conclusion: Chiropractic-education research has largely focused on formal curriculum. Summary of informal aspects has relied mostly on opinion. More study is needed to understand the impact of informal sources and how to use them as educational tools in chiropractic education. (This is a conference presentation abstract and not a full work that has been published.)

Femoral nerve irritation secondary to decreased core stability and paradoxical breathing pattern following adverse reaction to care

Trevor Shaw, Michelle Gingras

Objective: To discuss adverse reaction to care leading to underlying conditions causing antero-lateral leg and low back pain. Clinical Features: 24 year old female presented on crutches, unable to bear weight on problematic leg following an adverse reaction to a Thompson Drop adjustment. Lumbar MRI was negative for disc or pathology. Intervention: Upon examination the following tests were positive: Femoral Nerve Tension Tests, Eli's sign, Internal Femoral Hip Rotation, prone lumbar stability test, Janda Hip Abduction, paradoxical breathing pattern. Inspection revealed 45-degree internal foot rotation and inability to bear weight on the involved leg. First treatment included femoral nerve flossing, crocodile breathing, and tall kneeling diaphragmatic breathing. Post treatment the foot's internal rotation decreased to 20 degrees. Second treatment added bilateral half kneeling kettlebell heartbeat, halos and lateral band assisted RNT knee extensions. Post treatment foot rotation decreased to 0 degrees and patient able to walk 30 yards unassisted with no pain. Conclusion: Adverse reaction to an adjustment was a catalyst to re-evaluate and revealed the patient's underlying condition of femoral nerve irritation and weak core stability. (This is a conference presentation abstract and not a full work that has been published.)

Improved performance following glute activation in a cross-fit athlete

Trevor Shaw, Adam Sergent

Objective: To describe the case management of a female cross-fit athlete presenting for a functional movement assessment. She had knee pain, following months of training for a competition. Clinical Outcomes: Following her assessment, it was determined that the patient had difficulty utilizing her gluteus maximus musculature in various positions including standing, laying and quadruped positions despite being a competitive athlete. It was determined via biomechanical testing that the patient's posterior chain firing pattern was predominantly erector spinae vs gluteus and hamstrings muscles. Intervention and Outcome: Continuation of RNT (Reactive Neuromuscular Training) gluteus medius / activation exercise was prescribed to establish motor control, endurance and pre-activation while decreasing erector spinae overload for this patient. Conclusion: It is evident that even at the highest level, competition athletes can still suffer basic compensatory patterns that hamper their goals and increase the likelihood of pain. In this patient we witnessed someone with exceptional strength but poor motor control. Regressing back to the most basic activation exercises, we were able to simulate the

proper activation and motor control to decrease pain and improve performance. (This is a conference presentation abstract and not a full work that has been published.)

Eccentric loading used in reducing chronic fascial tear of hamstring in a high school sprinter

Cami Stastny, Melissa Engelson

Objective: A 17-year-old male sprinter was treated for a type I left hamstring complaint with a history of three prior left hamstring strains during the 2018 track season. He completed physical therapy after each occurrence but reinjured it each time he was released to participate. Clinical Features: The patient presented with a pulling sensation that prevented him from reaching his "normal top speed" and was afraid to try. A diagnostic ultrasound was performed on his first visit, showing scar tissue formation between his biceps femoris and semitendinosus with possible adhesion over the common fibular nerve. Physical examination revealed a decrease in left hamstring strength compared to the right and positive functional movement screens. Intervention: Treatment included soft tissue mobilization, cold laser, and active rehabilitation focused on strengthening his posterior chain and core through eccentric strengthening for hamstrings, glute strength in the frontal and sagittal planes, and anti-rotation work for his core. Outcome: After 12 visits, the patient's hamstring strength manually tested stronger, the faults in his functional movements improved, and he reported running at top speed without pain. Conclusion: Follow up ultrasound indicated partial healing to intermuscular fascia and decreased hyperemia in the facial plane. (This is a conference presentation abstract and not a full work that has been published.)

Changes over time in effective neural connectivity following a chiropractic adjustment

Stephanie Sullivan, Rebecca Shisler Marshall, Dan Tuttle, Emily Drake, Ronald Hosek, Jerry Hochman

Objective: To assess changes in brain communication patterns over time. Methods: A secondary analysis of electroencephalography (EEG) data from a previous single session chiropractic randomized controlled trial (NCT01953614) was analyzed at three time points: baseline, post, and one-week post. Brain communication changes were measured using LORETA Phase Slope Index (PSI), measuring direction and magnitude of communication between brain regions. Analysis was conducted on normalized PSI scores between fourteen study-specific Brodmann Areas. To control for Type I error, permutation tests were performed, followed by two-way mixed ANOVA and univariate analysis for significant simple main effects (SMEs). Results: One significant change was observed baseline to post with SMEs for the sham group ($p=0.03$). From post to one-week, six of the seven SMEs were observed for the sham group ($p:0.001$ to 0.033), involving the visual association cortex or posterior cingulate. In contrast, for baseline to one-week post, three of four SMEs were present following chiropractic care ($p:0.003$ to 0.027), and changes were observed in cortical executive function regions. No SMEs were observed in the control. Conclusion: Changes in brain communications patterns were more evident in relation to one-week post intervention and differ regionally between chiropractic and sham interventions. (This is a conference presentation abstract and not a full work that has been published.)

A Scoping review of variables of low level laser light therapy dosage to the efficacy of treatment of neuromusculoskeletal conditions

David Taylor, Shari Wynd, Tyler Winfield

Objective: Evaluate the dosage variables in the efficacy of low level laser therapy (LLLT) for neuromusculoskeletal conditions. Data Sources and Selection: A scoping literature review of the following databases was conducted: Cochrane Database, Cumulative Index of Nursing and Allied Health Literature, Medline, Physical Therapy Evidence Database, Index of Chiropractic Literature, manufacturer website, and online guidelines. The search was modeled after the Preferred Reporting Items for Systematic Reviews and Meta-analysis search criteria. Articles were included if LLLT was used in any treatment group for a neuromusculoskeletal complaint and dosage and efficacy were measured. Results and Conclusion: A total of 89 papers were included in the review. Descriptive statistics revealed sixty four percent (64%) of the papers were double-blinded randomized controlled trials (RCT). Single-blinded RCT were 14.6% of the studies. Mean duration of therapy was 5.92 +6.23min (min+SD). Wavelength of 800-899 nm was applied at the greatest frequency (55%) for 6 min, followed by 900-999nm (24%) applied for 5 min. The negative outcome studies were inconsistent in time duration with a range from 0.26min to 13.00 minutes. Initial findings revealed a correlation of positive clinical outcomes with higher wavelength LLLT. (This is a conference presentation abstract and not a full work that has been published.)

An evaluation of educational resources in an evidence-informed curriculum: a descriptive study

Daphne To, Stephanie Alexopulos, Anna Bartosik, David Starmer

Objective: The Chiropractic program at one institution is described as evidence-based that is derived from the latest research and best practices. This study aims to describe the foundational required resources the program is built upon. Methods: The institution's learning management system was used to search all 2017-2018 academic year courses. Resources listed in course syllabi and posted on course sites were extracted for data analysis. Relevant data included: year of publication; classification of resource as required, recommended, or additional; and type of resource. Results: 56 courses and 557 resources were analyzed. Of the 181 required resources, 70% were books and peer-reviewed journals. Courses in Foundational Sciences, Assessment and Clinical Presentation, and Treatment primarily used books. Courses in Patient and Clinical Management primarily used peer-reviewed journals and demonstrated the greatest variety of resources used. Required resources ranged from publication years 1982-2018, with a median of 2012. Conclusion: This study provides a transparent outline of resources used in the program and could be valuable in guiding future directions in curricular development. It may also help optimize collaboration with other stakeholders to ensure curricular resources are derived from the latest research and best practices. (This is a conference presentation abstract and not a full work that has been published.)

Traumatic Spondylolisthesis at L5-S1

Lauren Tollefson, John Chin-Suk

Objective: To describe the case of a patient who had a traumatic spondylolisthesis at L5-S1 secondary to unilateral facet fractures at L5 and S1 on the left. Clinical Features: A 21-year old male experienced a rollover motor vehicle accident that led to low back pain and progressive left-sided radiculopathy. Computed tomography demonstrated multiple transverse process fractures as well as left-sided L5-S1 facet fractures with unstable spondylolisthesis that progressed over time. Interventions and Outcomes: The patient was treated with chiropractic care to include palliative care followed by stretching, strengthening, and stability exercises. After an initial improvement, his symptomatology progressed. He was subsequently referred to a neurosurgeon 12 months post-injury. At this time, he underwent transforaminal lumbar interbody fusion with a posterior approach. The patient's pain and radicular symptoms resolved after the surgery. Conclusion: Patients with posterior element fractures with continued pain or symptom progression should be monitored for the development of a spondylolisthesis. Patients with a progressive spondylolisthesis should be referred for a neurosurgical consult to evaluate for surgical stabilization. (This is a conference presentation abstract and not a full work that has been published.)

Extracorporeal shockwave therapy for plantar fasciitis: a case report

Kily Tracy, Jonathan Slater, Andrew Johnston

Objective: To describe the successful management of chronic plantar fasciitis using extracorporeal shockwave therapy. Clinical Features: A 24-year-old male athlete presented with insidious right foot pain of three months duration. He experienced similar symptoms 12 years earlier and was successfully treated by an athletic trainer with tape, ice and electric stimulation. When the pain returned after 12 years, he self-managed with orthotics that worsened the pain, then sought

professional care. Initial evaluation found symptom reproduction with dress shoes, basketball, palpation at the medial aspect of the distal right calcaneus, and right foot dorsiflexion. X-rays showed minimal degenerative osteophyte formation at the anterior tibiotalar joint. Plantar fasciitis was diagnosed. Intervention and Outcome: Treatment was applied with a Richard Wolf WellWave low energy/medium energy shockwave therapy unit with focused dosage of 4000 shock pulsation at 10 mm depth to the site of pain. Treatment was applied ten times over one month, after which the patient reported a complete resolution of pain, and he was able to resume all impacted activities. He was consequently discharged from care. Conclusion: Extracorporeal shockwave therapy appeared to be an effective treatment approach for the management of this patient's plantar fasciitis. (This is a conference presentation abstract and not a full work that has been published.)

The Gillet Test: does it detect sacroiliac motion, or asymmetric one-legged stance patterns?

Felicia Truong, Robert Cooperstein

Objective: This study aimed to quantify apparent displacement of the posterior superior iliac spine (PSIS) and S2 tubercle during Gillet testing as a function of (a) hip flexion and (b) degree of palpatory pressure. Methods: Photographs were taken with the marked examiner's thumbs on the PSIS and S2 at 0, 30, and 90 degrees hip flexion, and for light vs. firm pressure at 30 degrees hip flexion. Photometric analysis measured the PSIS/S2 displacements for the various test conditions, which were assessed for statistical significance using paired t and Wilcoxon. Results: In 32 asymptomatic subjects, using light palpatory pressure, the left PSIS move caudal during hip flexion $\leq$30 degrees during right-legged stance, whereas the right PSIS moved cephalad during left-legged stance. Firm palpatory pressure abolished the appearance of PSIS/S2 displacements. Conclusion: Left-right differences in gluteus medius activation (more rapid left) and biceps femoris tone (tighter left) among asymptomatic individuals result in different balancing strategies during one-legged stance, producing pelvic obliquity that mimics absolute PSIS/SB displacement. Gillet test results can be wholly or partially explained by this Trendelenburg-like pelvic obliquity, thus threatening its validity. (This is a conference presentation abstract and not a full work that has been published.)

A case study in use of therapeutic laser in wound healing of a pressure ulcer

Dana Underkofler-Mercer, Emma Minx, Christopher Belics, Benjamin Heasty, Tyler White, Bobby Prichett

Introduction: Patients with limited ambulation, such as those confined to a wheelchair, are likely to develop pressure ulcers. This paper will examine the efficacy of a Class IV K-Laser on accelerating the healing process of a pressure ulcer in a patient confined to wheelchair. Methods: The patient received three treatments of a Class IV K-Laser using the soft tissue setting, over the course of four visits. Photographs were taken on the first and fourth visit, while treatment was received on first, second and third. A Pressure Ulcer Quality of Life Questionnaire (PUQLQ) was completed by the patient on the first and last visit. Results: A 33% reduction in the size of the ulcer was observed post treatment. Significant improvement in all categories with the greatest improvement noted in the Pain, Exudate and ADL categories. Conclusion: Class IV K-Laser was an effective method to treat pressure sores in a limited-ambulatory patient. A randomized control trial, with many participants, is recommended to further research a laser's effectiveness to treat pressure sores in a larger population. (This is a conference presentation abstract and not a full work that has been published.)

Prone straight leg raise, a proposed functional measure of sacroiliac joint range of motion

Robert Walsh, Aidan O'Brien, Molly Timmerman, Alec Schielke

Objective: To purpose of this study was to assess Prone Straight Leg Raise (PSLR), a proposed functional measure of sacroiliac (SI) joint range of motion. Methods: 103 patients with SI joint dysfunction were selected by the criteria established by Laslett. Treatment intervention was high velocity low amplitude spinal manipulative therapy (HVLA SMT). Treatment outcomes were measured by verbal digital score (VDS), Oswestry and PSLR range of motion (ROM) at both the manipulated joint and the opposite joint which was not manipulated. Results: 91/103 patients demonstrated initial PSLR asymmetry of 3 degrees or more. SMT was performed at the restricted SI joint determined by PSLR, ROM increased between one degree and forty degrees. Upon discharge 82/103 patients reported VDS pain reduction, 78% of patients reported Oswestry improvement, 86% of patients demonstrated a PSLR increase of 3 degrees or more. Conclusion: This study demonstrated sustained PSLR change with HVLA SMT in 86 % of the cases. VDS and Oswestry scores reflected improved outcomes. The lack of a gold standard for SI joint pain in this study limits the conclusion PSLR is a valid predictor of SI joint pathology, further research is necessary. (This is a conference presentation abstract and not a full work that has been published.)

Acute impact of cervical spine manipulation on isometric handgrip strength of participants with neck pain

John Ward, Jesse Coats

Objective: The impact of spinal manipulation on handgrip strength of individuals with neck pain has not been fully agreed upon in research literature. Methods: In this study, isometric handgrip strength was measured at baseline and post-intervention for 60 research participants using a Vernier computerized dynamometer. Participants with and without neck pain were recruited to provide multiple controls. After baseline testing of all participants, half of the participants were randomized to receive cervical spine manipulation. If they possessed neck pain the manipulation addressed hypomobile and painful spinal segments. If they did not possess neck pain a right cervical break at C4 was performed as a control. Thus, this study compared 4 groups: #1 neck pain – no manipulation (control #1), #2 neck pain – manipulation (experimental group), #3 no neck pain- no manipulation (control #2), and #4 no neck pain- manipulation (control #3). Results: The results were the neck pain- manipulation group improved their handgrip strength at post-evaluation 18.83 N (15.7%), while the other 3 groups did not improve to a statistically significant level. Conclusion: Data from this pilot study supports that handgrip strength can be increased short-term amongst neck pain patients receiving cervical spine manipulation. (This is a conference presentation abstract and not a full work that has been published.)

Evaluating service learning assignment in a doctor of chiropractic program (DCP) public health course

Krista Ward, Donna Odierna, Monica Smith

Objective: Little is published about service learning in Doctor of Chiropractic Programs (DCPs) despite its use in other healthcare programs. Since 2017, our public health course has included a service learning assignment in which students volunteer for 501c(3) organizations and write an essay about their experience. The objective of this study is to assess how this assignment changes students' public health knowledge and attitudes. Methods: Between April 2017 and June 2018, 59 essays were collected from students who volunteered at a 501c3 organization focused on youth, the environment, or poverty. Each essay was de-identified and assigned random four-digit number file names. 10 files were randomly selected from each category for qualitative thematic analysis using deductive and inductive coding. Results: The majority of reflections explicitly described a positive experience with almost a third of students expressing a desire to return. Students volunteering for environmental organizations expressed pride in work accomplished and improved understanding of environmental determinants, while those working for youth and poverty focused organizations described increased empathy and gratitude. Conclusions: This study demonstrates DCP students respond favorably to a service learning assignment which helps improve understanding of environmental determinants, and fosters increased empathy and gratitude. (This is a conference presentation abstract and not a full work that has been published.)

Assessment of hip and shoulder kinematics of a chiropractor during performance of side posture adjustments: data from a pilot study

Michael Weiner, Brent Russell, Linda Mullin, Edward Owens, Ronald Hosek, Gabriel Kelly

Objective: To describe kinematics of lumbar side-posture adjustments (SPAs) performed by chiropractors. Methods: One expert chiroprac-

tor performed right-handed, Gonstead-style lumbar SPAs on 10 adults. We analyzed hip and shoulder motions, adapting previously-reported spinal methods. All procedures were IRB-approved. Results: In set-up, left and right hips were flexed (35.8° +/- 5.1; 4.7° +/- 2.8), usually adducted (–3.2° +/- 4.4; –5.2° +/- 1.9), and rotated externally (12.5° +/- 8.8; 2.8° +/- 7.3). Around thrust onset, flexion increased (57.5° +/- 7.9; 18.3° +/- 3.4), the left hip usually abducted (5.2° +/- 6.3), the right hip remained adducted (–4.2° +/- 1.8), and external rotation increased (15.7° +/- 7.7 and 9.8° +/- 7.6). The left and right shoulders, in set-up, were flexed (24.5° +/- 3.8; 48.3° +/- 4.6), abducted (6.4° +/- 2.8; 32.5° +/- 7.8), and rotated internally (–36.6° +/- 5.2; –77.8° +/- 5.3). Around thrust onset, flexion was unchanged (24.7° +/- 3.9; 48.9° +/- 5.0), abduction increased (18.2° +/- 3.3; 38.7° +/- 6.8), and internal rotation decreased (–25.3° +/- 6.7; –65.0° +/- 6.5). Conclusions: These findings describe one chiropractor. Future studies of additional chiropractors may contribute to student education and understanding occupational injuries. (This is a conference presentation abstract and not a full work that has been published.)

Does publication bias exist in chiropractic clinical research listed in clinicaltrials.gov?

Breanne Wells, Dana Lawrence

Objective: Publication bias is a known problem in biomedical publication that occurs when the decision to publish a paper is based primarily on its outcome; papers that report positive findings are more likely to be published than those with negative ones. This subsequently affects any systematic review that investigates the topic area. Trial registries are offered as one means to ensure that all data is reported. Methods: We searched the clinicaltrials.gov database for all studies related to chiropractic that were completed or terminated. Publications associated with the studies were tallied, and abstracts were read to determine if each paper supported its hypothesis. We also report on the total number of papers published. Results: 6 studies were terminated, 59 were completed. Ten of those 59 studies posted results on clinicaltrials.gov. Twenty-two studies had published 1 or more articles, 8 studies had published only protocols. Results showed 35 studies supported the hypothesis, 8 did not, and 13 had mixed results. Conclusion: Published studies tend to be in favor of the study objective. Several studies on clinicaltrials.gov have not shared or published results, which may potentially affect care offered to patients. (This is a conference presentation abstract and not a full work that has been published.)

Recovery expectations for apophysitis in year-round single sport athletes: a case series on osgood-schlatter disease management

Courtney Wells, Melissa Engelson

Objective: To present chiropractic sports medicine treatment and management of Osgood-Schlatter Disease, an overuse syndrome that is often self-limiting and aggravated by exercise. Clinical Features: Case 1: A 14-year-old female year-round competitive cheerleader presented with gradual onset of unilateral knee pain at the tibial tuberosity (TT). No prior treatments for this complaint obtained. She sees a traditional chiropractor for regular spinal adjustments. Case 2: A 13-year-old female year-round competitive soccer player presented with bilateral knee pain at the TT over a year. She has a history of full body strength training 1-2 times per week. Initially, patient received physical therapy for two months following diagnosis and felt some relief with the soft tissue treatments. Intervention and Outcome: Case 1: Treatment interventions included extraspinal chiropractic adjustments, Class IV Laser, soft tissue manipulation, and kinesiology taping. Case 2: Treatment interventions with our clinic included chiropractic extraspinal adjustments, soft tissue manipulation, Class IV Laser, kinesiology taping, and rehabilitative exercises. Both patients reported decreased severity of symptoms, decreased frequency of flair-ups, and increased training and game time. Conclusion: Osgood-Schlatter Disease, under conservative management with sports medicine principles, can be a viable alternative to activity modification or complete rest. (This is a conference presentation abstract and not a full work that has been published.)

The use of Force sensing Table Technology™ to instruct and evaluate students and clinicians in performing spinal manipulative therapy

Shari Wynd, Brad Koby, Michael Sheppard, John Mrozek

Objectives: To examine the biomechanical parameters that can be used to assess and instruct the task of spinal manipulative therapy on a human-analog mannequin™ (HAM™) using Force-Sensing Table Technology™(FSTT™). Methods: A total of 6 female clinicians with 14.5±1.7 years' experience, and 9 male clinicians with 18.5±2.0 years' experience were instructed on the use of the FSTT™'s HAM™. Each clinician performed a posterior-to-anterior cross-bilateral high-velocity low-amplitude thrust in the thoracic region of the HAM™. A total of 10 thrusts were performed. Descriptive statistics were computed for the recorded biomechanical parameters. Non-parametric tests of significance were used to compare the biomechanical parameters of the male and female clinicians. Results: The male clinicians were significantly heavier (882±11) than the female clinicians (742±15)($p<0.01$). Given their lower body mass, female clinicians had a significantly lower average peak force (457±38N) compared to the male clinicians (748±69N)($p<0.001$). Biomechanical parameters that were not sensitive to mass were loading rate and variance. Conclusion: When using the FSTT™ as an instruction tool, absolute parameters such as peak force will be influenced by body weight. Relative parameters such a loading rate and variance provide valuable biomechanical feedback regardless of the size of the performer. (This is a conference presentation abstract and not a full work that has been published.)

Reliability and validity of neurological tests in low back pain population: a systematic review

Hainan Yu, Fabrice Mallard, Pierre Cote, Anne Taylor-Vaisey, Nadege Lemeunier

Objective: To determine reliability and validity of neurological tests in adults with low back pain. Data Sources and Selection: We systematically searched five databases from 2000 to 2017. We screened and critically appraised eligible studies using QAREL and QUADAS-2 instruments for reliability and validity studies. We included low risk of bias articles in our synthesis. Results: 4991 articles were captured and 10 were low risk of bias. Inter-rater reliability of straight leg raise test ranges from k=0.60 to K=0.69. Validity was reported in four phase II and six phase III studies according to Sackett and Haynes. There is inconsistent sensitivity and specificity in ankle and knee reflex, sensation, and muscle strength. When combining reflex, sensation and muscle strength together, sensitivity is 90% and specificity is 24%. Straight leg raise test has consistent sensitivity (41%-67%) and specificity (47%-56%). Slump test alone is sensitive (91%); when combining pain location and quality, slump test is specific (100%). However, the validity of reference standard is unknown. Femoral nerve stretch test is specific (99%). Conclusions: There is limited evidence to support the clinical utility of neurological tests. More high quality phase III validity studies are needed using valid reference standards. (This is a conference presentation abstract and not a full work that has been published.)

Reliability and validity of self-reported disability questionnaires in low back pain population: a systematic review

Hainan Yu, Raiz Mohammed, Pierre Cote, Anne Taylor-Vaisey, Nadege Lemeunier

Objective: To determine reliability and validity of disability questionnaires in adults with low back pain. Data Sources and Selection: We systematically searched five databases from 2000 to 2018. We screened and critically appraised eligible studies using QAREL and QUADAS-2 instruments for reliability and validity studies. Low risk of bias articles were included. Results: 10917 articles were captured and four were low risk of bias. Four questionnaires were studied: Functional Rating Index (FRI), Oswestry Disability Index (ODI), StrarT Back Screening Tool (SBT), and Absenteeism Screening Questionnaire (ASQ). The test re-test reliability is ICC=0.63 for FRI and 0.78 for ODI. Validity was reported in four phase II studies according to Sackett and Haynes. FRI is correlated with ODI and has the area under the curve as 0.93 using 8.4 as cut-off in measuring four-week changes. There is statistically significant difference in ODI scores

between patients with or without sick-leave or treatment. SBT is associated with ODI and numerical pain scale. ASQ has sensitivity 92% and specificity 89% using 40% and 70% of total score as a cut-off, respectively. Conclusions: There is limited evidence to support the clinical utility of disability questionnaires. More high quality studies are needed. (This is a conference presentation abstract and not a full work that has been published.)

POSTER PRESENTATIONS

A case of flexor carpi radialis tenosynovitis mimicking carpal tunnel syndrome diagnosed by diagnostic ultrasound

Ahmad Abdella, Patrick Battaglia

Objective: To present a case of flexor carpi radialis (FCR) tenosynovitis in a patient with symptoms of carpal tunnel syndrome (CTS) and highlight the value of diagnostic ultrasound to augment the physical exam. Clinical Features: A 62-year-old female presented with wrist pain, numbness, and tingling in digits 1-4. There was a hard, tender mass on the right wrist proximal to the thenar eminence. Physical examination was equivocal for features of CTS. Diagnostic ultrasound was performed, demonstrating a normal median nerve but FCR tenosynovitis. Intervention and Outcome: Initially, treatment included low level laser therapy, activity modification, and a spica splint. Symptoms did not abate; diagnostic ultrasound showed worsening tenosynovitis, so radiographs and a blood panel were ordered and excluded inflammatory causes. Manual and ice therapy were included, the wrist splint was discontinued, and home exercises prescribed. After 6 sessions, the patient reported minimal pain and returned to full activities. Updated diagnostic ultrasound documented near resolution of the tenosynovitis. Conclusion: This case illustrates the value of diagnostic ultrasound to aid in the diagnosis of FCR tenosynovitis in a patient with symptoms of CTS. Having diagnostic ultrasound available at the point of care may enhance musculoskeletal diagnosis. (This is a conference presentation abstract and not a full work that has been published.)

Improved cranial nerve sensation in a patient with occitipal neuralgia with scar mobilization

Devon Ackroyd

Objective: Effects of scar tissue mobilization on a patient with paresthesia from left temple to mandible angle, difficulty with mastication ipsilaterally with visual disturbances, tinnitus and vertigo. Clinical Features: Repaired vascular cavernous malformation communicating artery of the left peduncle of the cerebellum excised through a posterior lateral temporal-occipital approach two years ago. Reports generalized weakness left sided unilaterally in both upper and lower limbs. Past history of cerebral infarction in 2014 and smokes five cigarettes per day. Patient is 54 year-old ataxic, moderately obese female. Upper limb neural testing revealed 4 out of 5 for myotomes and decreased dermatomal sensation in C5-T2. Twenty-centimeter semicircular keloid scar noted on left temporal bone. Cranial nerve dysfunctions identified unilaterally in CN II-XI. Decreased sensation in the distribution of second division of CN V. Intervention and Outcome: Soft tissue therapy (STT) for scar mobility, jaw mobilization, acupuncture and home exercises were prescribed seven times over an eight-week period. Subjective improvements in pain level, sensation and ADLs such as walking, and eating. Conclusion: STT proved beneficial for improved sensation in CV3 dermatome and decreased nerve pain medication (Gabapentin) from 1800mg to 300mg daily. (This is a conference presentation abstract and not a full work that has been published.)

Perceptions of safety culture in chiropractic

Joel Alcantara

Objective: To assess the perceptions of safety culture among chiropractors. Methods: A modified version of the AHRQ Medical Office Survey on Patient Safety Culture was given to a convenience sample of chiropractors attending a post-graduate seminar in pediatric chiropractic. In addition to socio-demographic and practice/practitioner characteristics, the survey includes 38 items that measure 10 dimensions of patient safety culture. Responses utilized a 5-point Likert-type scale (i.e., strongly agree to strongly disagree; always to never). Results: A total of 136 chiropractors completed the survey. Their average years in practice was 8.445 (SD=8.00). Identified safety and quality issues include unavailability of patient records and improperly working equipment. Problems in communication with outside laboratories/imaging centers and with other chiropractic/medical offices was indicated as occurring several times in the last 12 months by 24% and 13% of the responders, respectively. However, the majority (91%; N=124) indicated that systems and clinical processes were in place to avoid potential harms to patients. In terms of ratings on quality of care, 92.20% of responders indicated that their clinics were patient-centered, effective, timely, efficient and equitable. Conclusion: We identified issues and overall perceptions with safety and quality of patient care among chiropractors. (This is a conference presentation abstract and not a full work that has been published.)

The predictive relationship of quality of life domains to sense of coherence subdomains

Joel Alcantara, Andrew Whetten

Objective: To assess the predictive relationship between quality of life (QoL) domains with the subdomains of sense of coherence (SOC). Methods: We measured the SOC and QoL of patients using the SOC-29 and the PROMIS-29/PROMIS global health measures, respectively. The SOC subdomains are comprehensibility, manageability and meaning. The measured PROMIS-29 QoL domains are physical function, anxiety, depression, fatigue, sleep disturbance, ability to participate in social roles and activities, pain interference and intensity while PROMIS global health are global physical health (GPH) and global mental health (GMH). Predictive relationships utilized random forest regression analysis based on variable importance. Results: Our convenience sample consisted of 1980 responders (average age=40.72 years; 1494 females). Based on variable importance outcomes, the SOC subdomains were strong predictors for each other such that comprehensibility strongly predicted manageability and manageability strongly predicted meaning. The mental health domains (i.e., GMH, anxiety, depression) and age were also strong predictors for the SOC subdomains while the physical domains (i.e., physical function, pain interference) were the least predictive. Educational level predicted comprehensibility and meaning, while sleep disturbance predicted manageability. Conclusion: The subdomains of SOC were strongly predictive for each other along with mental health QoL domains. (This is a conference presentation abstract and not a full work that has been published.)

The prevalence of adverse events, effectiveness rating and satisfaction of patients attending chiropractic care in a practice-based research network

Joel Alcantara, Jeanne Ohm, Joey Alcantara

Objective: To determine the prevalence of adverse events (AEs), effectiveness rating and satisfaction of patients attending chiropractic care in a practice-based research network. Methods: A secondary analysis of data examining the quality of life, sense of coherence and clinical covariates of chiropractic patients was performed. We examined reported AEs, effectiveness of care (i.e., Likert scale: very satisfied; not very satisfied) and patient satisfaction with the RAND VSQ9 with descriptive statistics. Results: A convenience sample of 1696 patients (1286 females; mean age=40.68 years) comprised our study population. Mean number of visits was 6.09 (SD=14.47). The prevalence of adverse events was 12.68% (N=215). Indicated AEs were: increased stiffness at site adjusted (N=30;1.77%), stiffness at site different from region adjusted (N=25;1.47%), increased pain/soreness at site adjusted (N=33;1.95%), new pain/soreness at site adjusted (N=107; 6.31%) and experience worsening headaches (N=30;1.77%). The majority (N=1662; 97.99%) rated their chiropractic care as effective. Mean scoring for overall visit satisfaction was 94.90 (SD=13.02). Convenience of office location was rated the least (mean=86.65; SD=21.33) while the interpersonal process of care experienced was rated the highest (mean=95.86; SD=12.57). Conclusion: Chiropractic patients rated their care as effective, were highly satisfied with indicated AEs as mild. (This is a conference presentation abstract and not a full work that has been published.)

Improvements in quality of life of chiropractic patients following a course of care in a practice-based research network

Joey Alcantara, Jeanne Ohm, Joel Alcantara

Objective: To assess the quality of life (QoL) of chiropractic patients following a course of chiropractic care. Methods: In addition to socio-demographic information, baseline and comparative measures of mean T scores of QoL were made with the PROMIS-29. Mean differences involving 2 or more variables were analyzed with paired t-test and ANOVA, respectively. Statistical significance set at $p < 0.05$. Results: Our convenience sample numbered 1419 responders (average age=40.96 years; 1062 females). The mean number of visits was 4.15 (SD=4.24). The baseline/comparative mean T scores were: physical functioning (51.03/51.32), anxiety (51.91/50.33), depression (47.23/46.56), fatigue (51.01/49.17), sleep disturbance (49.67/48.52), ability to participate in social roles (54.69/56.18), pain interference (51.24/49.27) and intensity (2.82/2.36). Significant differences were found in QoL domains at baseline and comparative measurement based on 4 age groups except for sleep disturbance. With respect to visit numbers (i.e., 3 groups), significantly difference were found with physical function, participate in social role, pain interference and intensity at baseline and physical function and pain intensity at comparative measurement. Observed improvements in all QoL domains from baseline to comparative were statistically significant based on paired t-test. Conclusion: We observed statistically significant improvements in QoL of patients under chiropractic care. (This is a conference presentation abstract and not a full work that has been published.)

A rare presentation of old Osgood-Schlatter Disease and old Sinding-Larsen-Johansson Disease in the same knee with contralateral acute patellar tendon rupture

Alejandro Aponte

Objective: To demonstrate the rare presentation of old OSD and old SLJD in a single patellar tendon with acute patellar tendon rupture in the opposite knee. Clinical presentation: 27-year-old male with previous diagnosis of bilateral patella alta and previous athletic history presented with anterior right knee pain following non-contact basketball injury, the patient reported superior patellar shift immediately after injury. Bilateral knee x-ray series were performed for comparison. Studies were consistent with displacement of the patella associated with right patellar tendon rupture. Incidental findings included old OSD and old SLJD with some patellar tendon thickness in the left knee. Intervention and Outcome: Patient was referred to Orthopedic Surgeon, surgery was performed shortly after MRI results confirmed tendon rupture. Conclusion: OSD and SLJD are common tendinopathies, observing them coexist in the same tendon is rare. This rare presentation compounds concern for patellar tendon rupture and should raise this diagnosis in settings of acute knee failure in patients with multiple tendinopathies/apophysitis in the opposite knee, therefore more research is needed in individuals fitting this description. (This is a conference presentation abstract and not a full work that has been published.)

Chiropractic care of professional hockey player suffering from multiple concussions: a case report

Thomas Bloink, Charles Blum

Objective: Awareness of sport related concussion/post-concussion syndromes are becoming more of an issue in the health of professional athletes and their teams. Conservative and effective methods of care that help the athlete recover are important healthcare considerations. Clinical Features: A 21-year-old white male professional hockey player was referred to this office due to multiple concussions and an inability to practice/play hockey due to unresolving post-concussion syndromes (over 9-months). He presented with headaches, photophobia, impaired memory, intermittent brain fog and mood swings, forgetfulness, fatigue, and depression. Intervention and Outcome: The patient pO2 values were 95% at rest and while on a stationary bicycle decreased to the upper 80s. SOT and cranial assessment revealed multiple cranial, craniofacial and TMJ related imbalances necessitating treatment at this office and co-treatment with a dentist specializing in TMJ care. The patient was treated for 10-visits (3-4 weeks) at which point he returned to regular play again. His oxygen saturation improved and with activity registered 98 to 99%. All of his original presenting symptoms were resolved. He scored a goal and two assists his first game back. Conclusion: Further research into chiropractic care to facilitate recovery of sports related post-concussion syndromes might be warranted. (This is a conference presentation abstract and not a full work that has been published.)

A survey of chiropractic students or recent graduates on their experiences in chiropractic college adjusting lab or class

Charles Blum, John Lin

Objective: There have been reports of iatrogenic injuries during student adjusting classes in chiropractic colleges, with colleges' studying how to protect students. One possible contribution for prevention might be to assess students for benign joint hypermobility syndrome (BJHS), reported in 20% of the general-population. Since chiropractic colleges predominately tend to teach that most spinal manipulative conditions are restricted motion, awareness of BJHS in the student-population may be an important consideration. Methods: A survey (IRB approved) distributed via email/social media was sent to chiropractic students or recent graduates (up to 5-years of graduation) about their experience participating in chiropractic adjusting class and determine what percentage might have BJHS. Results: The data (n=385) was relatively balanced between years of college or graduation, as well as between gender. 30% of responses described themselves being highly flexible with 25% responding positively to having BJHS. Over 65% of responders had discomfort or reluctance being a subject or practice body in technique lab. Conclusion: Further study is necessary to determine what subset of students have BJHS and if this affects their experience during adjusting class. Chiropractic colleges may need to teach modified adjusting procedures for subjects with BJHS in technique classes. (This is a conference presentation abstract and not a full work that has been published.)

Cranial therapeutic applications to facilitate dentofacial growth and development in a 50-year-old adult female: a case report

Charles Blum

Introduction: A 50-year-old female patient previously under chiropractic care for multiple presenting symptoms (e.g., temporomandibular joint dysfunction, obstructive sleep apnea, mitochondrial disorders, and others) began chiropractic co-treatment with SOT cranial/TMJ techniques and a functional-orthodontic dentist (e.g. Alternative Lightwire Functional and The Crane) for under-developed craniofacial growth/development. Intervention and Methods: The orthodonture/orthopedic dental care sought to create hard-palate expansion and to facilitate maxillary advancement to improve her airway. Novel SOT cranial related procedures focused on facilitating craniofacial expansion and tongue exercises were utilized. These helped reduce her head and neck tension and improve craniofacial suture compliance, facilitating the orthodontic/orthopedic dental interventions. Results: During the three-years of dental/chiropractic co-treatment the patient's cervicothoracic pain and discomfort went from a chronic (over 2-decades) VAS 6-8 to a steady VAS 1-2, and 3-4 during a flare-up (2-4 times annually). As appliances were modified she would have increased head/neck pain and following chiropractic/cranial care would reduce pain/discomfort within minutes. Her condition is currently stable and she notes significant improvement sleeping with less head/neck pains and more energy during the day. Conclusion: Greater study is needed to determine if these conservative chiropractic procedures can be helpful to pediatric/adult patients receiving maxillary expansion and advancement. (This is a conference presentation abstract and not a full work that has been published.)

Intervention in gall bladder dysfunction through chiropractic adjustment and nutritional therapy: a case report

William Boro, Mary Psaromatis

Objective: This report describes the clinical course, treatment and response of a 58-year-old female suffering 2-years from unremitting gall bladder dysfunction, seeking conservative chiropractic care. Clinical Features: Patient had been receiving allopathic care for epigastric pain and esophageal reflux. She presented June-2016 with hopes of avoiding surgery. Initially her medications included (taken daily) Protonix and Zantac as well as various other medications for allergy, stress and pain reduction. Intervention and Outcome: Treatments consisted of spinal manual manipulation Van-Rumpt organ adjustments, sacro-occipital

technique's chiropractic manipulative reflex technique, and liver/gallbladder visceral manipulations. Following the first-treatment the patient noticed improvement for the first time in two-years. Initially nutritional supplementation focused on the liver, adrenals, and sooth stomach lining, ceasing supplementation by 2-3 months. After 45-days (8-treatments) a radionuclide hepatobiliary scan noted a gallbladder ejection fraction (11%) at 60 minutes (abnormally low). Due to her symptomatic relief and ability to significantly reduce medication intake she continued with chiropractic care. Approximately six-months later (22-treatments) a follow-up scan noted a normal ejection fraction (75%). Conclusion: This case report demonstrates a chiropractic approach utilizing manual manipulation and somatovisceral reflex techniques that appeared to aid a patient suffering from gall bladder dysfunction. (This is a conference presentation abstract and not a full work that has been published.)

Intervention in tachycardia through chiropractic adjustment, Sacro Occipital Technique's chiropractic manipulative reflex technique: a case report

William Boro

Objective: This report describes the clinical course, treatment and immediate response of 64-year-old male patient suffering from tachycardia and arrhythmia of 15-years' duration to the application of chiropractic adjustments and Sacro Occipital Technique's (SOT) Chiropractic Manipulative Reflex Technique (CMRT). Clinical Features: A patient presented with history of atrial fibrillation and arrhythmia dating back to 2002. Cardiac ablation and catheterization of the left atrium performed in September 2014 helped to control his condition. However the effectiveness of the prior interventions waned and patient reported ongoing increased pulse rates constant for months. Typical findings (21-random-pulse-readings) during the first week of May 2016 noted an average heart-rate of 134.6/minute. Intervention and Outcome: Two office visits consisted of cervical adjustment, cranial manipulation, and CMRT related to cardiac viscerosomatic/somatovisceral reflex balancing with local vagal nerve stimulation. Heart-rate reduced within 5-minutes of the treatment. Patient-supplied data during the two-weeks post-treatment (41-random-pulse-readings) averaged heart-rates of 88.7/minute for the two-weeks following adjustment. Conclusion: This case report demonstrates a chiropractic approach utilizing manual manipulation and somatovisceral reflex techniques that appeared to aid a patient suffering from tachycardia. Greater study is needed to determine what subset of patients might benefit from this procedure. (This is a conference presentation abstract and not a full work that has been published.)

Reduced opioid use through chiropractic care subsequent to failed low back surgery

Diane Clark, Donald LeBlanc

Objective: An example of opioid reduction in a failed low back surgery patient using chiropractic care. Clinical Features: A 73 year old female presented with 9 months of low back pain and bilateral radiculopathy which began twelve days post-surgery. It severely limited her iADLs. Intervention and Outcome: Over the course of 2 weeks, patient received 8 low force spinal manipulations. On the ninth visit, patient had stopped taking Oxycodone, Gabapentin was reduced by half, and no longer needed her cane. After three months, rehab was added to her care plan. Currently her iADLs are mildly affected by pain and she is managing light chores and short walks with her dog. Conclusion: Research shows clinical symptoms of sequestered discs typically resolve within 3 to 6 weeks by resorption confirmed via MRI. This sequestered disc syndrome did not resolve within 9 months post-surgery. Within one month of chiropractic care, the patient had significant improvement. Chiropractic care reduced opioid use in this patient who had low back surgery and helped restore her instrumental activities of daily living. (This is a conference presentation abstract and not a full work that has been published.)

Sonoelastography of the trunk and lower extremity muscles in Duchenne's muscular dystrophy

Stacey Cornelson, Ashley Ruff, Muriel Perrilat, Norman Kettner

Objective: Duchenne's muscular dystrophy (DMD) is a rare genetic disorder typically presenting with muscle weakness and reduced tone of trunk and lower extremities. The sonoelastographic properties of DMD are poorly understood. We describe sonoelastographic characteristics of a patient's trunk and lower extremity musculature. Clinical Features: An 8-year old male presented with a 5-year history of DMD and thoracolumbar and low back pain. An examination revealed a lower crossed syndrome, hypertonic and hypertrophied tibialis anterior muscles, and atrophy of the rectus abdominis and calf muscles. Sonoelastographic measures of the gluteus maximus and medius, lumbar erectors, rectus abdominis, rectus femoris, biceps femoris, tibialis anterior, medial and lateral gastrocnemius muscles were obtained. Intervention and Outcome: Sonoelastography demonstrated increased elasticity by elevated kiloPascals (kPa) across all muscles, except the lumbar erectors. Patient values were compared to an age-matched healthy control. These abnormal sonoelastographic findings reflected the pathological mechanical properties of DMD. Conclusion: Sonoelastography is valuable for characterizing mechanical properties of normal and abnormal tissues. There is limited information in its application to DMD. This technique may serve as a useful measures of diagnosis and monitoring clinical outcome. (This is a conference presentation abstract and not a full work that has been published.)

Sonography of gluteal muscles and sciatic nerve in a 37-year-old with chronic spinal cord injury

Stacey Cornelson, Devon Ackroyd, Norman Kettner

Objective: Sonography is emerging as an imaging resource in the evaluation of the peripheral nervous system. This case described sonographic features including characterization of the gluteal muscles, cross-sectional area (CSA) and sonoelastography of the sciatic nerve in a spinal cord injury patient with paraplegia. Clinical Features: A 37-year old male presented with a 6-year history of paraplegia resulting from a spinal cord injury. His vital signs were within normal limits. The patient demonstrated severe muscle atrophy of the gluteal region and lower extremities. Following physical examination, moderate physical disability was demonstrated. Sonography was performed to assess the extent of gluteal muscle atrophy, sonoelastography, and CSA of the sciatic nerve were also measured. Intervention and Outcome: Sonography demonstrated severe gluteal muscle atrophy, and there was a marked decrease in the CSA (16 mm2) throughout the entire sciatic nerve (normal: 30-60 mm2). Sonoelastography of the sciatic nerve was consistent with normal values. Conclusion: Sonography was useful in measuring the extent of muscle atrophy. CSA characterized a pathologic sciatic nerve in a spinal cord injury patient with paraplegia. (This is a conference presentation abstract and not a full work that has been published.)

Sacral neural stimulator mimics low back pain after fall

Joanne Eash

Objective: To discuss a case of female patient with musculoskeletal complications related to damage to her sacral neuromodulation device from a slip and fall. Clinical Features: 46 year old female patient with low back pain after slip and fall. The patient was examined using Laslett's criteria, spinal and tissue palpation. All performed orthopedic tests were negative. Segmental overpressure with prone hip extension demonstrated right SIJ restriction with pain at the left SIJ. Intervention and Outcomes: Treatment consisted of spinal manipulation, using Thompson drop technique, on the left SIJ. The patient reported only transient improvement. A careful review of the chief complaint was conducted. The patient reported that she had implanted a Sacral Neural Stimulator (SNS) for urinary incontinence, in the left gluteal tissues. The patient was asked to turn off her device, via remote control, and her pain was instantly relieved. Urology explanted the device to the opposite gluteal region, with no complications. Conclusion: This case illustrates the importance of reviewing past medical history and ROS for visceral/surgical causes for MSK pain. This appears to be the first case in the literature of adverse event due to accidental damage to an SNS medical device. (This is a conference presentation abstract and not a full work that has been published.)

The chiropractic care of a multiparous female with a history of chronic breech and fetal malposition

John Edwards, Allison Union, Joel Alcantara

Objective: To describe the chiropractic care of a Caucasian pregnant patient with a fetus in the transverse-presentation with a previous

history of experiencing multiple pregnancies in the breech-and transverse-fetal position. Clinical Features: A 41-year-old pregnant female presented at 31-weeks gestation with concerns of transverse-fetal presentation. Medical history disclosed that her four previous pregnancies consisted of breech-or transverse-fetal presentations responsive to external cephalic version at 38-weeks gestation with the exception of the previous pregnancy, when abdominal fascial intervention by a chiropractor was successful. Intervention and Outcomes: Palpation demonstrated tilt of the uterine-axis to the left shoulder, restricted motion of the sacral fascia, and left psoas contracture. The chiropractor used fascial-release techniques in addition to Webster-protocol over six visits until these resolved. During the patient's fifth visit the on-premises midwife reported vertex fetal presentation at 34-weeks gestation. Webster sacral-analysis consistently indicated a left anterior-inferior sacral-apex subluxation over 20 visits. The patient continued care twice-a-week until 38-weeks, at which point her visit frequency increased to three-times-a-week to manage the patient's sacroiliac-joint pain. Fetal-lie remained vertex until vaginal delivery at 41-weeks gestation. Conclusion: This study describes the chiropractic care of a woman presenting with a history of chronic fetal-malposition. (This is a conference presentation abstract and not a full work that has been published.)

The chiropractic care of a multiparous woman experiencing dystocia during active labor

John Edwards, Allison Union, Joel Alcantara

Objective: To describe the care of a patient during her labor presenting with occiput-posterior (OP) fetal positioning. Clinical Features: A 29-year-old Caucasian female at 38 weeks gestation presented with severe lumbar pain and a fetus in the OP position. Her previous baby had also presented OP. The patient received chiropractic care twice the week preceding labor-onset. The attending midwife requested the chiropractor visit the patient's home seven hours into active-labor because she determined the fetal descent had stalled at the pelvic outlet. The patient was examined in a knee-chest position. Logan Basic indicators of sacral subluxation initially appeared on the left, then after sacrotuberous correction and abdominal, gluteal/hip fascial release the sacroiliac joint cavitated and the indicators appeared on the right. Release of tension in the right sacrotuberous and sacrospionous ligaments followed by fascial release of bilateral psoas improved sacral nutation/counter-nutation. Fetal heart tones remained within normal ranges during the adjustment. The patient delivered her baby without complication 30 minutes later with a triple nuchal cord. Conclusion: This case study describes the application and utility of chiropractic care during a labor. (This is a conference presentation abstract and not a full work that has been published.)

Effects of high-intensity interval training and strength training on endurance and coordination in a patient with a brain stem injury

Melissa Engelson

Objective: Effects of high-intensity interval training (HIIT) and strength training (ST) on endurance and coordination in a 66-year-old male with a brain stem injury. The patient's goal was to complete a 1-mile walk race on his own in one hour. Clinical Features: Brainstem infarction in 2010 affecting overall balance, left-sided coordination and motor control. He has regularly exercised six days a week since 2012. The patient is a low fall risk with a walker, but initial assessment determined poor ability to control his race walker in a straight line. Comorbidities affecting training included thermoregulation and dysphagia. Intervention and Outcome: A six (6) week training program consisting of three days of ST and cardiovascular (CV) training and three days of therapeutic activity was implemented. ST included two lower body days and one upper body; CV exercises included HIIT and laps for time. Rehabilitation focused on improving control of his race walker. The patient completed his walk without any physical assistance from his family but did not make his time. Conclusion: Application of HIIT and ST principles were effective in this patient. Safety and efficacy of this training in people with similar medical histories warrants further study. (This is a conference presentation abstract and not a full work that has been published.)

Contraindications in certain types of chiropractic manipulative therapy (CMT) for the connective tissue disorder patient: a case report on chiropractic management and Ehler-Danlos Syndrome

Erika Evans

The safety in chiropractic manipulative therapy (CMT) in patients with connective tissue disorders is an important topic relating to contraindications involving types of chiropractic high velocity adjustments (HVLA). While safety in HVLA has been explored in the general population, there are some contraindications in higher force thrusts administered to those suffering from certain connective tissue disorder such as Ehler-Danlos Syndrome (EDS). While an HVLA style thrust is typically safe for an examined candidate, the patient with a lack of connective tissue integrity not exclusive to tissues like ligament, tendon, muscle, vasculature or labrum may suffer from an ill-informed practitioner utilizing certain styles of CMT to manage acute or chronic pain. The intention of this case study is to inform the chiropractic practitioner of the appropriate screening questions and corresponding route to uncovering the type of EDS at hand and subsequently choosing the most appropriate technique for the patient thus limiting the risk factors associated with treating a patient diagnosed with this connective tissue disorder. (This is a conference presentation abstract and not a full work that has been published.)

Chiropractic care of an infant with Mosaic Trisomy 15, Prader-Willi Syndrome, plagiocephaly, and torticollis

Melissa Ferranti, Sarah Williams

Objective: To discuss the chiropractic care of an infant with multiple rare genetic conditions. Clinical Features: A 10-month-old male presented for chiropractic consultation with the previous diagnosis of Mosaic Trisomy 15, Prader-Willi syndrome, plagiocephaly, and torticollis. The patient was unable to participate in tummy time due to the inability to swallow, g-tube, and open-heart surgery 3 months prior. Upon examination patient had low muscle tone, evident right head tilt, palpable tightness in the right sternocleidomastoid, and tight recessed jaw. On oral exam palate was high and narrow and sphenoid rotated anterior and right. Atlas shifted right, L1 posterior, and sacrum restricted on the right. Intervention and Outcome: Treatment included sustained digital pressure, SOT cranial technique, and sternocleidomastoid stripping. Mild to moderate improvement was noted in torticollis after 4 treatments. Conclusion: Mosaic Trisomy 15 is extremely rare; 20 known cases have been reported in the literature; however, Prader-Willi syndrome affects an estimated 1 in 10,000 to 30,000 people worldwide. This case discusses improvement of torticollis treated with chiropractic care in an infant living with multiple rare genetic conditions. (This is a conference presentation abstract and not a full work that has been published.)

Incidental finding of osteochondritis dessicans in a 15-year-old female athlete

Melissa Ferranti, Stacey Brehm

Objective: To discuss discovery of osteochondritis dissecans on routine radiographs performed on a patient with history of stress fracture and calf pain. Clinical Features: A 15-year-old female presented with acute right calf pain. The patient has a history of a healed 5th metatarsal stress fracture and a recent right foot injury while competing in a trail race. Intervention and Outcome: Upon examination, the right foot had full range of motion with mild pain on dorsiflexion, left tight internal hip rotators, and bilateral loss of foot arches. Graston and kinesiology tape were utilized over the patient's right calf. Ankle and foot x-rays were performed to evaluate; findings included mature callus at the distal metadiaphysis of the 2nd metatarsal consistent with an old stress fracture with healing and an osteochondral defect was present on the medial dome of the talus. The patient was referred to a pediatric orthopedic surgeon for an evaluation where they determined the fragment to be stable and not surgical. Conclusion: Chiropractic physicians are primary care providers and are in the position to identify pathology on routine radiographs and comanage when appropriate. (This is a conference presentation abstract and not a full work that has been published.)

Describe and demonstrate Vertebral Distraction Pump (VDP) for intersegmental distraction during DMX fluoroscopic imaging

Bryan Gatterman, Gregg Anderson

Objective: Describe and demonstrate Vertebral Distraction Pump (VDP) for intersegmental distraction during DMX fluoroscopic imaging. Clinical Features: A 46-year-old female, disabled from repetitive injury for past three years; under chiropractic care for last one year. Chronic neck pain, radiating pain to left shoulder, left arm and hand numbness, headaches. Intervention and Outcome: The DC used the Vertebral Distraction Pump (VDP) as chiropractic clinical protocol during the care of patient. The VDP is intended to introduce a provocative motion into the affected spinal segments to improve the range of motion. DC referred patient to DACBR for Digital Motion X-ray (DMX) of the cervical spine. DACBR's may employ provocative maneuvers in imaging studies. Referring DC accompanied the patient to the imaging consult. The DMX imaging was performed before, during, and after the use of the VDP on the patient, to document the provocative effect of the instrument on intersegmental joint function. Conclusion: The imaging studies indicate that the VDP provided a provocative change in the cervical spine, and significantly altered the intersegmental joint function. Imaging study documented restoration of a normal motion pattern at C 2/3. Video presentation of these findings will be presented at conference. (This is a conference presentation abstract and not a full work that has been published.)

Asymmetry of paired occipital condyle convergence angles

Rachel Gilmore, Roger Morrison, Mark Pfefer, Jackson Berg

Objective: This study investigated eight variables associated with the geometry of occipital condyle facets of the human skull. Symmetry of paired facet geometry has not been established. Methods: Magnetic resonance images were reconstructed from a retrospective sample of one hundred fifty patients. Institutional review board approved this project. Bilateral measurements of condyles included left and right convergence angles, left and right slope angles, left and right anterior convexity angles, and left and right posterior convexity angles. Statistical analysis including assessment of correlation between measured angles was performed using SYSTAT (Systat software, San Jose, California). Results: Strength of associations was small between measured paired angles. Conclusion: Asymmetry exists between each paired measured angle of the occipital condyles. This finding may have clinical implications when performing functional assessment of the upper cervical spine. Bony asymmetry may influence palpation findings for manual therapy practitioners. (This is a conference presentation abstract and not a full work that has been published.)

Metastatic cancer presenting as hip pain

Kenice Grand, Stephen Grand, Justin Willis, Jose Maiz

Objective: The objective of this case report is to highlight a presentation of non-responsive hip pain due to metastatic prostatic carcinoma. Clinical Features: 63-year-old male presented for right hip pain. History included a fall off an ATV 3 months earlier without immediate pain. Examinations indicated a preliminary diagnosis of sprain/strain of the sacroiliac and hip girdle regions with segmental dysfunctions. After a trial of care, radiographic imaging was obtained that revealed hydroxyapatite deposition at the gluteal tendon. Intervention and Outcome: Chiropractic manipulative therapy and physiotherapy were provided to the patient over nine visits. On the third visit, the patient exacerbated his hip pain while mowing the lawn and never completely recovered. Despite occasional pain relief with treatment, he began to complain of weakness. After nine visits of care, the patient disclosed a 10-year history of elevated PSA. The patient was referred to a medical practitioner and he was diagnosed with prostatic carcinoma that had metastasized to his involved hip and lumbar spine. Conclusion: Prostatic metastatic disease may present as hip pain. Non-responsive pain syndromes in particular populations should trigger a high suspicion for metastatic disease, and patients may not always be forthcoming in their history. (This is a conference presentation abstract and not a full work that has been published.)

Active vs. passive Gillet sacroiliac motion testing in the side-posture position

Jake Halverson, Felisha Truong, Christopher Meanley, Robert Cooperstein

Objective: A previous study demonstrated that Gillet testing for sacroiliac motion is confounded by the asymmetric balancing strategies that subjects deploy during one-legged stance. The goal of the present study was to devise an alternative side-posture version of the test and determine if results were impacted by active vs. passive hip flexion. Methods: Photographs were taken of the pelvis of subjects in a neutral side-lying position, and with the upper hip actively flexed and then passively flexed to 30 degrees. Two examiners performed photometric analysis of the PSIS and S2 locations for all 3 test conditions, on both the right and left. Paired T testing determined if there were statistically significant differences in active/passive hip flexion. Results: In 34 subjects the PSIS moved cephalad by 2.2mm during active hip flexion while moving caudally by 1.8mm during passive hip flexion. The difference was significant, and 21.6% of sacroiliac joints were judged hypomobile. There were no significant left/right or gender-based differences. Conclusion: Side-posture Gillet testing may identify hypomobile sacroiliac joints provided hip flexion is passively created, which avoids the confounding effect of either upright balancing strategies or side-posture "hip-hiking" due to iliopsoas contraction during active hip flexion. (This is a conference presentation abstract and not a full work that has been published.)

When did I feel competent? Student and new graduate self-perceived attainment of clinical competence from a North American chiropractic program

Navine Haworth, Linda Jones

Methods: A qualitative exploratory descriptive design was used for this research. Semi structured interviews lasting 60 minutes were undertaken on 25 students and 8 new graduates. Results: Earlier trimester students with only exposure to their introductory on-campus clinic placement expressed feeling competent earlier than those latter trimester students and new graduates who did external or hospital clinical placements. The external clinical rotations assisted students with developing competencies, with more complex patients in comparison to institution based clinics, which assisted in their clinical development and sense of preparedness. The variation in clinical experiences provided helped build confidence and build upon clinical skills to become more intuitive practitioners. Yet despite feeling competent, many expressed that there was still much to learn as a new graduate. Conclusion: Self-perceived sense of clinical competence was reported by majority of students and new graduates prior to completion of their clinical program. Several factors impacted on their perceived attainment of competence. Despite feeling competent, there was an understanding of ongoing learning as a professional. (This is a conference presentation abstract and not a full work that has been published.)

Navigating a supermarket of choices, what a headache: a case report

Nathan Hinkeldey, Keira Fika, Harold Olson

Objective: To discuss the successful chiropractic management of a patient with chronic migraines. Clinical Features: A veteran reported with 5 years of consistent debilitating migraine headaches present 5-6 days a week. Complicating factors included a history of three traumatic brain injuries, one stroke, post-traumatic stress syndrome, anxiety, depression, and substance abuse. Previous failed treatment included: medication management, supplementation, acupuncture, and chiropractic treatment. Intervention: Chiropractic intervention included instrument -assisted soft-tissue mobilization, thoracic spine manipulation, and use of acupuncture at point Shen Men. Withdrawal from all other modalities was also suggested. Outcomes: Chronic migraines were reduced to 1/week lasting on average 4 hours. With an improvement in the debilitating migraines, the patient could re-engage in volunteering work, a workout regimen 4 days/week. He could discontinue supplementation, acupuncture, chiropractic care at the previous office, and cryotherapy saving $25,000. Improvement from a 25 to a 12 and 82 to a 44 were reported on the PROMIS PI 6B and Headache Disability Index respectively. Conclusion: This case

study suggests the need for ongoing evaluation regarding the effectiveness of chiropractic intervention for migraine management. (This is a conference presentation abstract and not a full work that has been published.)

Using a survey to define interprofessional competency limitations within a VA chiropractic student clerkship

Nathan Hinkeldey, Matthew Knieper

Introduction: Few interprofessional training opportunities for chiropractic students exist making program structure, development, and outcomes hard to quantify. The Interprofessional Education Collaborative (IPEC) has defined four domains of core competencies designed to prepare healthcare students to deliberately work together. Objective: The goal is to evaluate the student outcomes of the VA Central Iowa Healthcare System (VACIHS) chiropractic clerkship against the competencies defined by the interprofessional education collaborative and use the data to identify areas of strength and opportunities for program improvement. Method: A 42 item IPEC competencies paper survey was distributed twice to chiropractic students upon completion of a clinical rotation at the VACIHS. The design of this study was based on the retrospective pre/post-test design. Results: A total of 5 participants completed the IPEC competency survey. Values and Ethics, roles and responsibilities, interprofessional communication and teamwork showed a statistical improvement in the post survey ($p<0.05$). The change in means was 11.2, 18.4, 11.8, 16.20 respectively. Conclusion: Each of the participants showed improvement in each domain of the IPEC competencies. While there was great improvement in each domain. Areas for continued improvement is present within interprofessional communication and teamwork. (This is a conference presentation abstract and not a full work that has been published.)

Enuresis and encopresis of a 10-year-old female: a case report

Julie Johnson, Katherine Clark

Objective: To describe the conservative management of a 10-year-old presenting with bedwetting. Clinical Features: A 10-year-old female presented with primary nocturnal enuresis and weekly diurnal encopresis. Abdominal x-ray revealed dysmotility of the gut. Orthopedic/neurological evaluation was normal. There were no gross postural abnormalities. Examination suggested sacral, thoracic segment, and occipital dysfunction. Intervention and Outcome: Chiropractic manipulative therapy was applied using Sacro Occipital Technique. At eight weeks the patient noted decreased enuresis frequency from nightly to 2-3 times per week. At this point, the patient was referred for nutrition consultation and fecal laboratory testing revealed dysbiosis in gut flora. One week following dietary change consisting of increased water consumption, supplementing whole foods for processed foods, and fiber supplementation, the frequency of enuresis decreased from 2-3 times weekly to once per week with no further encopresis incidents. Three months post implementation, she continues to have approximately one enuresis incident per week. Conclusion: This case report suggests that the combination of chiropractic care and nutritional consultation may be beneficial in treating some patients with enuresis/encopresis. To validate this observation, controlled studies are necessary. (This is a conference presentation abstract and not a full work that has been published.)

Innovative engagement of doctor of chiropractic students in extracurricular research

Ward Jones, Stephen Onifer, Randall Sozio, Charles Arends, Charbel Medlei, Austin Webster

Objective: Published reports suggest that students benefit tremendously from extracurricular research activities. This report details an innovative process engaging Doctor of Chiropractic Students in relevant and collaborative basic science research regarding a spared nerve injury rat model and blood biomarkers. Methods: Students were engaged in active literature searches to define research questions and experimental design followed by implementation of enzyme-linked immunosorbent assay (ELISA) protocols to test rat blood biomarker levels. Results: The results include information regarding engagement of honors program students in the process of lab design/setup, lab safety, good laboratory practices, use of laboratory equipment, experimental design and implementation, literature search, defining research questions, and presentation of preliminary ELISA spared nerve injury biomarker data as a component of a larger collaborative study. Conclusion: Positive student feedback regarding engagement in research programs and preliminary proof-of-concept ELISA data suggests continued support of research programs is beneficial to Doctor of Chiropractic Students. (This is a conference presentation abstract and not a full work that has been published.)

Assessing students' knowledge about caring for patients from diverse cultures

Lisa Killinger

Objective: Assessing students' knowledge about cultural issues in caring for 5 diverse patient groups. Methods: Pre-Post written forms assessed students' perceived knowledge about 5 cultural groups studied in two different sessions of a 45 hour Health and Diversity class. Results: Students in both cohorts entered the course with little knowledge (1.5 on a 5 point Likert) of various cultures and their specific health risks, with the lowest knowledge being Native American and Muslim culture and health. ON the post assessment, students rated themselves as am average of 4.0-4.5 on the same Likert scale, on their knowledge of cultures and health risks. Conclusions: With a single course intervention, students may gain significant knowledge and confidence in issues related to health risk and caring for patients from diverse populations. In an increasingly diverse country, the value of culturally competent health professionals is also increasing. Student comments related to this educational experience in addition to their pre-post assessments will be shared. (This is a conference presentation abstract and not a full work that has been published.)

What principles do health care professionals profess? A review of the literature

F. Stuart Kinsinger

Objective: This review focuses on the academic references to the values, principles and tenets of professionalism. Data Sources: Usual and conventional search protocols were used. Results: Under this broad search mandate the following values and principles are associated with health care professions. 1. Social contract - Practitioners must understand how they personally fulfill the contract's obligations and provisions. 2. Moral agency - Practitioners deliver optimal care while using their position of power and authority for social justice. 3. Ethical practice - Practitioners apply the foundational ethics and virtues of care. 4. Boundary setting and maintenance - The setting and maintaining of boundaries ensures the privilege of touch is never abused. 5. Empathy - Health care demands the patient is cared for in a nurturing environment. 6. Confidentiality - Patients bare their bodies and their souls because they trust us to keep private things confidential. 7. Truthful communication - Practitioners must take proactive steps to communicate honestly with clarity and manage their digital footprint on social media. 8. Self-care - Avoiding burnout allows practitioners to model health and wellness. 9. Put patient needs first and foremost - This is the fiduciary responsibility. Conclusion: Educators are obligated to teach the principles of professionalism. (This is a conference presentation abstract and not a full work that has been published.)

Perceptions of chiropractic students toward their first term in chiropractic college: does educational background influence student perceptions on the difficulty of the academic program?

Raymond Kociolek, Judy Bhatti, Elissa Twist

Objective: Assess program perception and academic self-perceptions of chiropractic students towards their first term of the chiropractic program, and determine educational background on these perceptions. Methods: A survey including demographics, program perceptions, and a domain of the Dundee Ready Education Environment Measure (DREEM) measuring academic self-perception was administered to a convenience sample of 2nd term chiropractic students. This domain of DREEM is scored 0-32, higher scores indicate confidence in academic perceptions within the educational environment. Results: Fifty-seven (34 male) students, 20-25 years old (75%), completed the survey. Most participants report having a bachelor's degree (65%) with a major in science (86%). Over-all

DREEM academic perceptions (n=56, M=20.8 SD=3.6). Students described surprise at challenges of the chiropractic program (53%). Many wished they had taken more anatomy (n=22), chemistry (n=18), and physiology (n=17) before chiropractic school. Out of 57 participants, 37 perceived what they learned in first term was relevant to a career in chiropractic. Conclusion: Academic self-perceptions in the educational environment are scored as positive, but many students report not feeling prepared for the chiropractic program despite a strong science background. Interestingly, many participants fail to understand the relevance of first term to their future career. (This is a conference presentation abstract and not a full work that has been published.)

Case report of an adult patient with self-reported symptoms of Attention Deficit Hyperactivity Disorder (ADHD) receiving multimodal Applied Clinical Neuroscience care

Eniabitobi Kuyinu, Stephanie Sullivan, Michael Longyear, Emily Drake, Paulette Lawrence

Objective: To describe the care and management of an adult patient with self-reported symptoms of ADHD receiving multimodal Applied Clinical Neuroscience (ACN) care. Clinical Features: Patient was a 39-year old male presenting with depression, anxiety, difficulty concentrating, and constant need to move and stretch, who felt overwhelmed in large gatherings or with simultaneous tasks. Pre-treatment examination revealed low BP in left versus right arm, diminished left eye latency upon Videonystagmography (NVG) testing, facial and left arm tics. Intervention and Outcome: Patient underwent intensive 5-day tailored multimodal ACN care, which included chiropractic adjustments, whole-body rotation, balance board training, breathing and gargling exercises, and Interactive Metronome training. Post-treatment, patient reported overall mood stability, ability to tolerate crowds and simultaneous tasks without anxiety, improved focus and concentration, and resolution of need to move and stretch. BP did not resolve, but VNG revealed percent change improvements in bilateral saccade latency responses, most notable in right horizontal (L-17.7%; R-19.7%) and downward directions (L-17%; R-18.8%). Facial and left arm tics resolved. Conclusion: ACN may serve as a viable therapeutic intervention for patients with adult ADHD. Additional research is required. (This is a conference presentation abstract and not a full work that has been published.)

Outcome measures in public health service programs

Dana Madigan, Haley Doherty

Objective: The US Public Health Service Commissioned Corps (USPHSCC) and National Health Service Corps (NHSC) employ healthcare professionals to meet public health needs through primary health care services. Chiropractors regularly advocate for inclusion but may not be demonstrating fulfillment of outcomes of importance to these organizations. This literature review aimed to identify outcome measures used to determine eligibility and success of health professions in the USPHSCC and NHSC. Data Sources and Selection: Literature was searched in PubMed for outcome measures used by professions in the USPHSCC and NHSC. Hand searches were conducted for additional articles and governmental reports. Results: A total of 24 articles were found, of which 16 were deemed relevant. There was little use or consistency of specified outcome measures demonstrating improvements in health. Articles that used outcome measures were generally older and reported increased provider placement. Conclusion: Standardized outcome measures evaluating the eligibility and effectiveness of health care professions within the USPHSCC and NHSC were rarely reported in these articles. It may be appropriate to develop specific outcome measures for chiropractors to demonstrate the ability to fulfill the mission of public health service organizations. (This is a conference presentation abstract and not a full work that has been published.)

Two sisters with Plagiocephaly accompanied by torticollis - one treated with a cranial orthosis (helmet); the other with Sacro Occipital Technique (SOT) Cranial Therapy: a comparative case report

Keila Nichols

Objective: A common therapeutic approach for nonsynostotic plagiocephaly (NP) with congenital torticollis (CT) in otherwise normal children is the utilization of a cranial orthosis. This study introduces SOT Cranial Therapy (SCT) as an additional therapeutic option by examining a case of two-sisters (2-years apart) with NP and CT receiving two-different treatment approaches. The outcomes, costs and practicality of therapy are compared. Clinical Features: The older-sister was treated with the Doc Band (DB) from age 4-6 months. The younger sister was treated from age 10.5 weeks to 7 months using SCT. Intervention/Outcome: A chiropractic evaluation of the older-sister (DB) was performed at age 4 and again at age 7, showing a persistent or return of cranial asymmetry, as well as a mild to moderate scoliosis. The younger-sister (SCT) maintained cranial and postural symmetry from 7 months to her current age of 5. Conclusion: SCT may be considered a more affordable and less problematic alternative to cranial orthoses for plagiocephaly with torticollis in infants. Greater research is warranted to determine if there are instances when SCT may offer a more favorable long-term outcome than CH, and if bands-helmets might have secondary adverse effects not occurring with SCT. (This is a conference presentation abstract and not a full work that has been published.)

Promoting wellness initiatives on campus with students as the driving force

Tolu Oyelowo, Wei Xia

Objective: Health services universities have an obligation to walk their talk. Yet the rigors of a college education particularly in graduate school may conflict with ensuring a healthy lifestyle. A program utilizing a public health course to develop a health promotion initiative for the university with the goal of enhancing wellness was developed and implemented. Methods: This was a quantitative study to determine the level of participation (number and frequency) in campus wide health promotion activities developed by students at a health services university for "Public Health Awareness Week." Results: Peer support enhances participation. Student participation exceeded participation of faculty and staff. Peers, were more likely to participate in activities initiated by classmates. Conclusion: This studies findings indicate that students are a creative source for development of health promotion programs. Connecting a health promotion program to a course requirement enhances student wide participation. Peer support is a mechanism for enhancing participation. (This is a conference presentation abstract and not a full work that has been published.)

Plantar plate tear injury: a case study and review of conservative versus surgical management

Mark Pfefer, James Halloran, Rachel Gilmore, Nathan Hoover

Objective: The plantar plate is a structure that maintains metatarsalphalangeal joint (MTPJ) stability and has recently gained attention as a source of pain, instability, and disability. The purpose of this project is to describe a patient with partial plantar plate tear successfully managed with a conservative approach. We also review the literature with emphasis on comparing indications for conservative versus surgical management. Clinical Features: A forty-five-year-old male presented for care with recent increase in running mileage and increasing right foot pain for 3 months. The patient presented with persistent, severe pain and slight deformity of digit two with pain on the plantar surface. Recent MRI confirmed partial plantar plate tear. Interventions and Outcome: A trial of conservative treatment interventions included supportive taping, use of a rocker-bottom sole shoe, graded return of foot dorsiflexion with activation of lower leg muscles and intrinsic foot muscles, and instrument-assisted soft tissue mobilization. Conclusion: This case report describes a significant reduction in pain and improved function with conservative management in a patient with partial plantar plate tear. Conservative management for partial tears is a reasonable approach but it is likely that complete tears will often require surgical management. (This is a conference presentation abstract and not a full work that has been published.)

Survey of attitudes of doctor of chiropractic interns' dress and appearance

Mark Pfefer, Alexandra Scavuzzo Jones, Rachel Gilmore, Nathan Hoover, Jackson Berg, Jason Qualls

Objective: The purpose of this study was to determine the opinion of patients on the importance of style of clothing worn by doctor of chiropractic student interns. Methods: A convenience sample of patients were surveyed at an outpatient chiropractic college health center. The main outcome measure was a ranking of four different styles of doctors' attire as illustrated by accompanying photographs of a male intern. Style of clothing included scrubs, shirt with tie, polo shirt, and tie with white coat. Participants also were surveyed on other attributes of their intern such as cleanliness and personal grooming as well as ranking of appearance, politeness, compassion, and knowledge. Results: Questionnaire surveys were obtained from 150 participants. Irrespective of participant gender, knowledge was rated as the most important attribute, while appearance was regarded as less important. The white coat with tie style was ranked highest followed by the casual polo style shirt. Conclusion: Patients slightly prefer to see their chiropractic student interns wearing a tie with white coat. Patients view attributes other than clothing as more important than how interns choose to dress. Limitations include only use of a male illustrating clothing choices. (This is a conference presentation abstract and not a full work that has been published.)

Lisfranc ligament injury in a 23-year-old female with multimodality imaging

Carrie Santore, Stacey Cornelson, Patrick Battaglia, Norman Kettner

Objective: This case described clinical and multimodality imaging in a patient with an acute dorsal Lisfranc ligament tear. Clinical Features: A 23-year-old female presented with right-sided dorsal mid-foot pain that extended into her right ankle. She sustained an inversion injury while jumping between trampolines. Radiography, magnetic resonance imaging, and sonography demonstrated widening of the right first cuneiform/2nd metatarsal joint, complete fibrillar disruption of the dorsal Lisfranc ligament, power Doppler hyperemia, and subcutaneous and bone marrow edema in the first and second metatarsals and cuneiforms. Weight-bearing radiography and sonography demonstrated gapping of the Lisfranc joint. These findings were consistent with an acute dorsal Lisfranc ligament tear. Intervention and Outcome: The dorsal Lisfranc ligament tear was surgically repaired one week following presentation. Interval sonographic examination, five and a half months post-surgical, revealed Lisfranc stabilization on weight-bearing. The patient was lost to follow-up after surgery. Conclusion: Lisfranc injuries are commonly associated with direct crush and plantar flexion mechanisms of injury. Multimodal imaging provided critical diagnostic features to support the diagnosis and provide timely treatment and follow-up. The Lisfranc ligament injury may compromise foot stability increasing the risk for osteoarthritis. Surgery is typically the treatment of choice. (This is a conference presentation abstract and not a full work that has been published.)

Experiences and perspectives of graduating alternate admission track students at Life Chiropractic College West

Norman Strutin, David Straub, Suzanne Ray

Objective: This study explored student self-reported experiences about the Alternate Admission Track Plan(AATP)at a US Chiropractic college. Methods: Our institution recruited 16 graduating AATP students for semi-structured exit interviews. We analyzed blinded, de-identified interview transcripts for student self-reported: 1. facilitators and barriers to student success, 2. satisfaction with academic support, 3. experiences in early basic science courses, 4. preparation for NBCE part 1, entrance to the Health Center, and graduation. Results: Facilitators were strong commitment to chiropractic, cooperative environment (study groups), work ethic, and time management skills. Barriers were lack of chemistry background, and time constraints. Conclusion: Graduating AATP students were positive about the AATP program overall, their preparation for NBCE part 1, their clinical preparation, and the opportunity to accelerate their entrance into Chiropractic College. They recommend that AATP entrants without science backgrounds take prerequisite courses in biology and chemistry, yet they also observed that a capable student could dedicate the time and effort to obtain the needed information via available college resources. A major limitation of this study is that the perspectives of AATP students who did not complete the DC program are not represented in these interviews of graduating students. (This is a conference presentation abstract and not a full work that has been published.)

A case study of a patient with aqueductal stenosis causing hydrocephalus

Jee Won Suh, James Beadle, Bryan Gatterman

Objective: This case study reports a reduction of fall risk in an elderly patient with hydrocephalus undergoing chiropractic care. Clinical features: A 56-year old male presented with a chief complaint of bilateral low back pain that began with flexion-extension injury 20-30 years earlier and increased with hydrocephalus about 4 years ago. Examination revealed unilateral hypertonicity of the paraspinal muscles with right postural tilt, abnormal gait, and decreased cerebellar function. Intervention: The patient was under Evolutionary Percussive Instrumental Correction and diversified techniques for once per week for 8 weeks. Outcome: Patient consented to share their pre- and post-care (8 weeks) photographic and video documentation. Stationery and motion-captured posture analysis demonstrate marked improvements in postural lean, and gait analysis video show improvements from small shuffling gait (pre) to increased bilateral knee and shoulder involvement. Improved stability and cerebellar function post-care were associated with decreased the number of falls: from 3-4 falls per week (pre) to 0 falls reported by the patient after 5 weeks of care. In addition, the lateral and the third ventricle size decreased, as documented on MRI. Conclusion: Chiropractic care may be beneficial for older adult patients with high fall risk. (This is a conference presentation abstract and not a full work that has been published.)

Chiropractic management of acute low back pain in an integrative Veterans Health Administration (VHA) community based outpatient clinic (CBOC) a case series

Charles Sullivan, Robert Walsh

Objective: To compare and comment on cases of ALBP co-treated the same day with their Primary Care Physician (PCP) to delayed treatment in a typical outpatient chiropractic clinic. The purpose is to evaluate the response of same day treatment from PCP to Chiropractor. Clinical features: Three patients with ALBP were referred from PCPs the same day for Chiropractic services. Average highest pain scores were greater than 6/10 VDS. Disability scores averaged greater than 50%. Lumbar Ranges of Motion (ROM) were decreased by more than 50%. Intervention and outcome: High velocity low amplitude (HVLA) manipulation was delivered on average of 6 occasions. Pain ratings as well as low back disability scores significantly decreased. Lumbar ROMs significantly increased. Conclusion: Acute/urgent MSK is often a difficult condition for PCPs to manage. This case series demonstrates successful management of multiple patients with ALBP with direct referral from a PCP to a same day clinic located in the same facility. All three of the patients responded well to the immediate intervention program instituted by the individual CBOC. Further research is warranted to determine if integrated immediate HVLA manipulation for ALBP may be a new paradigm for treatment of these conditions. (This is a conference presentation abstract and not a full work that has been published.)

Fetal heart rate testing of pregnant women under concurrent chiropractic and midwifery care

Allison Union, John Edwards, Joel Alcantara

Objective: To determine the results of fetal heart rate (FHR) testing of pregnant women under concurrent chiropractic and midwifery care. Methods: We performed a retrospective analysis of patient files for women under concurrent chiropractic and midwifery care during pregnancy. In addition to socio-demographic and pregnancy status data, inclusion criteria for file review were: the patient received chiropractic adjustments and FHR monitoring was performed. Data was analyzed using descriptive statistics. Results: We found 6 women in the 1st trimester (mean weeks gestation (MWG)=12.4; 0.58) meeting our inclusion criteria. The mean FHR was 150 beats per minute (bpm) (SD=6.32). Fourteen women were in their 2nd trimester (MWG=22.03; SD=3.59) with mean FHR at 143.71 bpm (SD=5.98). A total of 33 women were monitored in their 3rd trimester (MWG=35.75; SD=3.37) with mean FHR at 140.30 bpm (SD=8.48). All FHR findings were within normal limits (i.e., 100-160 bpm) with

decreasing trends with gestation. On average the women were attending chiropractic appointments 19.76 (SD=11.56) before delivering. Conclusion: The use of spinal/pelvic adjustments during pregnancy did not result in adverse outcomes for the fetus as monitored with FHR. (This is a conference presentation abstract and not a full work that has been published.)

Perinatal chiropractic care of a woman seeking a trial of labor after cesarean and subsequent vaginal breech birth

Allison Union, John Edwards, Joel Alcantara

Objective: To describe the care of a Caucasian female seeking a trial of labor after cesarean (TOLAC) who experienced a breech vaginal birth. Clinical Features: A 33-year-old woman presented for wellness chiropractic care eight months prior to conceiving. The patient continued chiropractic care during her pregnancy as her primary concern shifted from wellness care to seeking a TOLAC. At 32 weeks the midwife palpated the baby's position as breech, but reported vertex positioning by 34 weeks onward. Intervention and Outcomes: Periodic photogrammetry of umbilical-trochanter angle and palpation of verticality of uterine axis, pubis-tenderness, and sacral fascial movement complimented the usual perinatal chiropractic care and guided visit-frequency recommendations. The patient was adjusted by a Webster-certified chiropractor bi-monthly until 25 weeks' gestation, weekly until 34 weeks, then twice weekly until delivery. The patient presented to the hospital in active-labor with the fetus frank breech, but vaginally delivered the 5 lbs 3 oz baby boy at 39+3 weeks' gestation. Conclusion: This case study illustrates the chiropractic co-management of a pregnant woman seeking a TOLAC who birthed a breech fetus. (This is a conference presentation abstract and not a full work that has been published.)

Contextual factors effects on patient global rating of change in chiropractic care: a pilot study

Pierre Veau, Mathieu Picchiottino, Caroline Teulier, Arnaud Lardon

Objective: To assess the feasibility of the study and to determine if contextual factors influence Global Rating of Change (GRC) or expectations of patients with musculoskeletal pain disorders in a student chiropractic clinic. Methods: Twenty adult participants with musculoskeletal pain disorders were randomized into two groups: intervention group (chiropractic treatment commonly use associated with contextual factors: therapist's appearance and verbal suggestions) and control group (chiropractic treatment commonly use). The study was set into chiropractic school clinic by the students under the clinician supervision. GRC and expectations were assessed after treatment and GRC a second time 7-15 days after the initial visit. Results: Twenty patients (40% of women) participated to the study. Fisher's Exact Test showed a significant difference ($p=0.014$) between intervention group and control group for the GRC assessed after treatment during the first visit; participants in intervention group reported more improvement. Expectations just after treatment and GRC at the follow-up were equal for the two groups ($p>0.05$). Conclusion: This pilot study highlighted the possibility to set this type of research in chiropractic school clinic. Preliminary results suggest further research on the subject, to highlight the clinical application of contextual factors in chiropractic. (This is a conference presentation abstract and not a full work that has been published.)

Effect of atlas realignment via NUCCA in patients with mTBI and persistent symptoms: two case studies

Noah Volz, Scott Lessard, Chris Woolf, Monica Smith

Objective: Describe effect of upper cervical chiropractic on athletes with mTBI and persistent concussive symptoms. Clinical Features: Two Cases, young male Rugby players with recent (within six months) medically diagnosed concussion, Chronic cervicalgia and cephalgia, post concussive symptoms (PCS). Case 1: PCS of headache, dizziness, fatigue, irritability, impaired memory and concentration, insomnia, and lowered tolerance for noise and light. Case 2: PCS of chronic, unremitting headaches for over six months. Intervention: Patients seen weekly over 8-week period. NUCCA upper cervical chiropractic protocol addressing alignment of the atlas vertebrae. Outcome: Case 1: Improved subjective and affective pain scores, headache frequency, verbal memory and frequency of cervicalgia. No improvement in neck disability, visual memory, visual motor scores, reaction time, impulse control, or number of symptoms. Case 2: Patient reported resolution of headache for 48 hours following first visit. After 7 visits, patient reported 24-48 hours of resolution of headaches. General outlook and attitude improved and Headache Disability Index score decreased from 60% to 40%. Conclusions: Supports evidence that atlas vertebrae realignment may benefit patients with post concussive syndrome. Future studies should examine effects of chiropractic care on factors and mechanisms of post concussive syndrome, including headaches. (This is a conference presentation abstract and not a full work that has been published.)

Specific chiropractic care for acute otitis media in a 10-month-old female

Breanne Wells, Brett Bovee

Objective: To describe specific chiropractic evaluation and treatment of a 10-month-old female with acute otitis media. Clinical features: A 10-month-old female reported with a 1-week history of acute otitis media confirmed by a medical doctor who prescribed antibiotics. The parents wanted to try chiropractic care before administering antibiotics. The baby was not sleeping well and had a poor temperament. Physical exam findings revealed a red tympanic membrane without effusion in both ears and a fever of 101.1 degrees. A dual probe heat-sensing instrument noted findings in upper cervical spine. Additionally, atlas had decreased right lateral bend, decreased left rotation and palpation prominence of the right posterior arch. Intervention: With the patient seated, the chiropractor contacted the right lateral superior atlas transverse process with the distal end of his right index finger and utilized a high velocity low amplitude thrust. Force vectors came from right to left, posterior to anterior, and superior to inferior. Outcome: The day after adjustment, without taking antibiotics, the baby had a reduction in fever, decreased redness in her ears, increased ability to sleep, and a better temperament. Conclusion: Specific chiropractic evaluation and adjustment may lead to improvement in acute otitis media. (This is a conference presentation abstract and not a full work that has been published.)

A comparison of the immediate effects of thoracic spinal manipulative therapy on lung function in healthy subjects, subjects with a history of smoking, and patients with Chronic Obstructive Pulmonary Disease (COPD): a preliminary study

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Objectives: To examine the immediate effects of thoracic spinal manipulative therapy (tSMT) on lung function in participants with COPD and contrast these effects with immediate changes in lung function in age-matched smokers and young healthy participants. Methods: A total of 15 healthy subjects (28.7±5.9 years), 4 subjects (60.5±7.7 years) with a history of smoking, and 4 subjects (67.3±4.3 years) with mild to severe COPD were recruited. Spirometry was performed on them prior to having tSMT and immediately following tSMT. Changes in the participants forced expiratory volume in one second (FEV1), forced vital capacity (FVC), and FEV1/FVC were computed. Comparative non-parametric statistics were performed to examine the differences between the groups. Results: There were no significant changes in FEV1 and FVC following tSMT in healthy participants and participants with a history of smoking; however, the COPD participants had a significant increase in FEV1 (6.3%±3.6%) and FVC (8.0%±6.5%) compared to both smokers and healthy participants. There was no change in FEV1/FVC following tSMT in all subjects. Conclusion: This preliminary study suggests that lung function may be altered by tSMT in subjects with COPD, however the state of the disease remains unchanged. (This is a conference presentation abstract and not a full work that has been published.)