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# CONFERENCE PROCEEDINGS

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## Association of Chiropractic Colleges Educational Conference and Research Agenda Conference 2023: Leadership in Education

Association of Chiropractic Colleges

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### ABSTRACT

This conference was convened by the Association of Chiropractic Colleges in New Orleans, Louisiana from March 23-25, 2023. The theme for this Association of Chiropractic Colleges Educational Conference and Research Agenda Conference (ACC-RAC) program was *Leadership in Education*. This proceedings document includes the names of the Peer Review Committee members and all platform and poster abstracts presented at the 2023 ACC-RAC.

**Key Indexing Terms:** Chiropractic; Education; Congress [Publication Type]

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### INTRODUCTION

The Association of Chiropractic Colleges Education and Research Agenda Conference (ACC-RAC) addresses the needs of the chiropractic academic and research community by providing an outlet for educational, scholarly, and research-related dialog. This meeting offers educators and researchers the opportunity to present new findings from the educational, clinical, and basic science domains.

This conference was convened by the Association of Chiropractic Colleges in New Orleans, Louisiana from March 23 to 25, 2023. The theme for this Association of Chiropractic Colleges Educational Conference and Research Agenda Conference (ACC-RAC) program was *Leadership in Education*. The purpose of this proceedings document is to publish the names of the Peer Review Committee members and all platform and poster abstracts presented at the 2023 ACC-RAC.

### ACC-RAC Peer Review Committee

For the 2023 conference, the ACC-RAC peer review committee worked under extenuating circumstances. The March 2022 conference was moved to July 2022 due to the COVID-19 pandemic, thus creating an irregular cycle for submissions and reviews for 2023. Additionally, following several transitions within ACC, the 2023 chair was invited after the abstract submission date had already closed. This resulted in substantial time pressure for all involved and several downstream effects. The peer review committee chair was selected, potential peer reviewers were invited, reviews were completed, results were announced, and this report was submitted to the *Journal of Chiropractic Education* in just 5 weeks. Despite these challenges, all of the 166 peer review committee members submitted their ratings and formative comments in record time, reflecting great credit upon them and their commitment to scholarly values. The ACC commends the peer review committee members and the peer review committee chair for their excellent scholarly work and steadfast professional service.

The ACC thanks all participants for their hard work, perseverance, and dedication to advancing the education and research for the chiropractic profession. Following are the volunteers who provided peer review services for the 2023 ACC-RAC:

Whitney Amos-McNary, Brian Anderson, Christopher Arick, Kira Baca, Michele Bahadoor, Barclay Bakkum, Angie Ballew, Tyler Barton, Patrick Battaglia, Judy Bhatti, Edward Bifulco, Jessica Billham, Charles Blum, Gina Bonavito-Larragoite, Patrick Boylan, Renee Broughten, Kathryn Brown, Paul Bruno, Frank Bucki, Casey Buns, Kara Burnham, Robert Butler, Alice Cade, Marni Capes, Beth Carleo, Jonathan Carlos, Michelle Chambers-Lewis, Cynthia Chapman, Chin-Suk Cho, Munyeong Choi, Jesse Coats, Stephan Cooper, Kelsey Corcoran, Matthew Cote, Zachary Cupler, Stuart Currie, Clinton Daniels, Brian Davis, Faye Deane, Vincent DeBono, Marshall Deltoff, Scott Donaldson, Stephen Duray, Jonathan Emler, Roger Engel, Dennis Enix, Kimary Farrar, Amberly Ferguson, Marina Fox, Leslie Fuller, Yuan Gao, Geoff Gelley, Brian Gleberzon, Jordan Gliedt, Derek Golley, Christopher Good, Kenice Grand, Joseph Guagliardo, Brett Guist, Marty Hall, David Hannah, Billie Harrington, Shawn Hatch, Navine Haworth, Shawn He, Charmaine Herman, Nate Hinkeldey, Kathryn Hoiriis, Dana Hollandsworth,

Greg Hollandsworth, Mariève Houle, Ramona Houston, Adrian Hunnisett, Thomas Hyde, Fatima Ismail, Fiona Jarrett-Thelwell, Edward Johnnie, Theodore Johnson, Michelle Jourdan, Jane Joyce, Martha Kaeser, Ashlee Kates-Ascioti, Norman Kettner, Lisa Killinger, Kyle R. Klinginsmith, Charmaine Maria Korporaal, Christie Kwon, Suzanne Lady, Misty Lagasse, William Lauretti, Dana Lawrence, Ian Le, Makani Lew, Joe Lintz, Craig Little, Ashley Long, Christine Major, Barbara Mansholt, Emile Marineau, Cecelia Martin, Janny Mathieu, Anne Maurer, Heather Meeks, Hiwot Melka, Kevin Meyer, Meredith Meyers, Michael Moore, Casey Mullen, Jason Napuli, Shawn Neff, Lia Nightingale, Aidan O'Brien, David Paris, Steven Passmore, Kevin Percuoco, Kristina Petrocco-Napuli, Sharne Pillay, Judy Pocius, Katherine Pohlman, Lynn Pownall, Morgan Price, Mohsen Radpasand, Macy Randolph, Muhamad Faizzuddin Razali, Katherine Reckelhoff, Christopher Roecker, Sandra Rogers, Anthony Rosner, Robert Rowell, Brent Russell, Eric Russell, Stacie Salisbury, Gary Schultz, Samuel Schut, Margaret Sels, Mayda Serrano, Zac Shannon, William H. Sherwood, Dingbo Shi, Margaret Sliwka, Monica Smith, Christopher Smoley, Eugene Spilker, Carina Staab, Timothy Stecher, Misty Stick-Mueller, John Stites, Kent Stuber, Alexander Sundin, Mark Thomas, Jeff Thompson, Steven Torgerud, Elissa Twist, Michael VanNatta, Robert Vining, S. Prasad Vinjamury, Ashley Vogt, Amanda Vozar, Kenneth Weber, Breanne Wells, Michael Wiles, Shari Wynd, Christopher Yelverton, Kenneth Young, Niu Zhang, Nicole Zipay. Peer Review Chair: Claire Johnson. *Journal of Chiropractic Education* Editor-in-Chief: Bart Green.

The result of the peer review process are the accepted abstract presentations. Below, the accepted abstracts are listed in platform and poster presentation categories. In each category, the abstracts are listed in alphabetical order by the first author's last name.

### PLATFORM ABSTRACTS

#### Multidisciplinary management of osteochondritis dissecans of bilateral knees in an 11-year-old competitive gymnast

Philip Afghani, Melissa Ferranti, Trevor Shaw

**Objective:** To present the case management of an 11-year-old with osteochondritis dissecans of bilateral knees and discuss the importance of timely diagnosis and multidisciplinary approach to management. **Clinical Features:** An 11-year-old female competitive gymnast presented with a history of bilateral knee pain lasting one year with worsening symptoms in the last several weeks. Imaging revealed osteochondritis dissecans of bilateral medial femoral condyles with associated fibrocartilage formation and mild cartilage thinning. **Intervention and Outcome:** A multidisciplinary approach to management was utilized. The plan of management included patient education, activity modification, passive modalities, rehabilitation, and surgery. An inter-professional referral within our clinical institution allowed for pre and post operative rehab which helped support the patient and increased function allowing for return to sport. **Conclusion:** This case study demonstrates a multidisciplinary management of osteochondritis dissecans of bilateral knees and highlights the importance of preserving joint function and avoiding potential significant sequelae. Further studies are needed to improve treatment potential and indications for the conservative co-management of knee osteochondritis dissecans pre and post

operative. (This is a conference presentation abstract and not a full work that has been published.)

#### **A cluster analysis of practitioner responses to a survey on the chiropractic care of children**

*Joel Alcantara, Andrew Whetten, Joey Alcantara*

**Objective:** The objective of this sub-study was to characterize chiropractors and their care of children (0-17 years). **Methods:** A hierarchical cluster analysis of the responses of chiropractors to a survey characterizing themselves (i.e., age, sex, years in practice), their practices (fee structures), their management protocols (i.e., chiropractic techniques and adjunctive therapies) and cross-referral patterns with other healthcare providers. **Results:** A convenience sample of 163 chiropractors (115 females and 46 males) with an average age of 37.80 years ( $n=163$ ;  $SD=8.42$ ; range = 26-66 years) and mean practice experience of 10.60 years ( $n=163$ ;  $SD=7.71$  years; Range=1-36 years) comprised our responders. Our final model detected 3 clusters with responder counts of  $n=81$  (Cluster 1),  $n=34$  (Cluster 2), and  $n=48$  (Cluster 3). Cluster 1 were relatively younger chiropractors with less clinical experience. Cluster 2 reported highest percentage of infant patients 1 year of age. Clusters 1 and 3 reported higher percentages of patients 13-17 years of age and cared for by mostly male chiropractors. **Conclusions:** Our clustering model detected similarities and differences between chiropractors based on practitioner gender, children age group and chiropractor referral network. We encourage further development of exploratory strategies to characterize the chiropractic care of children. (This is a conference presentation abstract and not a full work that has been published.)

#### **Effects of an acute mindfulness-based intervention on exercise tolerance, maximal strength, and pain-related experiences in individuals with primary chronic low back pain: A pilot study**

*Louise Amiot, Catherine Daneau, Bastien Couepel, Martin Descarreaux, Marjorie Bernier, Jean Fournier, Alexis Ruffault, Anne Courbalay*

**Objective:** To investigate the effects of an acute mindfulness-based intervention on exercise tolerance, maximal voluntary contraction, pain and effort-related experiences in primary chronic low back pain individuals. **Methods:** The 23 participants were divided between an experimental ( $n=13$ ) and a control group ( $n=10$ ). Before and after the intervention, participants completed maximal voluntary contractions, a modified Sorensen test and scales about pain intensity and unpleasantness, effort perception and use of acceptance of a coping strategy. Data analyses were conducted using t-test and linear mixed-models. **Results:** The control group significantly decreased their maximal voluntary contractions across time and showed a trend towards a decrease in exercise tolerance across time while the experimental group did not. For both groups, pain unpleasantness and effort were perceived higher during the second modified Sorensen test. Analyses did not reveal any significant effect of time nor group on averaged pain intensity and on the use of acceptance. **Conclusion:** Mindfulness seems to be a promising avenue to improve biopsychosocial adaptations to effort while targeting referred pain. Larger samples and controlling for individuals' functional status seems necessary for further research. (This is a conference presentation abstract and not a full work that has been published.)

#### **COVID-19 related curricular changes and their impact on National Board of Chiropractic Examiners Part I scores: A cohort study comparing classroom vs remote basic science instruction**

*Brian Anderson, Dustin Derby, Robert Percuoco*

**Objective:** Evaluate the association between chiropractic basic science curriculum (online vs classroom) and Part 1 National Board of Chiropractic Examiners (NBCE) pass rate. **Methods:** Two student cohorts were generated, both matriculating during the Spring-Fall trimesters: Cohort 1 (2018, classroom curriculum); Cohort 2 (2020, online curriculum). Poisson regression modeling estimated the adjusted relative risk (RR) with 95% confidence intervals (CI) of NBCE pass rate based on cohort. Step-wise general linear modeling evaluated predictors of NBCE domain scores. **Results:** Age (26.1 vs 28.9) and NBCE domain scores (except Pathology) were lower in Cohort 2, while undergraduate GPA (3.31 vs 3.23), undergraduate science GPA (3.10 vs 3.01), and chiropractic basic science GPA (3.44 vs 3.23) were higher vs cohort 1 ( $p<0.05$ ). Cohort 2 had an adjusted relative risk 14% lower than cohort 1 for passing NBCE (RR 0.86, 95% CI 0.80, 0.92,  $p<0.0001$ ). Chiropractic basic science GPA + cohort best explained NBCE domain scores. **Conclusion:** Students in an online basic science cohort were less likely to pass NBCE Part 1 when compared to a classroom cohort 2 years prior. These results are likely influenced by the rapid and forced transition to online learning secondary to the COVID-19 pandemic. (This is a conference presentation abstract and not a full work that has been published.)

#### **Exam item degree of difficulty in a physiopathology course is correlated with National Board of Chiropractic Examiners performance in pathology**

*Ilija Arar, Jeanmarie Burke, Patricia Merkle, Deborah Hall*

**Objective:** Item analysis is an important tool in evaluating exam quality. This study investigates the relationship between exam item difficulty in a third-

trimester physiopathology course and NBCE Part 1 pathology domain performance. **Methods:** The item difficulty index was employed to categorize exam questions as easy (.85), medium (.51 to .84), or hard (.50) administered to third trimester students over 3 iterations of a physiopathology course during the 2019 academic year. Course assessments consisted of 2 midterm exams and one final exam for a total of 150 questions administered to 136 students for a total of 61 200 graded attempts. Percentage scores (0 to 100%) for easy, medium, and hard questions were calculated. Pearson correlation coefficients were calculated between exam item degree of difficulty percentage scores and NBCE pathology domain scores. **Results:** Item difficulty was positively correlated with NBCE pathology domain performance, with medium difficulty items ( $r=.62$ ,  $p<0.001$ ) having a stronger relationship than easy or hard items ( $r=.51$ ,  $p<0.001$  and  $r=.42$ ,  $p<0.001$ , respectively). **Conclusion:** Assessments in pathology curriculum within chiropractic education should consist of items of appropriate difficulty to assess learning and optimize student performance on external, high stakes outcome measures. (This is a conference presentation abstract and not a full work that has been published.)

#### **Diagnosis and referral of emergent arterial occlusion in a 64-year-old lifelong smoking male Veteran: Considerations for increased awareness in public health screenings**

*Annie Babikian, David Paris*

**Objective:** This case study describes the recognition, diagnosis, and referral of a rare emergent condition, femoral arterial occlusion, in the chiropractic clinical setting. The importance of participation in public health efforts and preventative screenings in a chiropractic practice are discussed. **Methods:** A 64-year-old established patient presented with an acute episode of low back pain and right lower extremity symptoms. Description of key historical factors, physical examination findings, diagnostic considerations, medical decision making, and referral are discussed. Review and emphasis are focused on the importance of knowledge and utilization of public health practices and screening guidelines. **Results:** Successful resolution of the femoral arterial occlusion presenting to a hospital-based chiropractic clinic resulted through recognition, diagnosis, and referral for immediate surgical intervention. **Conclusion:** This case presents an unusual and rare pathology in a chiropractic practice. It offers considerations and discussion on a challenging differential diagnosis. This study adds to the limited literature on emergent and rare cases that may present in the chiropractic clinical setting. The authors believe this may be the sole report presenting to a chiropractic clinic, and thus, an original contribution. The importance of awareness and utilization of public health measures and screenings are recommended. (This is a conference presentation abstract and not a full work that has been published.)

#### **Psychosocial risk factors for neck pain in workers: A systematic critical review with meta-analysis**

*Florian Barbier-Cazorla, Yolande Esquirol, Arnaud Lardon*

**Objective:** Musculoskeletal disorders represent one of the main causes of absenteeism and presenteeism at work. Among these, non-specific neck pain (NSNP) is a frequent condition, with an annual prevalence that can reach 50% in the general population. For the last decade, preventive strategies in the workplace were set. However, robust evidence about modifiable risk factors (RFs) is needed to implement preventive strategies. This review aims to identify psychosocial RFs for NSNP in workers. **Methods:** A systematic review with meta-analysis was conducted and reported according to PRISMA statements and MOOSE guidelines. Six electronic databases were systematically searched from 2006 to 2020. Random pairs of independent reviewers screened, critically appraised eligible studies using SIGN criteria, and extracted relevant data. Thirteen potential analyzed RFs, from 10 articles, were included in 3 main categories (psychosocial ( $n=11$ ), organizational ( $n=1$ ), and individual ( $n=1$ )). **Results:** Meta-analyses highlighted a significantly higher risk of NSNP occurrence for people exposed to 3 RFs: high psychological load (OR=1.27 [1.01-1.59]), high work rhythm (OR=1.69 [1.11 e<sup>2</sup>.60]) and high individual mental stress and strain (OR=1.79 [1.29-2.49]). **Conclusion:** Three Psychosocial RFs were associated with NSNP and may be considered in workplace preventive strategies implementation. (This is a conference presentation abstract and not a full work that has been published.)

#### **Degenerative cervical myelopathy discovered in a patient referred to VA chiropractic clinic for lower back pain: A case report**

*Tyler Barton, Derek Golley, Jonathan Danner, Andrew Dunn*

**Objective:** To highlight a patient presenting with progressive neurological signs indicating degenerative cervical myelopathy during a trial of care for a lumbar spine related disorder. **Clinical Features:** A 72-year-old male was referred for chiropractic care regarding a complaint of left lower extremity pain and paresthesia in the distal aspects of all 4 extremities. Initially unremarkable, a re-evaluation revealed new signs suggestive of myelopathy including brisk patellar reflexes and a unilateral Hoffman's sign. **Intervention/Outcome:** Lumbar spine radiographs requested at the initial follow-up visit demonstrated moderate diffuse spine related degenerative changes. A favorable response was achieved through 5 sessions of lumbar flexion-distraction manipulation, soft-tissue therapy and sciatic nerve mobilization exercises. Re-evaluation suggested

progressive neurological findings warranting a primary care referral for request of advanced imaging. Cervical MRI revealed severe spinal stenosis with impingement and mass effect upon the cervical cord at C3-C4. A neurosurgical consult was placed by the requesting physician for surgical consideration. Conclusion: This case exemplifies the importance of performing a thorough re-evaluation when managing multimorbid neuromusculoskeletal conditions and how chronic conditions, such as degenerative cervical myelopathy, may rapidly manifest with clinical features. (This is a conference presentation abstract and not a full work that has been published.)

#### **A case report of a patient with bilateral shoulder pain secondary to statin-induced myopathy**

*Patrick Battaglia, Macy Randolph*

**Objective:** To present clinical features and management of a patient with statin-induced myopathy referred to chiropractic for management of shoulder pain. **Clinical Features:** Written informed consent was obtained. A 63-year-old patient was referred by their primary care provider to chiropractic integrated within one Federally Qualified Health Center for evaluation of worsening bilateral shoulder pain. Pain was insidious and progressively worsening, and associated with reduced function, like reaching overhead. Also, the patient noted walking more with a cane, and having weakness in her legs. She had an extensive cardiovascular history and was on prolonged statin medication. Exam confirmed 3/5 weakness in the muscles of the shoulder and hips and thigh, with tenderness to palpation. Laboratory investigation revealed elevated aldolase (67.7 U/L; normal <8.1) and creatine kinase (12319 U/L; normal 29-143), confirming the suspicion of myopathy. **Intervention and Outcome:** Patient was referred to the Emergency Department for further management, where they were admitted and underwent extensive testing including a muscle biopsy, securing the diagnosis of immune-mediated necrotizing myopathy secondary to prolonged statin exposure. **Conclusion:** While statin use is common and side effects are rare, awareness of statin-induced myopathy is important for chiropractors managing patients with musculoskeletal dysfunction. (This is a conference presentation abstract and not a full work that has been published.)

#### **Evaluation and management of congenital spinal stenosis and complex spinal injuries in a circus artist: A case study**

*Guinevere Bennett, Tim Gooding*

**Objective:** Evaluation of evidence-based referral guidelines in complex cases. **Clinical Features:** Patient presented as a 40-year old female experiencing recent intense exacerbation of low back pain without specific trauma. History revealed pain was preceded by bilateral foot numbness and aching in the hamstrings, consistent with symptoms of neurogenic claudication. The patient was active in circus arts, which involved regular training for flexibility and core strength. Pain was relieved only with kneeling and leaning forward. Orthopedic tests for sciatica and disc herniation were negative. Radiographs showed mild to moderate disc degeneration at L4/L5 and L5/S1. **Intervention and Outcome:** After one month of no improvement with conservative care, patient consulted an orthopedist. Lumbar and sacral MRIs revealed a coccyx stress fracture, congenital spinal stenosis, and a large disc extrusion at L5/S1 causing severe spinal stenosis. Patient was referred for neurosurgery to preserve nerve function. **Conclusion:** Referring a patient without significant trauma or red flags can be inconsistent amongst providers and subject to potentially incomplete findings. Improved outcomes can be achieved through effective referrals when there is a failure to improve with conservative care or an overlooked diagnosis. Individual patient factors should be considered in case evaluation. (This is a conference presentation abstract and not a full work that has been published.)

#### **Magnetic resonance spectroscopy displays the structural and biochemical effects of spinal manipulative therapy in lumbar discogenic pain: A case report**

*Jessica Billham, Erika Evans, Francine Schranck, Kelly Brinkman, Matthew Gornett, Jim Cox, Norman Kettner*

**Objective:** We report utility of magnetic resonance spectroscopy (MRS) in identifying the intervertebral disc (IVD) as a pain generator, describe the contemporary pathophysiology underlying biochemical and structural components of discogenic low back pain (DLBP), and exhibit therapeutic responses to spinal manipulation. **Clinical Features:** A 29-year old man presented with uncomplicated low back pain (LBP). The non-specific presentation and clinical exam findings were consistent with non-specific LBP with the IVD as likely pain generator. **Intervention and Outcomes:** Conventional magnetic resonance imaging showed findings of IVD degeneration including Modic Type 1 changes consistent with a diagnosis of DLBP. MRS was utilized for structural and biochemical analysis of the IVDs. Altered spectral features confirmed a DLBP diagnosis. The patient underwent 12 Cox Flexion Distraction treatments at a chiropractic teaching clinic. Follow-up MRS revealed improved IVD spectral features including decreased biochemical pain markers and increased glycoprotein biosynthesis suggesting improved IVD structural integrity. **Conclusion:** We report the first utilization of MRS to quantify structural integrity and biochemical pain profile of the IVD in a conservatively managed DLBP patient. Findings of this case suggest spinal manipulative therapy in DLBP management may improve the structural integrity of IVDs and alter pain biochemistry. (This

is a conference presentation abstract and not a full work that has been published.)

#### **Treatment of a patient with cervicogenic related vertigo: A case report**

*Thomas Bloink, Charles Blum*

**Objective:** Discuss the care of a patient with cervicogenic related vertigo. **Clinical Features:** 70-year-old female patient presented with persisting (months) unresponsive severe left neck pain and vertigo. The patient had been successfully treated at this office six-years earlier for left-sided TMJ dysfunction, so returned for an assessment when her symptoms became unbearable. Current examination revealed significant left-sided neck pain (C5-C7) without radiculitis. She also received treatment at Stanford Medical Center from an allopathic pain management doctor who diagnosed her with cervicogenic vertigo. He treated her with acupuncture and advised her to continue with chiropractic treatment. **Intervention/Outcome:** The patient received 9 sacro occipital technique (SOT) treatments over a period of six-weeks. Along with SOT care, adjustments focused to C5, cervical-traction therapy, myofascial treatment to her left scalene muscles, and LED infrared therapy. Over the course of treatment as her neck pain diminished her vertigo symptoms diminished concurrently. By the sixth-week of treatment the patient reported no further vertigo symptoms. **Conclusion:** It is difficult to rule out placebo effects, regression to the mean, or other confounders so further research is needed to determine what patients with cervicogenic vertigo might be good candidates for this collaborative care. (This is a conference presentation abstract and not a full work that has been published.)

#### **Diagnosis and management of Saturday night palsy in a chiropractic teaching clinic: A case report**

*Patrick Boylan, Jessica Billham*

**Objective:** To present a case describing the evaluation and management of acute onset radial nerve palsy presenting with wrist drop which was confirmed by diagnostic ultrasound and managed conservatively. **Clinical Features:** A 39 year old male presented with a chief concern of parasthesia and weakness in the right hand and wrist. History and neurologic evaluation revealed findings that raised suspicion of Saturday night palsy, including unilateral wrist drop and an absent brachioradialis reflex. **Intervention and Outcome:** The patient was referred for a diagnostic ultrasound which revealed hypoechoogenicity and enlargement of the radial nerve at the spiral groove (5mm<sup>2</sup>) when compared to the asymptomatic side (3mm<sup>2</sup>), confirming the suspected diagnosis. The patient was managed conservatively with the use of education, reassurance, and self-management. Full resolution of symptoms was achieved after 6 weeks. **Conclusion:** Acute onset radial nerve palsy, often referred to as Saturday night palsy, is a type of compressive peripheral neuropathy and a diagnosis that chiropractors should be familiar with. Diagnostic ultrasound is a viable imaging modality to evaluate the extent of nerve damage in these patients. Neural mobilization (nerve flossing) may be an effective conservative treatment option for patients experiencing radial nerve palsy. (This is a conference presentation abstract and not a full work that has been published.)

#### **Imaging findings in a case of spontaneous resolution of syringomyelia**

*Gannon Brochin, Angelica Miller, Lauren Tollefson*

**Objective:** To describe the magnetic resonance imaging (MRI) findings of a patient who had spontaneous resolution of cervical syringomyelia from 2013 to 2021. **Clinical Features:** Serial imaging was submitted to a chiropractic radiologist of a 33-year-old male patient. In 2013, he experienced a traumatic motor vehicle incident that resulted in the loss of consciousness. Emergency department evaluation resulted in a diagnosis of concussion. The patient described symptoms of suboccipital neck pain that wrapped to his eyes rated 7 out of 10 with dizziness upon postural changes. He did not report symptoms of altered sensation in the upper extremity. **Interventions and Outcomes:** After a trial of care, MRI in 2016 revealed a syringomyelia of the cervical cord at C5-C7 measuring 26mm in length with 5mm cerebellar ectopia. He sought physical therapy and occasional chiropractic care. Repeat MRI in 2019 demonstrated minimal enlargement of the syringomyelia (27.4mm). Over time, the patient experienced intermittent symptom improvement. Follow-up MRI in 2021 demonstrated complete resolution of the syringomyelia. **Conclusion:** Patients with syringomyelia have rarely been reported to have spontaneous resolution. This case outlines the rare scenario of syringomyelia formation without Chiari malformation that spontaneously resolved. (This is a conference presentation abstract and not a full work that has been published.)

#### **Systematic review of virtual spinal examination component reliability and validity**

*Frank Bucki, Victoria Benschel, Brittny Walters, Clarice Wallert*

**Objective:** Systematically review the literature for reliability and validity of real-time video-based spine examination components. **Methods:** Medline database search keywords virtual, telerehabilitation, telehealth, telemedicine, spine, spinal, neurologic, exam, cervical, thoracic, lumbar, and back. **Inclusion criteria:** comparative studies, live video based. **Exclusion criteria:** artificial intelligence, virtual reality. Two reviewers captured data using PRISMA-P standards. Methodological quality assessed with SIGN checklist. **Results:** 2,232



studies culled, resulting in 6 studies ( $n = 242$ ). Sample sizes from 11 to 100. SIGN quality of evidence was acceptable for all studies. Two cervical region studies suggest high validity and reliability inspection, CN testing, pain localization, ROM, and deep neck flexion endurance. Four lumbar studies suggest poor reliability of posture, good reliability inspection, significant to excellent reliability SLR, excellent reliability Sorensen test, significant to excellent reliability ROM, good reliability lower extremity muscle testing, and very good reliability sensory deficits and pain localization. Conclusion: The literature suggests that live video-based inspection, ROM, some orthopedic tests, and lower extremity neurologic components of the cervical and lumbar regions may be reliable. There exists a paucity of evidence for palpation, thoracic region exams, validity of lumbar exam components, and upper extremity neurologic components. (This is a conference presentation abstract and not a full work that has been published.)

#### **Integrating chiropractic care and Tai Chi training for the treatment of chronic nonspecific neck pain in nurses**

*Wren Burton, Matthew Kowalski, Dan Litrownik, Peter Wayne*

**Objectives:** Chronic nonspecific neck pain (CNNP) is prevalent among healthcare workers, particularly nurses. Recommended non-pharmacological approaches for CNNP are exercise and manual therapies. Together, these treatments may synergistically target multiple therapeutic pathways. The purpose of this current study was to assess the feasibility and trends in effectiveness of combined multimodal chiropractic care and Tai Chi for CNNP in nurses. **Methods:** We are conducting a single-arm mixed-methods pilot trial of 16 weeks of multimodal chiropractic care and Tai Chi for 20 Mass General Brigham nurses with CNNP. Primary outcomes are feasibility of recruitment, retention, and adherence. Clinical outcomes include neck pain, disability, and a battery of functional, cognitive, affective, and work-related performance assessments. **Results:** Of 57 screened, 17 have been enrolled. Retention and adherence rates are 82% and 62%, respectively. Preliminary data from first 10 participants showed clinically meaningful reductions in both pain severity (mean change  $-2.2 \pm 1.14$ ) and disability (mean change  $-4.4 \pm 2.17$ ) from baseline to 16-week follow-up. Multiple secondary outcomes also exhibited positive trends. **Conclusions:** Along with qualitative feedback regarding facilitators and barriers to participation, these preliminary findings support a future randomized trial evaluating the combined benefits of multimodal chiropractic care and Tai Chi for CNNP. (This is a conference presentation abstract and not a full work that has been published.)

#### **Clinical pathway accessibility and utilization trends of complementary and integrated health services among older adults across 5 VA Healthcare systems**

*Robert Butler, Alec Schielke, Robert Walsh*

**Objective:** Assess access and utilization rate of VA's Whole Health program in response to the anticipated demographic changes and an aging veteran population, with a highlight on both patient and clinician values, in respect to current guidelines when considering treatment options. **Methods:** Cumulative data/CPT and clinic codes were pulled for retrospective review from FY2018-22 across 5 health care systems comprising VA's VISN 21. All CIH List 1 services plus chiropractic were considered, which includes: acupuncture, massage, tai chi/ qi gong, yoga, biofeedback, clinical hypnosis, and mindfulness-based stress reduction. The data was reviewed for those aged 65 and older, and manually analyzed for trends and an opportunity for commentary. **Results:** Conventional care (chiropractic care) use ranged from 1.4% to 4.3% in 2022, in contrast to a general U.S. utilization rate around 15%. Total CIH use (without chiro) was 2.49% among adults aged 65+. 75% of CIH utilization was acupuncture. **Conclusions:** Chiropractic and CIH List 1 services demonstrate continued underutilization. Possible considerations include population/provider bias, lack of resources/access, and lack of education on available interventions. (This is a conference presentation abstract and not a full work that has been published.)

#### **Posterior cervical spine muscle vibration in young adults with mild traumatic brain injury: Is there a non-brain-based contributor to visual symptoms?**

*Alice Cade, Phil Turnbull*

**Objective:** To establish if vibrational interference of spinal proprioceptive inputs affects optometric function after mild traumatic brain injury (mTBI). Using computerized eye-tracking, outcome measures included a battery of oculomotor and selective attention tests, previously shown to be reliable, including egocentric localisation, fixation-stability, smooth-pursuits, saccades, Stroop, and the vestibulo-ocular reflex (VOR). **Methods:** A single-session intervention study where 20 healthy and 20 age-matched young adults with mTBI had their baseline oculomotor and cervical spine function (flexion-relaxation-ratio, FRR) recorded. Vibratory stimulus (100Hz) was applied to the cervical spine and the test battery was compared. **Results:** At baseline, there was a significant difference between the mTBI and control groups, with mTBIs performing more poorly for most outcomes. After vibration, significant pre to post differences ( $p < .05$ ) were seen between the mTBI and control group for the FRR, egocentric localisation, fixation stability, pursuits, saccades, Stroop, and VOR.

**Conclusion:** Cervical spine vibration tended to improve performance in the mTBI for VOR, Stroop, and pursuits, but had mixed effects on the control group. This suggests that optometric mTBI symptoms involve some abnormal spinal or proprioceptive input, as altering proprioceptive input appears to impact visual outcomes. (This is a conference presentation abstract and not a full work that has been published.)

#### **Quantifying biomechanical and neurophysiological markers of joint dysfunction during spinal manipulation in an ovine cervical spine model**

*Christopher Colloca, Robert Gunzburg, Deed Harrison, Jeb McAviney, Mostafa Hegazy, Brian Freeman*

**Objective:** The objective of this study was to quantify neuromechanical responses from spinal lesions during spinal manipulation. **Methods:** Induced annular injury in 15 merino wethers confirmed degeneration of the C3-C4 intervertebral disc. Fourteen animals served as controls. After 6 months, bipolar platinum electrodes and nEMG electrodes were placed at C3-C4 bilaterally. Repeated measures Impulsive (2 msec) spinal manipulative thrusts (SMTs) were delivered to the left C3 lamina (72 N peak) equipped with an impedance head blinded to group allocation. Peak-to-peak (p-p) accelerations, displacements, nerve, and nEMG responses were compared. **Results:** Histopathological analysis confirmed distinct cervical spine disc lesions at C3-C4 in the experimental group ( $p < .001$ ). During SMTs, spinal accelerations and displacements of C3 were nearly two-fold less for the disc lesion group compared to controls ( $p < 0.0001$ ). Likewise, intersegmental C3-C4 accelerations were smaller in all 3 axes in the presence of disc lesions ( $p < 0.0001$ ). Peak-to-peak spinal nerve responses were reduced by up to 81% (left,  $p < 0.0001$ ), while 12-35% elevated neuromuscular responses were recorded at all 4 nEMG locations ( $p < .01$ ) in the disc lesion group. **Conclusion:** Neuromechanical markers provide evidence of biomechanical and neurophysiological differences in the presence of disc lesions in patients undergoing spinal manipulative care. (This is a conference presentation abstract and not a full work that has been published.)

#### **Assessing downstream healthcare utilization for low back pain among chiropractic users versus non-users in the Veterans Health Administration**

*Kelsey Corcoran, Brian Coleman, Xiwen Zhao, Lori Bastian, Cynthia Brandt, Anthony Lisi*

**Objective:** To determine if Veterans with low back pain (LBP) using on-station Veterans Health Administration (VA) chiropractic services differed in downstream LBP-related healthcare utilization compared to non-users. **Methods:** We identified a cohort of Veterans with visits between 10/01/2016-9/31/2017 containing an ICD-10 code for LBP conditions, with no LBP visits for the 6 months prior, and at VA facilities with on-station chiropractic clinics. Receiving chiropractic care was defined as 1 chiropractic visit within 6 months of the index visit. LBP-related healthcare utilization was measured as the sum of relative value units (RVUs) and work RVUs (wRVUs) of CPT codes from all visits with a LBP ICD-10 code from 6 to 24 months after the index visit. Propensity score matching controlled for demographics, comorbidities, and prior-year healthcare utilization. RVUs and wRVUs were compared between chiropractic users and non-users using weighted t-tests. **Results:** The analysis cohort contained 24,044 Veterans of which 12,022 used chiropractic services (1-on-1 match). Chiropractic users utilized more LBP-related healthcare on average than non-users (mean RVUs users=22.94, non-users=17.74, difference=5.20,  $p < 0.001$ ; mean wRVUs users=13.88, non-users=9.70, difference=4.18,  $p < 0.001$ ). **Conclusion:** An administrative data cohort of Veterans with LBP was constructed to compare outcomes between chiropractic users and non-users. (This is a conference presentation abstract and not a full work that has been published.)

#### **The beneficial effects of laser IV therapy (photobiomodulation) on grade I-III pressure wounds in a chronic quadriplegic patient**

*Patricia Estrada, Norman Kettner, Dan Underkofler-Mercer*

**Objective:** Pressure wounds are commonly encountered in patients with quadriplegia. We report the effectiveness of tissue healing with laser therapy treatment on grade I-III pressure wounds in a patient with chronic quadriplegia. **Clinical features:** The patient presented in a powered wheelchair with previously diagnosed quadriplegia-related pressure wounds ranging from grade I to grade III. NPIAP grading is classified by inspection and palpation of tissue layers. Quadriplegic-related pressure wounds occur due to prolonged pressure, shearing, and injuries. The patient reported a three-year history of chronic injury-related pressure wounds. Wounds varied from non-blanchable erythema, partial and full thickness loss, exposed dermis, extensive inflammation, and granulation. **Intervention & Outcome:** The patient underwent weekly laser treatments utilizing Class IV laser. Treatment duration ranged from weeks to months according to wound size and grade. Initial treatment began with Superficial Tissue setting on chronic  $400 \text{ cm}^2$ , 100 Hz, average power of 6.0 W, and 810 joules. Wound response progressed treatment to chronic  $100 \text{ cm}^2$ , average power of 4.5 W, and 1836 joules. Interval wound healing was demonstrated by re-epithelialization, reduced size, and grade. **Conclusion:** Class IV laser therapy provided improved tissue healing in a quadriplegic patient with grade I-III pressure wounds. (This is a conference presentation abstract and not a full work that has been published.)

**Classroom recordings: Utilization and influence on course performance***Amberly Ferguson, Lia Nightingale*

**Objective:** The goal was to assess the extent and purpose of video usage, and their impact on course performance within first year basic science courses. **Methods:** Three cohorts of first year students were invited to complete a survey regarding video usage for courses they were enrolled in the previous term. Grades were obtained for each consenting student. Statistical analysis using SPSS included descriptive statistics, ANOVA, and correlation analysis. **Results:** Overall, 245 students completed the questionnaire for an 89.7% response rate, yielding a combined 1,355 students enrolled in 18 courses. Video use was significantly associated with replacing in-person attendance ( $p < 0.001$ ). Shorter summary videos were preferred by 78% of students over full lecture recordings. Perceived helpfulness of videos was associated with heavier usage, primarily to study for exams (49% students). In-person attendance and use of videos as a replacement for attendance did not influence course performance. However, students who relied heavily on videos for exam preparation scored significantly worse on exams ( $p < 0.001$ ). **Conclusion:** Access to classroom recordings was a substitute for attending class and when used as a study tool, negatively impacted course performance. Rewatching videos to prepare for exams may be mistaken for mastery of material. (This is a conference presentation abstract and not a full work that has been published.)

**A case of primary Ewing sarcoma of the clavicle***Whitney Fuqua, Whitney Graff, Lauren Tollefson*

**Objective:** Primary malignancies of the clavicle are rare, with Ewing sarcoma representing a small percentage. The aim of this case study is to demonstrate an unusual location of this aggressive tumor and promote awareness of the effects of patient care and delay in diagnosis. **Clinical Features:** A 23-year-old male presented with a painless soft tissue mass over the left clavicle of 2 months. **Intervention and Outcome:** Initial radiographs of the clavicle performed in 2018 were reported negative. In 2019 the patient returned for care and stated the mass had become painful and increased in size. Repeat radiographs demonstrated permeative destruction and laminated periosteal reaction of the left clavicle. Follow up advanced imaging to include CT, MRI, and PET-CT characterized the lesion and demonstrated multiple areas of metastasis. Subsequent biopsy diagnosed primary Ewing sarcoma. The patient was referred for oncologic management including chemotherapy and radiation with remission post treatment. Unfortunately, the tumor recurred 2 years later, and the patient passed due to related complications. **Conclusion:** Timely diagnosis of patients with suspicious presentations through appropriate management and referral is critical to long term outcomes. This case demonstrates the unfortunate consequences of delayed diagnosis. (This is a conference presentation abstract and not a full work that has been published.)

**Assessing referral patterns to on-station chiropractic clinics within the Veterans Health Administration***Sarah Graham, Anna Sites, Xiwen Zhao, Anthony Lisi*

**Objective:** To assess referral patterns to on-station chiropractors in the Veterans Health Administration (VA). **Methods:** Manual chart review of national electronic health record data. We randomly sampled 1,000 on-station VA chiropractic visits occurring from 10/01/2017 to 9/30/2018 from patients with no such visits within the prior 12 months. Patient demographics, consulting clinics, and consultation reasons were extracted. We applied a random coefficient Poisson regression to study correlation (Incidence Rate Ratio=IRR) between patient characteristics and interval time (IT) from consultation to index visit. **Results:** In 978 cases, chart notes were identified and abstracted. In 706, consult to a chiropractic clinic was placed within 6 months of index. Most were from primary care (75.9%), pain medicine (7.8%), and physical/occupational therapy (5.8%). The most common reasons for consultation were low back (70.3%) and neck (26.9%) conditions. Mean IT was 44 days ( $SD=39.1$ ). Longer IT was seen with increasing age (IRR=1.018, CI=1.005, 1.03) and conditions other than low back (IRR=1.068, CI=1.041, 1.096). Shorter IT was seen in patients consulted from clinics other than primary care (IRR=0.963, CI=0.932, 0.994). **Conclusion:** This preliminary analysis of referral patterns to VA chiropractic clinics provides foundation for further research and quality improvement. (This is a conference presentation abstract and not a full work that has been published.)

**Chiropractic impact on neural patterns, dysmetria, and quality of life in post-rehabilitation stroke patients: 2 case reports***NiAmber Harris, Emily Drake, Margaret Sliwka, Stephanie Sullivan*

**Objective:** These reports present changes observed in neural patterns (electroencephalography), quantitative dysmetria (inertial measurement units), and quality of life (Stroke Impact Scale (SIS)) in 2 post-rehabilitation stroke patients who completed chiropractic care. **Clinical Features:** P1 is a 55-year-old male with low back pain, left side ataxia, and right-hand numbness after a stroke in 2021. P2 is a 54-year-old female with left side ataxia after a stroke in 2016. **Intervention and Outcome:** Each patient received 12 weeks of full spine diversified technique with deep tissue therapy and therapeutic exercises. P1 demonstrated a decrease in relative alpha power (44%) and

increase in delta+theta/alpha+beta ratio (104%). P2 demonstrated an increase in relative alpha power (5%) and decrease in delta+theta/alpha+beta ratio (5%). P1 demonstrated improvements in quantitative dysmetria with the affected arm: 58% decrease in travel time and 15% decrease in path length. P2 maintained limited movement of affected arm. P1 reported improvements in 6/9 SIS domains along with resolved low back pain while P2 reported improvements in 8/9 domains and increased strength in affected arm. **Conclusion:** The promising outcomes of these cases lend support for the need of more research into chiropractic management with post-rehabilitation stroke patients. (This is a conference presentation abstract and not a full work that has been published.)

**Rare mosaic trisomy 17 in a preadolescent female: Clinical presentation and management of symptoms***Allison Harvey, Erika Evans Roland, Jessica Billham*

**Objective:** This case report describes the clinical presentation of a rare trisomy 17 mosaicism to a pediatric chiropractic office. **Clinic Features:** A 10-year-old Caucasian female with an abnormal microarray suggesting a variant of uncertain significance relating to the mosaic form of Trisomy 17 presented with anxiety, aggression, motor delays, and encopresis. Past medical history and inspection included post-surgical polydactyly, low IQ, hearing impairment, altered pain perception, flat nasal bridge, gap between the first 2 toes, short neck, and low hair line. Radiographs revealed agenesis of the posterior tubercle of C1, congenital block at C2/C3, lumbarization of S1, and spina bifida occulta at S1. Diagnostic ultrasound ruled out abnormality at the sacral dimple over the spina bifida occulta findings at S1. **Intervention and Outcome:** The patient was treated with a variety of chiropractic techniques, laser, and acupuncture. Subjective improvement was obtained in 16 visits spanning 8 weeks. **Conclusion:** Mosaic Trisomy 17 is rare. This case report describes a preadolescent clinical presentation and the importance of radiographically identifying the integrity of the cervical and lumbar spine prior to choosing the approach. Chiropractic, laser, acupuncture, and co-treatment were all found to be helpful in the management of symptoms. (This is a conference presentation abstract and not a full work that has been published.)

**Comparison of mistakes on multiple-choice question and fill-in-the-blank: A retrospective analysis***Xiaohua He*

**Objective:** To compare the number of mistakes (NoMs) on multiple-choice question (MCQ) and fill-in-the-blank (FIB) in anatomy lab exams. **Methods:** This was a retrospective study. Every student received both MCQ and FIB questions. The study cohorts were divided into 3 tiers based on the grades: low-tier (18-29 points), middle-tier (30-39 points), and high-tier (40-49 points). To compare the NoMs between MCQs and FIBs, a student t-test was used. The NoMs of both across 3 tiers were compared using a 1-way-ANOVA. **Results:** There was statistical difference of NoMs between FIB and MCQ (FIB:  $2.67 \pm 1.74$ ; MCQ:  $1.18 \pm 1.39$ ,  $p < 0.001$ ). The NoMs between 2 in the high and middle-tiers also had statistical differences (high-tier: MCQ  $0.72 \pm 0.79$ , FIB  $1.13 \pm 0.79$ ;  $p < 0.001$ ; middle-tier: MCQ  $3.04 \pm 1.28$ , FIB  $3.43 \pm 1.65$ ;  $p < 0.001$ ); but there was no statistical difference between 2 in the low-tier (MCQ:  $6.56 \pm 1.67$ , FIB  $6.89 \pm 1.74$ ;  $p > 0.05$ ). There were statistical differences of NoMs on MCQ and FIB among 3 tiers by 1-way-ANOVA (MCQ:  $F_{2, 140} = 84.52$ ,  $p < 0.001$ ; FIB:  $F_{2, 140} = 125.85$ ,  $p < 0.001$ ). **Conclusion:** Students performed better on the MCQ than on the FIB in general. Low-tier students struggled with both formats, implying that these scores could be used as an indicator to identify students at risk of failure. (This is a conference presentation abstract and not a full work that has been published.)

**Chiropractic management of a 29-year-old male with foot drop: A case study***Jesse Hodges, Misty Lagasse*

**Objective:** This report will demonstrate chiropractic management of a patient with acute onset foot drop. **Clinical Features:** 29-year-old male patient presents with acute low back pain, paresthesia, and abnormal gait in the right lower extremity. Exam findings reveal right-sided inability to heel walk, L5 myotome weakness, L5 dermatome hypoesthesia, muscle spasm in bilateral lumbar paraspinals, quadratus lumborum, and right-sided gluteals. **Intervention and Outcome:** The patient was treated with lumbar flexion/distraction, Thompson technique to the sacrum and prone diversified to the thoracic spine. PNF stretching was performed to gluteals, piriformis, and hamstrings, and lower limb nerve tension was rendered on the right. The patient was given at home exercises including stretching, active/passive right foot dorsiflexion instructions, and nerve flossing techniques. After 5 visits over a 2-week period the patient had complete resolution of all symptoms. **Conclusion:** Foot drop occurred due to irritation to the L5 nerve root. Adjustments, including flexion distraction, lower limb nerve tension, and treatment to associated soft tissue are all vital in management of a nerve root condition. Lower limb nerve flossing in particular reduces irritation and tension to the affected nerve and should be considered in cases of radiating symptoms. (This is a conference presentation abstract and not a full work that has been published.)

### Analysis of coordination between contralateral arm and thigh movements during walking

Ronald Hosek, Brent Russell, Claude Maysonet

**Objectives:** In healthy people walking at a preferred speed, one arm swing is typically coordinated with one contralateral thigh swing for a given stride. Such synchronization may be disrupted with some neurological conditions. This study was designed to assess the capabilities of cross-correlation (CC) and relative continuous phase (RCP) methodologies for discriminating and quantifying such coordination disruptions. **Methods:** Ten healthy volunteers underwent 2 one-minute treadmill walking trials, one while wearing one ankle weight or one shoe (ASYM) and the other with no encumbrance (SYM). Arm and thigh movements were tracked with inertial measurement units. Data streams from each sensor were arbitrarily referenced to left-thigh maximum extension and further processed yielding signals representing time-averaged normalized signatures of a single step. These normalized signatures were utilized for RCP and CC analyses. **Results:** RCP analyses typically demonstrated a 2-4% phase lag between the ASYM and SYM trials on the encumbered side. The CC analyses graphically mirrored these phase relationships while also demonstrating a very strong coherence between contralateral thigh-shoulder flexion-extension. **Conclusions:** The analytical methods appeared capable of discriminating changes in contralateral arm and thigh movements during induced asymmetrical walking. These methods will be used future chiropractic studies. (This is a conference presentation abstract and not a full work that has been published.)

### Clinical headache status of teleworkers with primary headache and coping strategies during the COVID-19 pandemic

Marieve Houle, Julien Ducas, Arnaud Lardon, Martin Descarreaux, Andree-Anne Marchand, Jacques Abboud

**Objectives:** The objectives were (1) to compare the clinical headache status between teleworkers with migraine and tension-type headache (TTH) and (2) to determine the association between coping strategies and headache frequency, and intensity in the context of the COVID-19 pandemic. **Methods:** 284 teleworkers (127 with migraine and 157 with TTH) were recruited. Sociodemographic data, information related to work factors, headache clinical features, coping strategies used during the COVID-19 pandemic, clinical headache status were compared between headache profiles. Bivariate logistic regression analyses were used to determine the association between coping strategies and headache frequency, and intensity. **Results:** Results showed that teleworkers with migraine had longer and more painful headache episodes than teleworkers with TTH ( $p < 0.001$ ). Teleworkers with migraine used the acceptance strategy more than those with TTH ( $p = 0.042$ ). Migraine frequency was associated with denial ( $p = 0.005$ ) while migraine intensity was associated with positive reframing ( $p = 0.014$ ). TTH frequency was associated with venting ( $p = 0.007$ ), self-blame, and behavioral disengagement ( $p < 0.014$ ) while TTH intensity was associated with substance and behavioral disengagement ( $p < 0.030$ ). **Conclusion:** Coping strategies associated with headache frequency and intensity were different between groups. (This is a conference presentation abstract and not a full work that has been published.)

### Functional MRI brain mapping of manual therapy in chronic low back pain: A narrative review

Janelle Hynes, Norman Kettner

**Objective:** Structural and functional neuroplastic alterations in the processing of brain regions characterize the development, maintenance, and the therapeutic resolution of chronic pain. The role of manual therapy (MT) in the management of chronic low back pain (cLBP) has clinical and research support as an intervention, but underlying neural responses are controversial. We report the results of a narrative review identifying controlled studies using fMRI brain mapping as an outcome measure of MT in cLBP. **Methods:** Existing literature was searched using selected terms and multiple digital databases including PubMed, Google Scholar, JSTOR and Science Direct to identify research reports of controlled studies in which fMRI was used to map brain responses to MT in cLBP. **Results:** Four eligible English language studies were identified meeting the specified search criteria. MT interventions ranged from lumbar spinal massage to spinal joint mobilization and spinal manipulation (HVLA). All studies reported interval pain reduction, and improved fMRI brain responses in areas of pain network processing of sensorimotor, cognition and emotion after MT, compared to controls. **Conclusion:** Understanding neuroplastic cortical structural and functional neuroplastic alterations underlying improved MT clinical outcomes could guide new therapeutic targets and improve patient outcomes in cLBP. (This is a conference presentation abstract and not a full work that has been published.)

### Report of electroencephalography data from a sample of student rugby players in a chiropractic program

Dale Johnson, Krista Ward, Monica Stith

**Objective:** Contact sports have a high concussion risk. Baseline electroencephalogram data was collected for student rugby players, which could be compared to post-concussion data in case of incident(s). **Methods:** WAVi technology was used to acquire electroencephalogram data from a convenience sample of 17

rugby players. Reaction times for the visual Trail Making A & B tests and audio P300 somatosensory evoked potentials were obtained and statistically analyzed in STATA. Results for participants were compared to age and gender adjusted normative target ranges. **Results:** Data from 2 EEG scans were unusable due to artifacts. The average auditory P300 reaction time ( $n = 15$ ) was 303.33 ms and the average P300 voltage was 11.95  $\mu V$ . The average time for the Trail Making A and B tests were 44.20 ms and 75.13 ms. Four students performed slower on the Trail Making B test than their target ranges and four students had lower voltages than their target ranges for P300. **Conclusion:** Additional research is needed to understand the clinical significance of findings outside target ranges. We do not know from this cross-sectional study if athletes had head injuries prior to baseline data or if results are generalizable to other rugby players. (This is a conference presentation abstract and not a full work that has been published.)

### Physical activity guidelines in American youth: A cross-sectional study of the 2020 National Health Interview Survey to identify predictors

Claire Johnson, Bart Green, Igor Himelfarb, Edward Kane

**Objective:** The purpose of this study was to identify biopsychosocial factors associated with American youth meeting physical activity guidelines and to present a prediction model. **Methods:** This was a secondary analysis of the National Health Interview Survey sample child data ( $n = 3,988$ ). A 3-step logistic regression predicted children most likely to meet physical activity goals. Independent variables were grouped into biological, psychological, and sociological categories and these blocks were added to the model in that order. **Results:** The strongest predictor in meeting physical activity guidelines was if a child performed strengthening exercises, OR = 4.34,  $p < .01$ . Other strong predictors ( $p < .01$ ) included playing sports OR = 1.65; attending physical education classes OR = 1.49; walking at least 10 minutes per day OR = 2.41; biking at least 10 minutes per day OR = 1.43; and screentime less than 2 hours a day OR = 1.28. **Conclusion:** American youth were more likely to meet PA guidelines if they participated in strengthening exercises, played sports, and other modifiable behaviors. This model may help chiropractic providers make informed decisions about factors associated with children and adolescents' daily physical activity, preventive screening, and public health policy. (This is a conference presentation abstract and not a full work that has been published.)

### Chiropractic management of a Veteran with post-colex interlaminar stabilization spine pain: A case report

Jane Joyce, Gina Bonavito-Larragoite

**Objective:** The purpose of this case report is to describe the conservative treatment of a patient presenting to the chiropractic clinic with chronic low back pain status post spinal decompression with Coflex interlaminar stabilization. **Clinical Features:** A 77-year-old Hispanic male presented to the chiropractic clinic at the Miami Veterans Affairs Medical Center with a complaint of chronic low back pain secondary to surgery. An associated regional assessment of the lumbar spine ensued. Radiological imaging revealed laminectomy and posterior fusion with Coflex interlaminar device at L3-4/ L4-5 levels. This study describes the outcome experienced by the patient receiving lumbar spine chiropractic manipulation. **Intervention and Outcome:** A trial of conservative care was performed for 4 visits throughout 5 weeks. It consisted of lumbar spine chiropractic manipulation in the form of flexion/distraction, with self-management strategies including flexion-based stretches. After 4 visits the patient's chronic pain remained baseline with an increase in activity. **Conclusion:** The patient denied adverse effects to spinal manipulation and onset of new symptoms post-treatment. Further investigation is needed to determine the benefit of spinal manipulation in patients with Coflex interlaminar stabilization device, but this study has shown the absence of adverse effects. (This is a conference presentation abstract and not a full work that has been published.)

### Educational leadership in developing an age-friendly health system in a chiropractic academic health center: Project, process, and pre/post assessment of geriatrics students

Lisa Killinger, Judy Bhatti, Elissa Twist

**Objective:** This presentation is part of a project to develop the first Age Friendly Health System within the chiropractic profession. Following WHO/Institute for Healthcare Improvements guidance. This multi-faceted project focuses on academics, research and clinical practice enhancements. This presentation focuses on an educational intervention and assessment of students in a Geriatrics class on the 4s of Age Friendly Practice (AFP). **Methods:** An initial educational intervention assessed and trained students in the geriatrics course on the 4Ms of AFP. This included a pre/post assessment (using a 4-point Likert scale) on knowledge before and after this one-hour intervention. **Results:** Prior to the intervention, most students ( $N = 65$ ), reported little (2.7%) or no (96.6%) knowledge on the 4s of AFP. After training, students reported moderate (25.4%), good (46.6%) or very good knowledge (24.2%) of implementing the 4Ms of AFP, and qualified changes they will make in patient care from this knowledge. Details on educational aspects of this project/future interventions/program development will be shared. **Conclusion:** With focused educational interventions, students have gained knowledge of the 4Ms of Age-Friendly



practice. This initial step sets the stage for detailed program development and further research over the next 1-2 years. (This is a conference presentation abstract and not a full work that has been published.)

#### **Educational leadership in developing an age-friendly health system in a chiropractic academic health center: Project, process, and pre/post assessment of clinical faculty**

*Lisa Killinger, Judy Bhatti, Elissa Twist,*

**Objective:** This presentation is part of a project to develop the first Age Friendly Health System within the chiropractic profession. Following WHO/Institute for Healthcare Improvements guidance. This multi-faceted project focuses on academics, research and clinical practice enhancements. This presentation focuses on clinician education on the 4s of Age Friendly Practice (AFP). **Methods:** An initial 1-hour educational intervention assessed and trained faculty clinicians on the 4s of AFP. This included a 4-point Likert scale pre/post assessment on knowledge before and after this intervention. **Results:** Prior to the educational interventions, the vast majority of clinical faculty (N=19), had little (21.0%) or no (73.7%) knowledge on the 4Ms of AFP. Following the training, faculty reported moderate (50.0%), good (35.5%) and very good (11.8%) knowledge of the 4 Ms. Additionally, qualitative descriptions provided by clinicians showcase ways this knowledge will be implemented into patient care. Details of the project and future interventions and program development pieces will be shared. **Conclusion:** With focused educational interventions, faculty have gained knowledge of the 4Ms of Age-Friendly practice. This initial step sets the stage for detailed clinical program development interventions and further research over the next 1-2 years. (This is a conference presentation abstract and not a full work that has been published.)

#### **Diagnosis of acute middle cerebral infarct with atypical presentation in a patient with cervical vascular compromise**

*Kyle Klinginsmith, Alec Schielke, Robert Walsh, Robert Butler*

**Objective:** Demonstrate a case highlighting essential proficiencies of providers in a hospital-based chiropractic setting. **Clinical Features:** A 75-year-old male initially referred from same day urgent care for chronic pain management, with past medical history of multiple arterial occlusions and cervical instability, presented for routine appointment regarding neck and hip pain. He presented with confusion and heaviness in the bilateral lower extremities. **Intervention and Outcome:** Initial neurological examination performed in the chiropractic clinic revealed no gross deficits. However, the patient demonstrated clear personality change and difficulties with instructions and recall tasks. He was referred to the ED, where he was nearly discharged following a neurological check that revealed memory problems without progressive changes. After discussion with the chiropractic team, a neurology consult was placed, which concluded that there was merit for advanced imaging. This revealed a middle cerebral artery infarct, and the patient was admitted for post-stroke care. **Conclusion:** A case study featuring emergent referral and diagnosis of an acute middle cerebral artery infarct after presentation to a chiropractic/acupuncture clinic with confusion but otherwise normal CN examination. (This is a conference presentation abstract and not a full work that has been published.)

#### **The role of the chiropractor in triage and self-efficacy: A case report**

*Ian Le, Nathan Hinkeldey, Heather Meeks, Gina Percuoco*

**Objective:** To describe the diversity of roles held by the chiropractor working in an interdisciplinary clinical setting. **Clinical Features:** A 67-year-old male reported to hospital-based chiropractic clinic with chief complaint of chronic low back and neck pain. Pain regimen included trazadone and lidocaine patches, without physical therapy, chiropractic care or other medical intervention. Relevant past medical history includes history of alcohol abuse, cardiomyopathy, and transient ischemic attack. **Intervention and Outcome:** Lumbar spine x-rays indicated compression deformity of unknown age at L2/L3, prompting coordination with PCP for follow up DEXA, leading to diagnosis of osteoporosis and identification of a caution to spinal manipulation. End range loading was trialed, resulting in centralization of symptoms. At a follow up visit, the patient presented with a new complaint of cervicalgia and subjective description of TIA the night, prompting consultation with the emergency department for formal workup and evaluation for TIA. **Conclusion:** This case highlights the role of the chiropractor in identification of imaging findings requiring coordination and follow up studies, as well as an important role in diagnostic triage. Additionally, imaging suggesting caution with manipulation, resulted in implementation of end range loading, allowing for resolution and improved self-efficacy. (This is a conference presentation abstract and not a full work that has been published.)

#### **The COVID-19 pandemic faculty stress: Are we all burnt out?**

*Christine Major, Kara Burnham, Suzanne Lady*

**Objective:** The purpose of this study was to measure chiropractic faculty stress during the height of the COVID-19 pandemic. **Methods:** Full-time chiropractic faculty were surveyed anonymously regarding measures of stress and burnout related to remote and on campus teaching. They were instructed to reflect on the period of March 2020-March 2021. A five-point Likert scale was utilized to respondents' reactions to 21 closed-ended questions. **Results:** The survey

request yielded 36 respondents. The majority of respondents, 66%, worked partially at home and partially on campus, while 26% worked entirely from home and 8% entirely on campus. In addition to work responsibilities, 31% of respondents were educating children at home. Nearly 2/3 of respondents (61%), indicated that they did not stop working at the end of the workday and 47% indicated that they felt stressed at work. However, 72% of respondents indicated that they were able to create a productive learning environment for students. **Conclusion:** Chiropractic faculty variably experienced stress during the height of the COVID-19 pandemic. This may be due to working remotely and an absence of separation of home and work life. Despite teaching and work-related stressors, faculty created a positive learning environment for students. (This is a conference presentation abstract and not a full work that has been published.)

#### **The effect of evidence-based triage versus usual medical management on low back pain patient outcomes and trajectories in a tertiary care setting**

*Janny Mathieu, Julie O'Shaughnessy, Claude-Edouard Chatillon, Cesar Hincapie, Petra Schweinhardt, Marie Beausejour, Charles Tettreau, Martin Descarreaux, Andre-Anne Marchand*

**Objective:** This study aims to evaluate and compare the effects of evidence-based triage on low back pain (LBP) patients' clinical outcomes and care trajectories in a tertiary care setting. **Methods:** Fifty patients (18 years old), scheduled in the neurosurgery outpatient clinic with a primary complaint of LBP, underwent a 2-step evidence-based triage intervention prior to their medical consultation. Using a standardized clinical note, the working diagnosis, risk stratification and referral need were communicated to the neurosurgeon for only half the group (n=25), based on a computer-generated randomization sequence. Neurosurgeons then performed their own patient evaluation to determine the best management strategy. Clinical and patients' trajectory outcomes were measured at baseline, at 1 week, 3-, 6-, and 12-months follow-up. **Results:** At baseline, 44.9% of patients evaluated exhibited a clinical profile that did not warrant a neurosurgery consultation. Patients that were inappropriately referred showed significantly higher quality of life scores and lower levels of disability. Follow-up data will also be presented. **Conclusion:** Unnecessary referrals to medical specialists highlight the gaps between practices and evidence-based guidelines. Evidence-based triage by chiropractors may play a significant role in promoting appropriate and timely access to public health care services. (This is a conference presentation abstract and not a full work that has been published.)

#### **Arm swing symmetry in walking with induced lower limb asymmetry**

*Claude Maysonet, Brent Russell, Kate Hayes*

**Objectives:** During an investigation of arm swing during walking, we experimentally induced asymmetry in participants' lower limbs, with a premise that asymmetry would also manifest in the upper limbs. **Methods:** Ten volunteers walked on a treadmill in a typical manner, and again while wearing one ankle weight or only one shoe. Movement was tracked with inertial measurement units. A smoothing function in a Python app approximated flexion and extension endpoints for the hips and shoulders; symmetry was calculated with an established formula. Standard video recordings were made for a future study. **Results:** In comparison to typical walking, the induced condition increased asymmetry for hip flexion (typical: 12.8% vs. induced: 20.1%) and the calculated midpoints for overall ranges (52.4% vs. 91.2%); flexion was less consistent step-to-step. However, shoulder motions were more symmetrical (e.g., range 22.9% vs. 12.7%) and more consistent. **Conclusions:** The induced condition decreased asymmetry in shoulder motions; participants seem to have compensated. These results will be compared to visual perceptions of the video recordings and will help shape our expectations for patients in a patient care study. (This is a conference presentation abstract and not a full work that has been published.)

#### **Rapid resolution of chronic lumbar stenosis symptoms using an exercise based approach: A case study**

*Eleni Metrou, Nathan Hinkeldey, Heather Meeks, Mandy Wong*

**Objective:** To describe a case of symptomatic lumbar spinal stenosis that resolved rapidly following exercise. **Clinical Features:** A 75-year-old male presented to a hospital-based chiropractic clinic with 5 year history of progressive central low back pain. Lumbar spine x-rays indicate DISH, central canal stenosis, and neural foraminal narrowing. Functionally, he was limited to walking 50 yards at a time due to his back pain. **Intervention and Outcome:** Supine posterior pelvic tilt exercises implemented on the first visit resulted in the ability to walk 200 feet in clinic. In subsequent visits, a multimodal treatment plan including posterior pelvic tilt exercises, cupping therapy, and general graded walking was trialed 2 additional visits over 6 weeks. On the fourth visit, the patient reported a complete resolution of low back pain and reported walking 200-300 yards without pain. **Conclusion:** This case suggests implementation of posterior pelvic tilt exercises, in combination with manual therapy and walking was beneficial in alleviating symptoms caused by spinal lumbar stenosis in this case. (This is a conference presentation abstract and not a full work that has been published.)

### Chiropractic management of a US Veteran with spine pain and concurrent brachial monomelic amyotrophy (Hirayama disease): A case report

Kevin Meyer, Morgan Price, Sarah Page, Clinton Daniels

**Objective:** Monomelic amyotrophy (MMA), also known as Hirayama Disease, is a rare, self-limiting motor neuron disease manifesting as atrophy of the C7-T1 innervated muscles. We present a case report describing chiropractic management of neck and thoracic pain in a patient with known MMA. **Clinical Features/Interventions and Outcome:** A 30 year-old black male U.S. veteran with MMA, presented with myofascial pain of the neck, shoulder and back. A trial of chiropractic care was completed involving spinal manipulation of the thoracic spine and cervicothoracic region, manual and instrument assisted soft tissue mobilization, and home exercise prescription. The veteran realized modest improvement in pain intensity and did not experience any adverse events. **Conclusion:** This case depicts the first documentation of chiropractic services in musculoskeletal pain management of a patient with concurrent MMA. There is currently no guidance in the existing body of literature for safety and effectiveness of manual therapy in this population. (This is a conference presentation abstract and not a full work that has been published.)

### Bridging the gap between biomedical and biopsychosocial models in chiropractic teaching clinics: A series of targeted educational interventions

Kristin Miller, Patrick Boylan, Norman Kettner, Katherine Pohlman

**Objective:** Examine impact of students' knowledge and understanding of pain neuroscience (PN), patient-centered care (PCC), and chronic back pain (CBP) after attending a targeted educational intervention. **Methods:** Stratified randomization allocated interested 7th term chiropractic students (n=281) from 2 universities into 3 different educationally targeted intervention groups. Interventions were 50 minute lectures on PN, PCC, or CBP. Students completed pre and post-questionnaires that included a validated survey assessing each lecture content. Independent sample t-tests evaluated changes amongst the groups. Follow-up questionnaires are scheduled for 6 and 12-weeks. **Results:** Of the 157 (55.9%) participating students, 51.9% were males with a mean age of 26.4 (4.20SD) years and mean GPA of 3.38 (0.34SD). While all groups had improvement in their specific questionnaire, the PN group did not have a statistically significant difference (PN 3.99/100, p=0.18; CBP 0.42/7, p=0.02; PCC 0.25/6, p=0.05). **Conclusions:** These results support the practicality and immediate effectiveness of incorporating PN, PCC, and CBP targeted interventions into the training of chiropractic students. (This is a conference presentation abstract and not a full work that has been published.)

### Clinical research screening of chiropractic patients at a teaching clinic

Zakary Monier, Katie Pohlman

**Objective:** Evaluation of efforts to screen new patients for clinical research studies at a chiropractic teaching clinic. **Methods:** New patients were screened for study eligibility from February to August 2022 (24weeks). Different strategies were implemented throughout the study to help increase screening rates: QR code linked to study screening survey in clinician's pods for interns to ask new patient to participate (week1), biweekly clinician updates (week1), incorporating QR code into new patient paperwork that front desk staff distributed (week3), notification emails to interns/clinicians for new patients (week5), and clinic signage (week10). **Results:** Of the 2319 new patients, 503(21.7%) were successfully screened at the clinic. The lowest screening rate occurred in week 1(17.2%) with the highest occurring in week 6(38.8%). Rates decreased from there with slight fluctuations around the 21.7%. **Conclusion:** There is much value for clinical research to be conducted within chiropractic teaching/academic clinics, including the growth of research data and the ability for students to participate in research. For research to be successfully done, recruitment and fidelity to a study protocol (such as screening of consecutive patients) are crucial. There is a need to shift clinic culture to one of an academic clinic with ongoing research efforts. (This is a conference presentation abstract and not a full work that has been published.)

### A cross-sectional study of Australian chiropractors' and students' readiness to identify and support patients experiencing intimate partner violence

Keri Moore, Lyndon Amarin Woods, Deisy Amarin Woods, Dein Vindigni, Navine Haworth,

**Objective:** To explore Australian chiropractors' and final year students' readiness to identify and support patient's experiencing Intimate Partner Violence (IPV). **Methods:** This cross-sectional study used the Chiro-PREMIS, an adaptation of the Physician Readiness to Manage Intimate Partner Violence Survey (PREMIS) to explore readiness. Responses were analysed through a lens of Miller's framework for developing clinical competence and the chiropractic graduate competencies. **Results:** Ninety nine chiropractors and forty one students. Twenty one percent of chiropractors and twenty percent of students consulted with patients who had disclosed they were involved in IPV during the 4-weeks prior to taking the survey. Many are unclear about appropriate questioning techniques, documentation, referrals, identifying available resources, and have limited legal literacy. Respondents do not know about IPV, they

don't know how to and may not be able to show how or do when it comes to managing IPV related clinical scenarios. **Conclusion:** With the right preparation, chiropractors have an opportunity to make a positive contribution to this social problem. Chiropractic-specific discourse surrounding these escalating growing social concerns will highlight the intent of the chiropractic profession to make a substantial contribution to the healthcare of the Australian public. More studies are needed. (This is a conference presentation abstract and not a full work that has been published.)

### Assessing quality indicators and guideline-concordance in chiropractic low back pain visits in the Veterans Health Administration

Ryan Muller, Sarah Graham, Anna Sites, Kelsey Corcoran, Anthony Lisi

**Objective:** To assess the presence of select history and examination quality indicators, and guideline-concordant treatments, in initial chiropractic visits for low back pain (LBP) in the Veterans Health Administration (VA). **Methods:** Manual chart review of national electronic health record data. We randomly sampled 1,000 on-station VA chiropractic visits occurring from 10/01/2017 €-9/30/2018 from patients with no such visits within the prior 12 months. Characteristics of visits for LBP were extracted. Frequencies of previously published history and examination quality indicators and guideline-concordant management options for acute/subacute and chronic LBP were identified. **Results:** In 739 visits meeting criteria, general medical history, physical examination, and neurological examination were documented in 76%, 78%, and 64% of cases respectively. Identification of acuity and LBP management occurred in 556 visits, of which 59(11%) were acute/subacute and 497(89%) chronic. One or more recommended treatments occurred in 100% of acute/subacute visits [including high-velocity low-amplitude (HVLA) spinal manipulation (64%), education/advice (59%) and manual soft tissue (56%)] and 97% of chronic [including education/advice (65%), HVLA spinal manipulation (64%), and therapeutic exercise (40%)]. **Conclusion:** This assessment of quality in VA chiropractic care for LBP highlights the need for additional work to understand and optimize care delivery. (This is a conference presentation abstract and not a full work that has been published.)

### When hip pain is septic: A case report

Casey Mullen, Kelsey Lewis

**Objective:** Describe historical and clinical features of septic arthritis in a patient with recent history of streptococcus mitis bacteremia and highlight the importance of appropriate case management. **Clinical Features:** A 56-year-old female with a recent history of streptococcus mitis bacteremia was referred by her primary care provider (PCP) to chiropractic integrated within a Federally Qualified Health Center for evaluation of acute left hip pain. At exam, she presented with a limp, Trendelenburg sign, and a positive Thomas test, all indicative of effusion, increasing concern for septic arthritis. Recent lab analysis ordered by her PCP was unremarkable. **Intervention and Outcome:** The patient was referred to the emergency department where the diagnosis was clinically established as septic arthritis pending confirmation by joint fluid culture. The patient was lost to follow up. **Conclusion:** It is imperative for clinicians to understand and correlate the patient's history with pertinent clinical features of septic arthritis. Considering the short-term sequelae of infection, it is important to be aware that infectious processes, although rare, may occur despite the presence of standard lab results and may present clinically as hip osteoarthritis. (This is a conference presentation abstract and not a full work that has been published.)

### Conservative treatment for Achilles enthesopathy/plantar fasciitis

Baldomero Nunez

**Objective:** This describes presentation of chronic Achilles enthesopathy, plantar fasciitis of patient that failed conservative medical management for 6 months prior to presenting at this office. **Clinic Features:** A 51 year-old female Billing Coordinator presented with right heel/ankle pain with 6 months duration and worsening symptoms. The patient described the pain as constant 6/10 and increasing to 8/10 with walking. Patient was treated initially by Nurse Practitioner with Naproxen, Plantar Fasciitis Brace, and Compression Sock that was worn constantly. Radiographs denoted enthesophyte formation at the Achilles Tendon insertion at posterior calcaneus and plantar fascial attachment. Diagnostic Ultrasound denoted Achilles enthesopathy, with subacute sprain of anterior inferior tibiofibular ligament. **Intervention and Outcome:** Patient was treated with low-level laser, manual therapy, CMT to pelvis. Patient was treated for 6 weeks, weaned from compression sock use from 100% to 0% of time by end of treatment. Patient goals were: decrease pain, return to physical activities (like dancing and hiking), and decrease dependency of brace and compression sock. Patient was able to return to all activities, with residual episodic pain of 3/10 with overuse. **Conclusion:** Proper conservative care increased patient's outcome and goals. (This is a conference presentation abstract and not a full work that has been published.)

### Spindle cell sarcoma of bone: A rare bone sarcoma presenting in a rare age group

Aidan O'Brien, Jessica Billham, Ashley Vogt, Norman Kettner

**Objective:** We report clinical, multimodal imaging, pathological diagnosis and treatment of spindle cell sarcoma of bone. Additionally, we are reporting the



original sonographic findings of spindle cell sarcoma of bone. Clinical Features: A 28-year-old female presented to a chiropractic teaching clinic with right lower leg pain of several months. Pain was exacerbated following a fall in the shower. Initial diagnostic ultrasound of the distal right tibia to exclude fracture demonstrated anteromedial cortical irregularity without evidence of cortical destruction or pathologic fracture. Subsequent radiographic examination of the right lower leg demonstrated an expansile, centrally located lytic lesion of the distal metadiaphysis and questionable cortical destruction without soft tissue abnormality. Intervention and Outcome: The patient was seen by orthopedic oncology. Subsequent core needle biopsy of the lesion was followed by curettage and bone grafting. Spindle cell sarcoma of bone was identified. Post-operatively the patient experienced pain reduction and was supported by an assistive device. She continues to be ambulatory. Conclusion: This rare case report of spindle cell sarcoma of bone required coordinated clinical and multimodal imaging along with orthopedic surgical consultation. This is the original report of an ultrasound diagnosis of spindle cell sarcoma of bone. (This is a conference presentation abstract and not a full work that has been published.)

#### Baseline evaluation of diversity, equity, and inclusion notion in the students at a doctor of chiropractic program: A cross sectional survey

Anjum Odhwani, Pradip Sarkar

Objective: To assess the notion of Diversity, Equity, and Inclusion (DEI) at a doctor of chiropractic Program. Method: A 15 question survey curated questionnaire was implemented to 2 student cohorts, trimesters 3 and 7. Likert scale was used for most questions. Result: 49(16%) students completed the survey. 88% were 21-30 years of age. Current sex (55%) and gender identity (53%) in females were observed. 84% were heterosexual, Caucasian (53%), and Hispanic/Latino (37%) compared to other ethnic groups. Students agreed and "strongly agreed" on the following questions: treated with respect (89%), their opinion was valued (67%), had an opportunity for success (80%), availability of sufficient resources (65%), valued/treated equally in the classroom/labs (84%), treated as an individual and belong to the university (63%), no discrimination (80%), and their opinion was appreciated at the student senate (55%). Overall, 78% of students recognized university's commitment to DEI. Conclusion: This survey recognized DEI notion positively among the students. Due to the lower response rate importance of participation in the future survey should be encouraged. The feedback will foster DEI notion at the university. (This is a conference presentation abstract and not a full work that has been published.)

#### Functional impact of a whole food-based matrix in supporting phase II detoxification pathway: Spotlight on antioxidants support systems

Chinmayee Panda, Sara LeBrun-Blashka

Objective: Effects of 28-day Detoxification program on various biomarkers. Methods: 32 healthy adults completed a blinded randomized controlled trial. Nutritional supplement + education (Intervention, N=14) or detox diet education only (Control, N=18). Program readiness was ensured at baseline using Promis Global health-10 questionnaire and a normal blood metabolic panel. Biomarkers reflecting antioxidants balance and Phase II detoxification support were assessed pre and post intervention. Cluster analysis of urinary biomarkers was performed for individuals with high toxin burden. Paired and unpaired Student's t-test were used to determine significance ( $P < 0.05$ ). Results: Global T-Scores indicated stable emotional and physical wellbeing in both groups. Post-detox showed a significant decrease (13%) in Reactive Oxygen Species in the isolated PBMNCs. While cellular Glutathione (GSH) and GSH: GSSG ratio remained stable in both groups, SOD enzyme activity was enhanced by 23 % and total cellular antioxidant status by 40% in detox group. While control cluster exhibited reduction in urine Creatinine, the detox cluster showed marginal reductions in total Porphyrins and Phase I glucaric acid. Conclusion: Nutrients with antioxidant properties likely support Phase II detox pathway through enhanced free radical scavenging and balanced redox homeostasis under body's natural glutathione recycling capacity. (This is a conference presentation abstract and not a full work that has been published.)

#### Initiating the Keele STaRT back screening tool in a chiropractic academic clinic

Austin Parker, Bryce Derry, Gary Tam, Katherine Pohlman, Christopher A Malaya

Objective: To investigate the use of the Keele STaRT Back Screening Tool (SBT) in 2 academic clinics and describe group demographics and care outcomes in patients with low back pain (LBP). Methods: Between 03/05/2018 and 04/06/2018, new patients in 2 academic chiropractic clinics in Dallas, TX were screened for study inclusion. Patients between 18-70 years old and with LBP were asked to complete the SBT. Interns and providers were not given any training on the tool. A chart review of the first 4 weeks of care was conducted for all respondents to track treatments and group parameters, as well as follow-up. Results: Of 163 screened patients, 76 were excluded for not meeting study criteria and 87 were stratified into low-risk (n=57), medium-risk (n=24), and high-risk (n=6) groups. The percentage of participants in each group returning for evaluation was 10%, 20%, and 0%, respectively. Conclusion: The KSB was easy to administer without training and provided important clinical information. The lack of patients returning for 4-week evaluation highlights the

importance of tracking LBP patients, especially those in the high-risk category, where there is increased likelihood of developing ongoing disability and psychosocial barriers to recovery. (This is a conference presentation abstract and not a full work that has been published.)

#### Predictors of utilization frequency and expenditure level of chiropractic care in US adults: data from the Medical Expenditure Panel Survey

Trent Peng, Baojiang Chen, Henry Shelton Brown, David Douphrate, Jud Janak, Kelley Pettee Gabriel

Objective: This study aims to evaluate the prospective associations of baseline personal characteristics with utilization and expenditure of chiropractic care in US adults (18 years). Methods: Data are from 1,357 respondents to the 2014-2016 Medical Expenditure Panel Survey (MEPS) who utilized chiropractic care. Sociodemographic, health-related, and behavioral factors were analyzed to assess the association with annual chiropractic visit frequency and spending. Poisson and multinomial logistic regressions were modeled to examine the associations among the predictors and chiropractic utilization and expenditure. Results: Being publicly insured and uninsured was associated with a 44% higher (95% CI: 1.44, 1.82) and 36% lower (95% CI: 0.48, 0.86) visit frequency, respectively, than those privately insured. Rheumatoid arthritis was associated with 7.38 times the risk of high expenditure (95% CI: 2.61, 24.67) than medium expenditure, compared to no arthritis. Relative to physically active individuals, physical inactivity was associated with an 27% higher visit frequency (95% CI: 1.09, 1.49) and an 82% higher risk (95% CI: 1.05, 3.14) of having high chiropractic expenditure than low expenditure. Conclusion: Our prospective analysis has identified several determinants of chiropractic utilization and expenditure. Findings may aid in predicting response to care and determine future healthcare policy. (This is a conference presentation abstract and not a full work that has been published.)

#### Extension end range loading for lumbar spinal stenosis: A case report

Kevin Percuoco, Michalla Dunaj-Compo, Harold Olson

Objective: his case discusses the multimodal management of a patient with low back pain and spinal stenosis. Clinical features: A 73-year-old female sought chiropractic intervention for chronic low back pain with unilateral radicular leg pain. Aggravating factors included walking and standing. Alleviating factors included rest, medication, and spinal manipulative therapy. Her previous MRI report indicated marked central canal and mild neural foraminal stenosis at L4-L5 due to a Grade 1 spondylolisthesis, disc bulging, facet arthropathy, and degenerative disc disease. Intervention and Outcome: Treatment consisted of chiropractic spinal manipulative therapy (HVLA) and repetitive lumbar extension end range loading exercises for 8 visits over 8 weeks. A home exercise program of end range loading and walking was reinforced. The patient reported resolution of the radicular leg pain and improvement in low back pain. Upon discharge, the Back Bournemouth Questionnaire improved from 33/70 to 10/70. Conclusion: This report presents a patient with unilateral radicular leg pain and spinal stenosis that responded positively to spinal manipulative therapy and lumbar extension end range loading exercises. The results suggest extension exercises may offer value for those with image supported spinal stenosis. (This is a conference presentation abstract and not a full work that has been published.)

#### Neurogenic heterotopic ossification following spinal cord injury: A case report

Macy Randolph, Dingbo Shi, Patricia Estrada, Norman Kettner

Objective: Describe clinical and imaging features of neurogenic heterotopic ossification in a wheelchair bound patient with history of C5 spinal cord injury. Clinical Features: A 31-year-old male patient presented with 3-year duration of severe right hip pain and progressively worsening hip flexor muscle spasms. Myositis ossificans of the right hip was suspected. The patient experienced a C5 spinal cord injury 3 years prior following an MVA resulting in paraplegia. Subsequent cervical spinal fusion was performed from C3-C6. Intervention and Outcome: Clinical differentials included myositis ossificans traumatica vs. heterotopic ossification and radiographs (AP pelvis, AP, and frog-leg lateral right hip) were obtained demonstrating significant multifocal amorphous ossification about the hip and proximal femur supporting a final diagnosis of neurogenic heterotopic ossification. The patient was advised to consult with Primary Care But Was Lost To Follow-Up. Conclusion: Heterotopic ossification occurs in up to 50% of patients with spinal cord injury. It is imperative for clinicians to be knowledgeable about the prevalence and diverse sequelae of traumatic brain or spinal cord injuries. (This is a conference presentation abstract and not a full work that has been published.)

#### Disc progenitor cell therapy improves pain, disability, and quality of life for patients with lumbar disc degeneration: Results of an FDA-approved clinical trial

Erika Evans Roland, Norman Kettner, Matthew Gornet, Douglas Beall, Timothy Davis, Domagoj Coric, Michael LaBagnara, Angela Krull, Michael DePalma, Patrick Hsieh, Srinivas Mallempati, Kevin Foley

Objective: Allogeneic disc progenitor cells derived from adult intervertebral disc tissue have demonstrated immunomodulatory and regenerative properties in preclinical animal studies. This reports the results of an FDA-approved clinical

trial of injectable allogeneic disc progenitor cells and a viscous carrier for treatment of lumbar disc degeneration versus carrier and saline controls. Methods: A randomized, double-blind, placebo-controlled study of 60 subjects at 13 clinical sites used validated safety and efficacy parameters including low-back pain Visual Analog Scale (VAS), Oswestry Disability Index (ODI) and EQ-5D. Randomization was to one of four treatment groups for single intradiscal injections of low-dose cells (N=20), high-dose cells (N=20), vehicle alone (N=10) or placebo (N=10). A validated, automated MRI-based method measured change in disc volume. Results: Statistically significant improvements relative to Baseline and MCID in VAS and EQ-5D were achieved in the high-dose group at one and 2 years and in ODI at 2 years. Statistically significant disc volume increases were seen in the high-dose group only. No serious adverse events were reported. Conclusion: High-dose allogeneic disc progenitor cells produced meaningful, statistically significant improvements in back pain VAS, ODI, and EQ-5D, with significant disc volume increases, out to 2 years post-intradiscal injection. (This is a conference presentation abstract and not a full work that has been published.)

#### **Kinematically-determined rotational duration in supine cervical manipulative thrusts**

*Brent Russell, Mackenzie Keller*

Objectives: Studies of the mechanics of chiropractic cervical adjustment and manipulation have reported thrust duration as the time from onset to peak of force loading. We examined thrust durations determined kinematically, not previously done. Methods: In 2 related studies, humans and a specially designed mannequin wore inertial measurement units to track motion while receiving supine cervical thrusts. Rotational movement times of thrust onsets and peaks were identified in graphs and verified in data columns. The results were compared to force-derived durations ranging from 80 to 240 milliseconds. Results: We previously reported rotational durations averaging 134 ms (SD 33, range 52-185), with experienced DCs and human patients. More recently, with mannequin recipients DCs averaged 144 ms (SD 69, range 50-340); DC students with clinical experience averaged 136 ms (SD 44, range 65-270.) Conclusions: Thrust durations of rotation were within the range of reported force-derived durations. Student DCs had shorter mean durations with lower thrust-to-thrust variability than experienced DCs with mannequins. Force and motion magnitudes and duration are relevant to questions of whether cervical adjustments cause injury; further investigation might examine force and motion together. (This is a conference presentation abstract and not a full work that has been published.)

#### **Correlation between self-report measures of function and lower limb motor performance in patients with and without imaging evidence of unilateral lumbar nerve root compression**

*Shelley Sargent, Geoff Gelley, Steven Passmore*

Objective: The present study considered diagnostic imaging usefulness in determining the impact of unilateral lumbar nerve root compression (ULNRC) on function, and the correlations between motor performance and self-reported clinical measures. Methods: Back pain participants (N=45) were stratified into 3 equal groups (positive-positive; positive-negative; and negative-negative) based on combinations of: i) lumbar imaging; and ii) clinical presentation for ULNRC. Performance measures included behavioural and kinematic variables from an established lower limb Fitts' Task requiring movements to targets of different difficulties. Self-reported measures of disability, function and pain were collected. Analysis of variance for between and within group variables were conducted, and Pearson correlation compared performance with self-reported measures. The University Research Ethics Board approved all procedures. Results: All groups yielded main effects for movement time with increasing task difficulty as predicted by Fitts' Law. A main effect revealed positive-positive participants performed less accurately than negative-negative participants. Positive correlations were found between self-report measures and motor performance for positive-negative and negative-negative groups only. Conclusion: Imaging, and self-reported measures alone did not predict function, however, Fitts' task performance accuracy effectively differentiated groups. Neurological deficit may impede self-reported evaluation of function in ULNRC, thus performance measures are encouraged. (This is a conference presentation abstract and not a full work that has been published.)

#### **Assessment of back pain behaviors, attitudes, and beliefs of chiropractors after a biopsychosocial educational workshop**

*Alec Schielke, Clinton Daniels, Katherine Pohlman, Jordan Glied*

Objective: The purpose of this study was to assess chiropractic students, clinicians, researchers, and educators behaviors, attitudes, and beliefs toward chronic low back pain (CLBP) before and after a biopsychosocial (BPS)-based CLBP educational workshop. Methods: This single-arm intervention study used the Health Care Providers' Pain and Relationship Scale (HC-PAIRS) and CLBP-related clinic vignettes to assess behaviors, attitudes, and beliefs toward CLBP before and after a single, 90-minute, educational workshop. The HC-PAIRS is a self-reporting questionnaire that consists of 15-items rated on a seven-point rating scale with a higher score suggesting belief that pain is linked to movement and recommendations should be to avoid physical activities.

Results: The pre-education intervention HC-PAIRS and vignettes were completed by 40 participants. A total of 18 participants completed the post-education intervention HC-PAIRS and vignettes. A majority of participants identified as full-time clinicians, Veterans Affairs employees, and musculoskeletal/neuromusculoskeletal providers. Pre-education intervention HC-PAIRS mean score was 44.8 (SD 9.22) and post-score was 39.5 (SD 6.49). Conclusions: Findings suggest an immediate change in HC-PAIRS scores following a BPS focused CLBP education intervention for a chiropractic audience. However, due to limitations related to sample size and target population, findings should be interpreted cautiously. (This is a conference presentation abstract and not a full work that has been published.)

#### **The association of biomarkers with pain and function in acute and subacute low back pain: a secondary analysis of a randomized controlled trial**

*Michael Schneider, Valerio Tonelli Enrico Tonelli Enrico, Gwen Sowa, Mitchell Haas, Christine McFarland, Wan Huang, Nick Weber, Nam Vo*

Objective: This study explored the association between serum biomarkers and pain/disability in patients with acute/subacute LBP. Methods: 90 participants in a RCT comparing manipulation and medical care consented to have blood samples drawn at baseline and 4 weeks (post-treatment). Seven biomarkers were chosen based on previous literature and analyzed. Clinical outcomes were pain and Oswestry Disability Index (ODI) evaluated at baseline and 4 weeks. Spearman's  $r$  was used to study the association of each baseline biomarker level with baseline pain and ODI scores, and with changes in outcome scores from baseline to 4 weeks. Results: 4 of 7 biomarkers had an association with baseline pain that was  $r = .20$ : neuropeptide Y (NPY), E-Selectin, vitamin D, and c-reactive protein (CRP). No baseline biomarker had an association with disability that was  $r = 0.20$ . For 4-week change in outcomes, vitamin D showed a correlation with change in disability and/or pain in manipulation-related groups. CRP, NPY, E-selectin, TNF $\alpha$ , Substance P and RANTES showed at least one correlation with change in pain or disability in at least one of the treatment groups. Conclusions: The analyzed biomarkers, especially vitamin D, represent a small set of potential candidates for future chiropractic research of LBP. (This is a conference presentation abstract and not a full work that has been published.)

#### **Gamifying rehabilitation: A case report in a young male following reconstruction surgery for atraumatic sternoclavicular joint dislocation**

*Samuel Schut, Kara Shannon*

Objective: Describe a novel approach to post-operative rehabilitation of a 23-year-old male patient who underwent sternoclavicular joint (SCJ) reconstruction following an atraumatic anterior dislocation. Clinical Features: Patient presented with persistent, right-sided SCJ pain and cervical tenderness 12 weeks after reconstruction surgery for symptomatic recurrent anterior instability. Physical therapy was completed post-operatively for 6 weeks but terminated due to insurance changes. Despite significant improvement in both pain severity and function, the patient experienced residual pain daily with moderate to severe movement evoked pain, especially prominent during overhead activities. Although improved, his functional abilities remained suboptimal, as demonstrated with a 65/80 baseline score of the upper extremity functional index (UEFI). Intervention: Rehabilitation utilized principles of gamification (e.g. competition, task-focused, and point-scoring), patient-led exercise selection, and high intensity interval training in an academic chiropractic clinic setting. Outcome: After 8 rehabilitation sessions, the patient scored 75/80 on the Upper Extremity Functional Index (UEFI), representing a 13% improvement from baseline. Conclusion: A gamified approach to rehabilitation represents a potential method to promote patient engagement. Additional research investigating the impact of gamification on workload/volume within and across sessions, satisfaction with care, and adherence to prescribed rehabilitation is necessary. (This is a conference presentation abstract and not a full work that has been published.)

#### **Describing congruence between ICD-10 coding and medical record text in Veterans Health Administration chiropractic notes**

*Nikhil Sharma, Sarah Graham, Anna Sites, Brian Coleman, Anthony Lisi*

Objective: To describe congruence between International Classification of Disease 10th Ed (ICD) codes and documented text diagnoses from chiropractic notes in the Veterans Health Administration (VA). Methods: Manual chart review of national electronic health record data. We randomly sampled 1,000 on-station VA chiropractic visits occurring from 10/01/2017 to 9/30/2018 from patients with no such visits within the prior 12 months. ICD and documented text diagnoses were extracted. We mapped recorded diagnoses to 10 categories based on body region, presence of radiculopathy, non-specific musculoskeletal conditions, and non-musculoskeletal conditions. A rating system evaluated the congruence between ICD and text diagnoses. Results: Of the 978 identified and abstracted notes, ICD and text diagnoses were perfectly congruent in 441 (45.1%). With cases of partial congruence, ICD codes contained less detail/fewer conditions than text in 194 (19.8%) and contained more detail/more conditions than text in 178 (18.2%). Instances where ICD and text diagnoses somewhat agreed but had mixed differences in detail or conditions occurred in

101 (10.3%). Lastly, there were 64 cases (6.5%) where the 2 groups had no degree of congruence. Conclusion: VA chiropractic diagnostic coding and text documentation shows variable congruence, illustrating the need for further study and improvement. (This is a conference presentation abstract and not a full work that has been published.)

### Contrast bias impact on report of finding assessment grades during the transition between sequential clinic courses

*Michael Sheppard, John Ward*

**Objective:** To determine if contrast bias was occurring as clinician examiners graded students across the transition between sequential clinic courses (Clinic I vs Clinic II vs Clinic III). **Methods:** The hypothesis was that an examiner would intrinsically grade a student in a lower-level clinic course more poorly than a higher-level clinic course when a general grading rubric was utilized. Researchers analyzed report of findings (ROF) assessments by 255 clinic students (Tri 7-9) from January 2018-April 2022 as they transitioned from Clinic I to Clinic II and again as they transitioned from Clinic II to Clinic III. **Results:** There was a statistically significant increase in ROF assessment scores comparing the last graded assessment of Clinic I (2.56) vs the first graded assessment of Clinic II (2.86,  $p=0.000$ ). The effect size for this initial increase was large. Similarly, ROFs assessments increased from 2.99 in the last assessment of Clinic II to 3.13 on the first assessment of Clinic III ( $p=0.000$ ). **Conclusions:** Clinician graders appeared to be demonstrating a degree of contrast bias. However, the degree of contrast bias and the natural progression of student improvement over time need to be separated out further. (This is a conference presentation abstract and not a full work that has been published.)

### Observation of contrast bias through analysis of the relationship between clinic adjusting exit exam score and overall student graduating GPA

*Michael Sheppard, John Ward*

**Objective:** Determine if clinician graders are demonstrating contrast bias when they grade chiropractic student interns on their clinic adjusting exit exam. **Methods:** 116 clinic adjusting exit exam scores were analyzed over a 2-year data collection window in relation to the students' graduating GPA. Student interns were assessed by graders using a 1-4 modified Dreyfus model scoring system. A Pearson's correlation was used to determine the relationship between clinic adjusting exit exam score and overall graduating GPA of the student. **Results:** Pearson's correlation between clinic adjusting exit exam and student graduating GPA was 0.131. This low value demonstrates that there was no relationship between the 2 variables. Clinician graders appeared to be assigning grades close to 3.5 on the exit exam and not basing them on actual student performance. There was no correlation between a high GPA student and their score on the clinic adjusting exit exam, or vice versa for a low GPA student. **Conclusions:** There was a lack of correlation between graduating student overall GPA and clinic exit exam score for adjusting. These findings preliminarily support that clinician grader contrast bias may be occurring and countermeasures should be implemented. (This is a conference presentation abstract and not a full work that has been published.)

### Fully integrated chiropractic and occupational therapy co-management of a patient with chronic pain and carpal tunnel syndrome

*Bernadette Sheffield, Patrick Battaglia*

**Objective:** Report co-management between chiropractic and occupational therapy (OT) of a patient in one community health center with multiple neuromusculoskeletal complaints. **Clinical Features:** A 61-year-old female was referred to chiropractic integrated within one Federally Qualified Health Center (FQHC) for management of chronic neck, bilateral shoulder, and right knee pain secondary to degenerative changes. During their chiropractic encounter, they endorsed bilateral hand dysfunction and paresthesia, and exam to include bedside sonography confirmed carpal tunnel syndrome (median nerve cross-sectional area 19mm<sup>2</sup>). The patient was referred to OT also integrated within the same FQHC for management and assumption of care for carpal tunnel syndrome. **Intervention and Outcome:** Chiropractic management consisted of cervical, glenohumeral, and right knee mobilizations, myofascial therapy, therapeutic exercise, and relaxation therapies (eg, mindful breathing). OT care consisted of self-care/home management activities, therapeutic exercises, and therapeutic activities. By discharge, patient was asymptomatic with respect to their neck pain, reported minimal and episodic shoulder pain with prolonged work, endorsed 50% improvement in their knee pain, and had resolution of their carpal tunnel syndrome with restoration of function and activity independence. **Conclusion:** Patients in community health may benefit from multidisciplinary chiropractic and OT care to optimize physical function. (This is a conference presentation abstract and not a full work that has been published.)

### Coordination of care between a primary care physician and a chiropractic resident for the management of meralgia paresthetica: A case report

*Braden Sims, Christopher Arick, Eric Kirk*

**Objective:** This case report describes the coordination of care, evaluation, and management of a patient presenting with idiopathic meralgia paresthetica

associated with hip pain complicated by hypertonicity to the surrounding musculature. **Clinical Features:** A 46-year-old man presented to his primary care physician for a complete physical. Upon evaluation, the issue of left anterolateral thigh paresthesia and left hip pain of 2 days duration was disclosed by the patient. A chiropractic resident completing a rotation in family practice included meralgia paresthetica as a differential diagnosis and offered further evaluation from the chiropractic department within the integrated healthcare system. **Intervention and Outcome:** The primary care physician referred this patient to the chiropractic care team for co-management. A trial of conservative care was provided which included chiropractic manipulative therapy, soft tissue mobilization techniques, and ergonomic instruction. After 4 visits (two weeks), the patient's hip pain was resolved, and paresthesia was reduced by 50%. **Conclusion:** This case report highlights the recognition of a neuromusculoskeletal condition and referral for chiropractic management, the subsequent treatment approach, and favorable outcomes. (This is a conference presentation abstract and not a full work that has been published.)

### A systematic review of chiropractic high-velocity, low-amplitude sham protocols used in research

*Margaret Sliwka, Stephanie Sullivan*

**Objective:** To identify, categorize, and describe the previously reported HVLA sham protocols used in chiropractic clinical studies. **Methods:** Following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria, the databases PubMed, CINAHL, and Index to Chiropractic Literature (ICL) were searched using: Chiropractic AND sham, Chiropractic AND placebo, Chiropractic AND clinical trial, and Spinal manipulative therapy AND sham. Search limits included English, year 2000 or later, and peer reviewed. Studies were included if they were a clinical trial, involved human participants over 16 years old, and employed a HVLA-mimicking sham/placebo spinal intervention. Reviews, non-chiropractic interventions, and manipulations under anesthesia were excluded. Two reviewers independently screened abstracts and/or full-text articles for inclusion/exclusion criteria. **Results:** Initial search criteria yielded 2670 articles. Following abstract and full-text screening, 48 studies met inclusion/exclusion criteria. Sham interventions included manual ( $n=27$ ), mechanical instrument assisted ( $n=17$ ), or both ( $n=4$ ). Region specific applications were cervical ( $n=16$ ), thoracic ( $n=10$ ), lumbopelvic ( $n=8$ ), and multi-region ( $n=14$ ). Only 20 papers assessed blinding effectiveness. **Conclusion:** There was limited consistency in the application of sham protocols within the chiropractic clinical trial literature. The present review may serve as a foundation for future development of standardized chiropractic HVLA sham protocols. (This is a conference presentation abstract and not a full work that has been published.)

### Short-term risk of low back pain flares within 24 hours following spinal manipulation: A subgroup analysis of a case-crossover within a cohort study

*Carina Staab, Clinton Daniels, Andrew Timmons, Adrienne Tanus, Anna Korpak, Sean Rundell, Pradeep Suri*

**Objective:** To examine the association between spinal manipulation therapy (SMT) and low back pain (LBP) flares in Veterans. **Methods:** We performed a longitudinal case-crossover study of 238 Veterans (age 18-65 years) who were seen for LBP in primary care. Participants completed up to 36 scheduled surveys and an unlimited number of patient-initiated surveys (triggered by onset of new flares) over 1 year of follow-up. Each survey inquired about current flares (a period of increased LBP) and exposure to SMT over the 24 hours before survey completion. Conditional logistic regression was used to estimate the association between SMT exposure and participant-reported flares. **Results:** We included 198 participants (mean age 48 years, 74% male) in the case-crossover analysis. There were 2,402 non-flare periods (46 preceded by SMT [1.9%]), and 1,240 flare periods (28 preceded by SMT [2.26%]). After adjustment for depression, sleep, smoking, and other covariates, odds of a flare in the past 24 hours were 2.00 (95% CI 1.11 to 3.60) times higher for SMT exposure versus no SMT exposure. **Conclusion:** Receiving SMT was associated with a short-term increased odds of an LBP flare. (This is a conference presentation abstract and not a full work that has been published.)

### Attitudes toward patient-centeredness among Canadian chiropractors

*Kent Stuber, Silvano Mior, Gina Dolan, Mark Langweiler, Peter McCarth*

**Objectives:** To assess chiropractors' attitudes and orientation towards patient-centered care. **Methods:** We used a sequential explanatory mixed methods study design. We surveyed a convenience sample of Canadian chiropractors, followed by individual semi-structured interviews. The survey instrument consisted of demographic and clinical practice questions and a modified version of the Patient-Practitioner Orientation Scale (PPOS) to measure practitioner attitudes towards care. Quantitative data were analyzed with descriptive statistics, bivariate analysis, and linear regression, while qualitative data were analyzed using thematic analysis. **Results:** 31 chiropractors were included in the study, and 7 among these completed interviews. The involved chiropractors were essentially representative of recent surveys of Canadian chiropractors. PPOS Overall scores were significantly associated with years in practice and patient load. The PPOS score mean was 4.35, 95% CI [4.18,4.52]. In interviews, some



chiropractors preferred their expertise or scientific evidence over patient preferences when making clinical decisions. Conclusions: This study provides preliminary evidence on chiropractors' attitudes towards care. These results indicated that more doctor-centered attitudes prevailed but were comparable to the literature in other health professions. The significant association between more patient-centered attitudes and patient load and clinical experience indicates that chiropractors may learn such attitudes through experience. (This is a conference presentation abstract and not a full work that has been published.)

#### Evaluating a manual muscle test as a measure of neuromuscular coordination of the lower limb: A pilot study

*Stephanie Sullivan, Edward Owens, Ronald Hosek, Emily Drake, John Downes*

**Objective:** to evaluate the repeatability and force-time characteristics of a manual muscle test (MMT) in a population of young, healthy individuals. **Methods:** Ten healthy participants were randomized to treatment or control group. Three MMT assessments determined if the major hip muscles could maintain isometric contraction in each of 3 directions in the supine position. Adjustment group participants received cervical adjustments between tests 1 & 2. A force pad measured the contact force of the assessor's hand on the participant's leg. **Results:** All participants showed weak hip muscles on 1 side at initial testing. In controls, repeat testing produced the same results 95% of the time. After adjustment, all weak muscles showed strong in both post-tests. Applied force was greater for the strong muscles (19.2 N SD 11.6) versus weak (10.2 N SD 6.8). Test duration was shorter for strong muscles (2.0 Sec SD 0.5) versus weak (2.7 Sec SD 0.7). **Conclusion:** The force sensor provided adequate measurements showing consistency of force and time measurements during testing. Assessments were repeatable and showed changes with cervical adjustment. In future studies, blinding of the assessors to participant group assignment and previous test results needs to be implemented. (This is a conference presentation abstract and not a full work that has been published.)

#### Changes in functional movement screen scores associated with multimodal chiropractic care: A pilot study

*Harrison Vawter, Mark Pfefer, Rachel Gilmore, Tyrone Tate*

**Objective:** Emergency medical services (EMS) personnel are at high risk of injuries, often related to overexertion while lifting or carrying patients or equipment. They require a high level of functional fitness to operate safely and avoid injuries. The purpose of this pilot study was to explore feasibility and assess effects of multimodal chiropractic care on Functional Movement Screen (FMS) scores among EMS students. **Methods:** EMS students at a local community college voluntarily completed baseline FMS testing. Those who obtained 14 or less, a sign of movement dysfunction, were recruited to participate in a study to evaluate effects of multimodal chiropractic care on FMS scores. Participants received multimodal chiropractic care with an emphasis on spinal manipulation and corrective exercise for up to 6 weeks. **Results:** Twelve EMS students with average FMS score of 10.9 received up to 6 weeks of multimodal chiropractic care. Average posttest FMS score of 11 students who completed the program improved 61% (17.6). No adverse events were reported. **Conclusion:** Increasing FMS scores above 14 may reduce injuries among EMS personnel. Multimodal chiropractic care may positively impact FMS scores and further research is feasible and warranted. (This is a conference presentation abstract and not a full work that has been published.)

#### Survey of depression and anxiety attributes of chiropractic college students

*John Ward, Jesse Coats*

**Objective:** To measure the degree of depression and anxiety of chiropractic college students through an anonymous paper survey. **Methods:** 164 chiropractic college students completed a Major Depression Inventory (MDI) survey, 2-item Generalized Anxiety Disorder (GAD-2) survey, and were surveyed on how many hours of sleep they had per night. The survey was distributed 4 weeks into the trimester as their first rounds of exams were just beginning. **Results:** Students averaged a MDI score of 19.7 + or - 11.9 (mean + or - standard deviation), indicating the average chiropractic college student did not display depression. However, 18.9% of students displayed a MDI score of over 30 which is associated with possible severe depression. Of students that demonstrated possible severe depression 80.6% were female. Average GAD-2 score was 3.0 + or - 1.9 indicative that the typical chiropractic college student did display some degree of generalized anxiety. Students averaged 6.3 + or - 1.1 hours of sleep per night. **Conclusions:** Chiropractic students on average did not display depression. However, they did display a degree of anxiety comparable to that seen amongst medical school students. (This is a conference presentation abstract and not a full work that has been published.)

#### Discomfort during chiropractic manipulation: A survey of chiropractic students' perceptions of comfort during various manipulative procedures

*Simon Wang, Emily Montag, Sheilah Hogg-Johnson*

**Objectives:** To determine the magnitude of discomfort from spinal manipulative (SM) procedures taught during a chiropractic undergraduate education.

**Methods:** A cross sectional survey was used to collect data from chiropractic undergraduate students. The primary outcome was discomfort during SM procedures received over the previous month. Correlation analysis between discomfort and age, class year, sex, mass, height, and BMI were completed. **Results:** From 294 participants, the average sample data was: age (24.8 yrs), mass (71.8 kg), height (171.6 cm) and BMI (24.2 (kg/m<sup>2</sup>)). The procedures with highest mean discomfort scores for first year were: Upper thoracic prone hypothenar/transverse push, Lumbar side posture hypothenar/mamillary push, and Supine thoracic. Second year: Cervicothoracic prone thumb/spinous push, Cervical supine index/pillar push (lateral) and First rib supine & prone index/costal push. Third year: Supine hypothenar occiput push (lateral and rotation), Reverse lumbar side posture hypothenar/mamillary push, and Cervical prone index/pillar push. No correlations were found between procedures and age, year, sex, mass, height, and BMI. **Conclusion:** There are a number of spinal manipulative procedures which cause discomfort for students in an undergraduate chiropractic program. Future studies should aim to determine reasons for discomfort, alternatives and modifications to some SM procedures. (This is a conference presentation abstract and not a full work that has been published.)

#### Ultrasound of intermittent medial meniscal dislocation: A case study

*Joshua Wells, Chin-Suk Cho*

**Objective:** To describe a rare case of medial meniscal dislocation diagnosed on weight-bearing diagnostic ultrasound (US) in the absence of meniscal or cartilaginous injury. **Clinical features:** A 24-year-old male complained of right foot and left medial knee pain from a 10-foot fall. Prior medical history of limb-shortening surgery and congenital absence of the anterior cruciate ligament was reported. **Interventions and Outcomes:** Radiographs taken at the urgent care were negative for acute fracture/dislocation. MR imaging of the left knee demonstrated joint effusion with an equivocal medial meniscal tear, without evidence of the root tear. US of the left knee demonstrated no evidence of medial meniscal tear. Upon weight-bearing with active knee flexion, intermittent superomedial dislocation of the medial meniscus was observed. No therapeutic intervention has currently been implemented. **Conclusion:** This case report highlights the value of dynamic US at evaluating musculoskeletal condition in a Chiropractic clinic and discusses a rare case of intermittent meniscal dislocation and reviews different types of etiologies. (This is a conference presentation abstract and not a full work that has been published.)

#### Practical application of the biopsychosocial model of care

*Timothy Whiting*

**Objective:** Understand the biopsychosocial model of care and how to apply it practically in a typical chiropractic clinical setting. **Clinical Features:** A 55 year old female presented to the office with chronic lower back pain and left leg pain. Complaint was previously a workers compensation case, which has since been closed even though symptoms are still present. Patient was anxious and frustrated at the time of the visit. Complicating factors included: fear-avoidance behaviors, polypharmacy, previous Worker Compensation case, anxiety, depression, stress, hypothyroid, anemia, lethargy, obesity/deconditioning, poor diet. Orthopedic examination non-contributory. Neurological examination demonstrated mild weakness in the left L5 and S1 dermatomes, sensory and reflexes WNL. Diagnosed with Lumbo-sacral Radiculopathy. **Intervention:** Heat, manual soft tissue massage, chiropractic manipulation/Flexion & Distraction, emphasize positive language, implement activity traffic light, small and obtainable diet changes, return to activity. **Outcome:** Re-evaluation performed on 4th visit. NPRS decreased from 7/10 to 5/10, Oswestry from 38% to 32%, frequency of pain from 100% to 50-60%. Activity increased. Pain medications decreased. Mood improved. **Conclusion:** Implementing the biopsychosocial model of care is not always easy, however, clinician language, positive reinforcement, safe return to activity and obtainable/practical diet and lifestyle changes can be effective. (This is a conference presentation abstract and not a full work that has been published.)

#### A multifactorial approach to management of myofascial restriction: A case report

*Mandy Wong, Isaac O'Gara, Heather Meeks, Nathan Hinkeldey*

**Objective:** To report a case of unresolved thoracic region myofascial pain that responded favorably to a combination of manual therapy, therapeutic exercise, and spinal manipulative therapy within a Veterans Affairs outpatient chiropractic clinic. **Clinical Features:** A 36-year-old male with a 5 year of chronic thoracic pain. Relevant PMH included electrical burns covering 49% of his body as a result of a training accident. Examination suggested a myofascial origin of the patient's pain, which is complicated by skin burns, grafting and scarring. **Intervention and Outcome:** Treatment consisted of instrument assisted soft tissue mobilization, manual myofascial release, therapeutic exercise, and spinal manipulative therapy during 16 visits over a 10-month time period. He reported subjective improvement of 90% pain reduction and could self-manage his symptoms using his home exercise program. The PROMIS Pain Interference 6B also improved from an 18 to 8 during the treatment time period. **Conclusion:** The treatment resulted in important symptomatic relief and improved self-efficacy for this patient. This

report provides a case illustrating the importance of a multimodal approach to pain management. (This is a conference presentation abstract and not a full work that has been published.)

#### **How does test format affect the students' performance and their long-term retention of knowledge**

*Niu Zhang, James La Rose, Megan Franklin*

**Objective:** To compare unproctored and proctored online exams among chiropractic students. **Methods:** Pre-existing data of 234 students across 4 consecutive Endocrinology classes were analyzed for this study. The course was comprised of three 50-minute lectures each week. Student performance was evaluated by midterm exam and summative exam (S1). The students from 3 classes were asked to take a voluntary second summative exam (S2) approximately 7 months after the S1. Since this study was partially conducted during the COVID pandemic, some classes took the midterm and the S1 proctored in the classroom while others took them unproctored from a remote location. **Results:** The mean midterm exam ( $p < .001$ ) and S1 scores ( $p = .01$ ) for the unproctored group ( $93.60 \pm 6.97$  and  $88.77 \pm 8.18$ ) were significantly higher than the proctored group ( $88.14 \pm 8.18$  and  $83.93 \pm 11.20$ ). The mean time taken by students was much greater for the unproctored exams than for the proctored exams (Midterm:  $40.70 \pm 10.15$  vs.  $16.67 \pm 6.98$ ,  $p < .001$ ; S1:  $46.95 \pm 8.72$  vs.  $21.47 \pm 8.97$ ,  $p < .001$ ). By contrast, the mean unproctored S2 scores were lower than the proctored group ( $60.20 \pm 14.68$  vs.  $88.14 \pm 8.18$ ,  $p < .001$ ). **Conclusion:** The findings suggest that student performance is significantly altered by test format. (This is a conference presentation abstract and not a full work that has been published.)

#### **POSTER ABSTRACTS**

##### **Best practice approach to improve LGBTQ/gender and sexual identity-related competencies within the doctor of chiropractic program: A narrative review**

*Steve Agocs, Jon Wilson, Mark Pfefer*

**Objective:** Evidence exists demonstrating that lesbian, gay, transgender, and queer (LGBTQ) individuals experience deficiencies in health outcomes and report worse health care experiences than heterosexual/cisgender individuals. The aim of this project was to review current approaches to improve LGBTQ competency in graduate-level medical and health care educational programs and to inform updated recommendations for doctor of chiropractic Program curriculum. **Methods:** A search was conducted of medical literature using MEDLINE, CINAHL, and Index to Chiropractic Literature. Key words used included sexual orientation, transgender, medical education and culturally competent care. **Results:** Ultimately, 12 articles were evaluated and scored independently and then discussed by the authors. A number of issues were identified including the need for understanding and use of culturally sensitive language within the clinical setting. Recent literature demonstrates that didactic training alone may not be adequate to prepare future physicians to care for LGBTQ patients. **Conclusion:** The authors review and discuss ways in which the academic chiropractic community can develop curricular content to adequately educate chiropractors to promote culturally sensitive care for the LGBTQ community. (This is a conference presentation abstract and not a full work that has been published.)

##### **Force-time profiles associated with drop-assisted spinal manipulation**

*Steve Agocs, Jon Wilson, Tiara Schmidt, Mark Pfefer*

**Objective:** Drop-assisted spinal and extremity manipulation is commonly used by chiropractors to address musculoskeletal joint dysfunction. Drop-assisted manipulation was developed in the early 1950s. Drop-assisted manipulation is commonly classified as a high velocity, low amplitude intervention, although there is no prior research that characterizes biomechanical aspects. In spite of broad use, there is a dearth of published research regarding outcomes as well as forces generated in delivery of this intervention. The aim of this study was to investigate the force-time profile of this intervention. **Methods:** A practitioner experienced in drop-assisted manipulation provided 2 sessions of 3 average thrusts each to the left and the right sacroiliac joints on 2 adult subjects. A portable pelvic drop piece was used in conjunction with a table with force sensors. Twenty-four force-time profiles were obtained. **Results:** Transmitted average peak preload of 63N was recorded. The impulse, average peak force was 662N and average time to peak force was 137ms. The force-time curve had slightly different characteristics compared to a non-drop assisted procedure. **Conclusion:** Drop assisted spinal manipulation appears to have a similar force-time profile as other commonly used high velocity, low amplitude interventions. Clinically relevant outcome studies are needed. (This is a conference presentation abstract and not a full work that has been published.)

##### **The chiropractic care of women in the perinatal period: A cluster analysis to detect similarities and differences among chiropractor responders**

*Joel Alcantara, Andrew Whetten*

**Objective:** To understand similarities and differences among chiropractors in the care of women in the perinatal period. **Methods:** Chiropractors with

postgraduate training and clinical experience in the care of perinatal women completed a 136-item survey to characterize practitioners and their patients, their practices and management protocols and safety attitudes. A hierarchical clustering analysis was performed of their responses. **Results:** We found 2 clusters of practitioners providing high safety rating on the use of spinal manipulative therapy techniques in pregnancy care, a lack of decline and steady patient volume during the COVID-19 pandemic and the use of the Webster Technique. Differences between the 2 clusters were in their clinical work-up (ie, approach with absolute/relative contraindications to care or provide SMT and refer to a specialist) and patient motivation (ie, wellness care versus symptom care) in caring for perinatal women with a comorbidity (ie, bleeding, eclampsia). **Conclusion:** Our cluster analysis found similarities and differences in the response of chiropractors to a 136-items questionnaire on perinatal care. Such characterizations may inform the safety and effectiveness, chiropractic education and research, practice and policy in the care of women in the perinatal period. (This is a conference presentation abstract and not a full work that has been published.)

##### **An investigation of patient weekly visits among chiropractors attending to pregnant patients in a practice-based research network**

*Joel Alcantara, Andrew Whetten*

**Objective:** To identify chiropractor attributes that have strong relationships with self-reported overall and pregnant patient weekly patient visits (i.e., patient volume). **Methods:** A 2 linear models utilizing a stepwise Akaike Information Criterion-selected linear model with a log transformed or untransformed response variable using pregnant and overall patient visits as the dependent variables was constructed. The statistical software R was utilized for our analysis with statistical significance set at  $p < .05$ . **Results:** Overall patient volume, postpartum retention rate, and country of practice were predictive of pregnant patient volume. A 200 patient visits increase in overall patient volume was predictive of one pregnant patient increase, while a change from a Canadian to an American practitioner predicted a 113.25% increase in pregnant patients. Predictors for overall weekly patient visits were overall pregnant patient volume, retention of pregnant and postpartum patients, practitioner gender, wellness care and country of practice. A one-unit increase in pregnant patient weekly visits predicted a 1.801 increase in overall patient weekly visits. **Conclusion:** Linear regression modelling identified a number of chiropractor characteristics associated with high patient volumes. We encourage continuing investigations on how these variables affect the quality of care provided by chiropractors to pregnant women. (This is a conference presentation abstract and not a full work that has been published.)

##### **Adverse childhood experiences and trauma informed care: A review for chiropractors**

*Kira Baca, Stacie Salisbury, Robert Vining*

**Objective:** Sixty percent of the population is affected by Adverse Childhood Experiences (ACEs), including abuse/maltreatment, domestic violence, or parental mental illness, substance abuse, and divorce. We aim to increase awareness regarding negative effects of ACEs and detail principles of trauma-informed care (TIC). **Methods:** We performed a narrative literature review on ACEs and TIC in PubMed, 1990-present. **Results:** No articles on ACEs or TIC were identified in chiropractic literature; only medical and psychological literature were found. ACEs are associated with negative psychosocial and physiological outcomes, including chronic pain, depression/anxiety, body system dysfunction, and health risk behaviors (drug/alcohol abuse, recklessness, obesity). ACEs, like other traumas, can alter perception and response to aspects of chiropractic care, including physical touch. Validated screening tools generate ACE scores, which measure the level of exposure. The 4R's TIC model, adapted from the Substance and Mental Health Services Administration, involves 4 stages: Realize, Recognize, Respond, and Resist Re-Traumatization. The model provides a framework for trauma-informed chiropractic care, and referral, for ACE-affected individuals. **Conclusion:** ACEs are associated with poorer health outcomes, including chronic pain. Chiropractors can use trauma-informed care to address patients' physical and mental healthcare needs from a biopsychosocial standpoint and patient-centered framework. (This is a conference presentation abstract and not a full work that has been published.)

##### **Characterizing interspinous excursion with diagnostic ultrasonography in 2 cases of degenerative spondylolisthesis with intersegmental hypermobility: A novel case report**

*Jessica Billham, Jesse Politowski, Erika Evans, Dingbo Shi, Norman Kettner*

**Objective:** We utilized diagnostic ultrasonography (US) to evaluate spinous process motion in 2 cases of degenerative spondylolisthesis with intersegmental hypermobility. **Clinical Features:** A 52-year-old female (Case 1) and an 83-year-old female (Case 2) presented to a chiropractic teaching clinic with chronic low back pain without evidence of instability. Lumbar radiography revealed Grade 1 degenerative spondylolistheses at L4/5 in both cases. Angular motion of the lumbar disc spaces was evaluated on flexion/extension radiography. Subsequent US was performed in prone flexion and prone extension to characterize interspinous motion of all lumbar segments. Both cases showed radiographic

hypermobility and increased interspinous excursion at L4/5. Intervention and Outcomes: Both patients were diagnosed with degenerative spondylolisthesis with hypermobility. Case 1 patient was treated with flexion/distraction, skipping the hypermobile segment, and home exercises consisting of abdominal breathing and core strengthening. Case 2 patient was treated with instrument adjusting and cold laser therapy. Both patients experienced interval clinical improvement. Conclusion: Utilization of US as a supplement in the diagnosis of lumbar hypermobility is novel. We measured interspinous excursion in 2 cases of degenerative spondylolisthesis with radiographic hypermobility. The results suggest US may be useful in the workup of lumbar intersegmental hypermobility. (This is a conference presentation abstract and not a full work that has been published.)

#### **Treatment of a patient with cervicogenic and craniocervical related tinnitus: A case report**

*Thomas Bloink, Charles Blum*

**Objective:** Discuss the care of a patient with cervicogenic and craniocervical related tinnitus. **Clinical Features:** 83-year-old male patient presented with severe bilateral tinnitus, progressively worsening over the past 20-years. Initial examination revealed significant decreased cervical ranges-of-motion, particularly rotation and lateral flexion. Patient had a maxillary deficiency resulting in significant malocclusion. Evidence of clenching, significant mandibular tori was present, along with dysfunctional translation of his right TMJ. **Intervention/Outcome:** The patient received six-treatment with sacro occipital technique (SOT) protocols over a three-week period. Upon the first-treatment immediately after adjusting his C5, he reported profound reduction in left-sided tinnitus. He was referred to a dentist for a lower mandibular splint to stabilize his TMJ and reduce inner ear pressure. He was treated once-a-week, three-weeks in a row by the dentist to balance his lower splint with each visit preceded by chiropractic care at this office. Chiropractic treatment focused on his cervical spine, occipital region and associated TMJ/cranial distortions. After the sixth-visit his cervical spine ranges-of-motion improved dramatically with no left-sided tinnitus and a 75% reduction of right-sided tinnitus. **Conclusion:** Further research is needed to determine if other patients presenting with tinnitus might respond to similar dental chiropractic care. (This is a conference presentation abstract and not a full work that has been published.)

#### **Successful co-management of a patient with C7/8 nerve dysfunction scheduled for surgery: A case report**

*Charles Blum*

**Objective:** To discuss chiropractic and orthopedic surgical co-management of a patient with C7/8 nerve dysfunction scheduled for surgery. **Clinical Features:** A patient presenting with right-sided C7/8 nerve dysfunction consistent with radiating neck pain, reduced grip strength and finger (4/5th digits) approximation/separation, and scheduled for orthopedic surgery. Chiropractic evaluation suggested there were also some ascending (lumbar) and descending (TMJ) contributions to his cervical spine imbalance and a report was sent to his orthopedic surgeon. **Intervention/Outcome:** Surgery was going to be performed if his pain increased or grip strength did not improve. He was treated with chiropractic using sacro occipital techniques for lumbo-cervical involvement, TMJ/craniocervical relationships, and using the cervical stairstep technique. He was given home exercises to stimulate his C7/8 nerve and cervical (Pronex) traction. Following the second office visit (2 weeks apart) he reported no pain and improved dynamometer graded grip strength. He was seen by his orthopedist a few days following the second office visit and surgery was cancelled. **Conclusion:** During periods of time when a patient is awaiting surgery a trial of chiropractic care would seem prudent. Ideally chiropractic and orthopedic surgery collaborative care would be expected to yield greater patient outcomes. (This is a conference presentation abstract and not a full work that has been published.)

#### **Asymmetrical lumbar facets complicating a diversified high-velocity, low-amplitude lumbar side posture adjustment: A case report**

*Charles Blum*

**Objective:** How asymmetrical lumbar-facets complicated a diversified HVLA lumbar-side-posture adjustment in a patient. **Clinical Features:** A 22-year-old male patient presenting with chronic pain, aching, and numbness following a chiropractic lumbar side posture adjustment. Since the trauma he had received multiple chiropractic and physical therapy treatments over a year, but his condition had not progressed so he was unable to work and quality of life was compromised. Assessment of presenting radiographs indicated he had asymmetrical lumbar facets and prior care did not take that factor into account. While the radiographs did show an intersegmental lumbar vertebral rotation the side posture adjustment multiple thrusts had been performed into the coronal facet that ultimately limited the rotational correction. **Intervention and outcome:** Sacro occipital technique orthopedic block placement for lumbar rotation was used until related cervical indicators resolved. Following treatment he reported immediate pain relief and improvement of function for the first time since his trauma. However he was not able to remain long enough in the country for follow up care. **Conclusion:** When a patient has a poor response to a lumbar side posture HVLA adjustment it may be important to radiograph the

lumbar region to assess any facet asymmetry. (This is a conference presentation abstract and not a full work that has been published.)

#### **Illness scripts: A tool for teaching clinical reasoning in a chiropractic curriculum**

*Kelly Brinkman*

Chiropractic educators have the task of teaching clinical reasoning and each person collects, stores and applies the information differently. Given the amount of material taught in a chiropractic curriculum, it is difficult for the students to navigate and sort through the vast quantities of information that is taught. There are some well-known concepts that guide students in organizing their foundational knowledge and these include Must Not Miss, VINDICATE and Most Probable. The illness script is one tool not well known in the chiropractic profession and which has been used by the medical profession for years. Illness scripts are a template in which novice learners can use to organize diagnostically significant data for a typical presentation of a clinical diagnosis. This template creates a visual allowing the student to compare and contrast different diagnoses that present with a similar chief complaint and look for key and distinguishing features that assist in determining the diagnosis. The data used in these templates comes from evidence-based research and is compiled into 6 main sections: pathophysiology, epidemiology, timing, signs and symptoms, diagnostic/imaging and treatment. (This is a conference presentation abstract and not a full work that has been published.)

#### **Chiropractic care combined with a novel hemp oil nutritional supplement improve quality-of-life and the body's natural inflammation response**

*Carolina Carlisle, Kristine Polley, Kara Credle, Brandon Metzger, Sara LeBrun-Blashka, Keri Barron*

**Objective:** This double-blind, placebo-controlled trial aimed to assess the impact of a novel combination of hemp, omega-3 fatty acids, and broccoli supplement (Hemp Oil Complex (HOC)) in the body's natural inflammation response. **Methods:** We randomized 25 patients ( $\pm 52.24$  years) to either the HOC+Chiro group (n=12), receiving HOC daily and chiropractic care, or to the Placebo+Chiro group (n=13), receiving an inactive ingredient, daily, and chiropractic care for 12 weeks. **Results:** The HOC+Chiro group reported -44% less body discomfort and -41% less interference in their quality of life due to body discomfort, as compared to the Placebo+Chiro group that reported -28% and -37% respectively. In the second phase of the trial (weeks 6 to 12), participants in the HOC+Chiro group reported an additional decrease of -30% in interference in quality of life due to body discomfort, as compared to the Placebo+Chiro group that reported only 4% less interference in quality of life. Finally, the HOC+Chiro group demonstrated a significant improvement in their natural antioxidant pathway by reducing 29% of participants' ROS levels, as compared to the placebo group (-9% ROS). **Conclusion:** HOC and chiropractic care for 12 weeks supported improvement of quality of life and natural antioxidant capacity. (This is a conference presentation abstract and not a full work that has been published.)

#### **Creation and administration of a chiropractic program student safety preparticipation procedure**

*Michelle Chambers-Lewis, Beth Carleo, Jason Qualls*

**Objective:** A paucity in established classroom participation safety standards exists. A preparticipation procedure was created to ensure incoming students are screened for contraindications to participating as a patient in hands-on lab of the chiropractic program. **Methods:** Committee Consensus was met on a preparticipation questionnaire, exam and procedure. The incoming students were paired with the second-year students for administration of the exam. A determination of either clear to participate or referral warranted was made by a supervising licensed chiropractor based on the assessment of the findings. Referred students were restricted from classroom participation awaiting further recommendations from the clinic. **Results:** The new program was successfully implemented for the first time in April 2022. 8 out of the 48 students evaluated in the first cohort and 12 of the 81 in the second were found to have possible contraindications to participation, resulting in a referral to the clinic for evaluation. The area of suspected contraindication and the identifying exam procedure was documented. **Conclusion:** The procedure was successfully implemented with full participation of 2 student cohorts. The findings suggest the need for preparticipation screening. This procedure has now become an institution standard for all incoming students to participate. (This is a conference presentation abstract and not a full work that has been published.)

#### **Association between ideology, beliefs, and practice patterns of United States chiropractors: a secondary analysis of a national survey**

*Zachary Cuper, Jordan Gliedt, Stephen Perle, Aaron Puhl, Michael Schneider*

**Objective:** The purpose of this study was to describe and characterize the association of US chiropractors' ideology, beliefs, and practice patterns with: 1) chiropractic degree program of graduation, 2) years since completion of chiropractic degree, and 3) geographic region of practice. **Methods:** A secondary analysis of a cross-sectional survey of a 10% random sample of US chiropractors conducted between March 2018 and January 2020 (n = 8975;



response rate 39.4%). The 7-item survey instrument aimed to elicit differentiating ideologies, beliefs, and practice patterns regarding clinical examination/assessment, health conditions treated, role of chiropractors in the healthcare system, the impact of chiropractic adjustments [spinal manipulation] in treating cancer patients, vaccinations attitudes, and x-ray use. Multinomial regression was used to analyze the associations between the ideology and practice characteristic items and the demographic variables. Results: Responses to the 7 ideologies and practice characteristic items were significantly different based on chiropractic degree program of graduation, years since degree completion, and geographic region of practice. Conclusions: Among US chiropractors, variation in clinical ideology, beliefs, and practice patterns are associated with chiropractic degree program of graduation, years since completion of chiropractic degree, and geographic region of practice. (This is a conference presentation abstract and not a full work that has been published.)

#### **Resolution of hearing loss in 4-year-old male following chiropractic care: A case report**

*Callyn Dittmar, Barbara Mansholt*

**Objective:** This paper describes the resolution of conductive hearing loss following treatment with chiropractic adjustments. **Clinical Features:** A 4-year-old white male was diagnosed with otitis media without effusion and associated conductive hearing loss following an otoscopic evaluation of the ears by his primary provider. Proposed treatment was prescription drugs and possible surgery. The patient's parents deferred medical intervention and chose to seek chiropractic care. **Interventions and Outcomes:** The patient received 10 chiropractic adjustments using primarily the Activator instrument. The conductive hearing loss was no longer present at the audiogram following one month of care. The patient's parents chose to continue chiropractic maintenance care for the child. **Conclusion:** This case suggests that cervical spine manipulation may have positively affected hearing loss in this patient. While there are other treatment options that are offered to patients with this condition, chiropractic manipulation has not been studied at length, could be considered a possible low-force, low-risk intervention, and warrants further exploration. (This is a conference presentation abstract and not a full work that has been published.)

#### **Unintended outcomes of conducting research in an academic radiology practice**

*Emma Forlow, Ian McLean, Kira Baca, Robert Vining*

**Objective:** To describe effects of incorporating research into an academic radiology practice. **Methods:** Investigators developed a study retrospectively abstracting data from radiology reports to better understand how review of prior imaging and clinical history information contained in radiology orders influence recommendations for subsequent testing. Study development included a critical assessment of radiology reporting procedures, prior imaging review practices, developing and testing data collection methods, and modifying radiology reports to ensure complete and systematic data collection without disrupting usual radiology processes. **Results:** Study development included modifying radiology reporting procedures to standardize a process prompting a systematic search and review of prior imaging, consistent with best practices in diagnostic imaging. Critical evaluation of information contained in prior radiology reports revealed a need for more comprehensive information from ordering clinicians and standardized language describing a search for and use of prior relevant imaging when available. A consensus process developed to confirm data quality added critical thinking opportunities to radiology resident training. **Conclusion:** Conducting research in this academic radiology practice led to unique critical evaluation of procedures and unintended outcomes facilitating more comprehensive radiology reading and reporting practices and additional critical thinking opportunities in the resident training program. (This is a conference presentation abstract and not a full work that has been published.)

#### **Anatomical variation of the cervical sympathetic trunk: A case report**

*Yuan Gao, Jessica Billham, Norman Kettner*

**Objective:** Report the anatomical variation of the cervical sympathetic trunk and ganglion. **Clinical Features:** A wide range of organ and tissue functions are regulated by the autonomic nervous system (ANS). Transcutaneous vagus nerve stimulation (tVNS) is a newly developed non-invasive technique for treating depression and epilepsy. Furthermore, tVNS is being investigated for other disorders, including headache, tinnitus, atrial fibrillation, post-error slowing, prosocial behavior, associative memory, schizophrenia, and pain. There are 2 types of tVNS: transauricular and transcervical. In the carotid sheath, the transcervical VNS (tcVNS) most likely activates both efferent and afferent VN fibers. However, the anatomical variation of the cervical sympathetic trunk and ganglion should not be overlooked in the tVNS. The cervical sympathetic trunk and ganglia are usually posteromedial to the carotid sheath. Nevertheless, the cervical sympathetic ganglion may also be placed with the carotid sheath. **Intervention and Outcome:** During our cadaver dissection, we found the superior cervical sympathetic ganglion and cervical sympathetic trunk were within the carotid sheath. **Conclusion:** We assume that the tVNS may also stimulate the sympathetic fibers in some

patients. (This is a conference presentation abstract and not a full work that has been published.)

#### **Seasonal infectious disease patient reported outcome**

*Heather Garrison, Stephanie Sullivan, Shawn Neff*

**Objective:** Development of a Seasonal Infectious Disease Patient Reported Outcome (SID-PRO) using a two-tiered review and Delphi process. **Methods:** Using government resources and peer-reviewed literature, the most common seasonal infectious diseases (SID) and associated symptoms were derived from a list of 71-infectious diseases of relevance to public health. SIDs were included if they were non-zoonotic, infected over 5000 people each year in the United States, and could be transmitted through indirect transmission and droplet spread. Next, the SIDs and symptoms were evaluated for relevance to healthcare professionals using a Delphi process; members were recruited through social media, direct emails to healthcare organizations, and colleague introductions. SID and symptom appropriateness were rated by Delphi members (Likert scale). A 75% response of strongly agree, agree, or neutral resulted in approval. **Results:** The review produced 13 common SIDs with 17 associated symptoms. Recruitment resulted in 21 Delphi panel members. Following Delphi review, all diseases and symptoms received over 75% approval, exempting tuberculosis (67%). **Conclusion:** The two-tiered survey development process resulted in the selection of 12 SIDs and 17 symptoms for use in the development of the SID-PRO. Survey validation will be needed. (This is a conference presentation abstract and not a full work that has been published.)

#### **The future of teaching chiropractic technique: Lessons learned from 27 years in the trenches**

*Brian Gleberzon*

**Objective:** The objective of this study is to chronicle curricular changes made at one chiropractic program to how chiropractic technique – specifically HVLA spinal manipulative therapy – has been taught and assessed, based on best available evidence and sound pedagogical principles over a 27 year period. **Methods:** A review of published studies in indexed, peer reviewed journals and conference presentations describing successfully implemented curricular changes that overcame identified challenges is provided. Curricular changes were made in response to student concerns, emerging scientific findings and trends in the healthcare ecosystem. **Results:** Several changes to teaching methodologies have been implemented over the past 27 years, including: obtaining informed consent; in-class teaching strategies (before and during COVID); learning tools (e.g. instructive manual, video-library of tutors); use of technology (e.g. force sensing tables); qualitative assessment rubric linked to performance competencies; strategies to enhance consistency between tutors; panel-based assessment process; robust student remediation and; mitigating risks to reduce both student injuries and likelihood of patient complaints once in professional practice. **Conclusions:** A number of successful curricular changes have been implemented in technique courses at one chiropractic program over the past 27 years. Recommendations toward a standardized technique curriculum is provided. (This is a conference presentation abstract and not a full work that has been published.)

#### **Chiropractic graduates' perceptions of university health clinic versus community clinic educational experience**

*Navine Haworth, Louise Horstmanshof, Keri Moore*

**Objective:** Compare perceptions of preparedness for transition to practice, professional identity, and inter-professional clinical practice after one year of practice. **Methods:** Repeated measures study with same Chiropractic participants from 2 Australian universities after one year in practice. **Results:** Phase Two UHC prepared transition to practice through scaffolded supervision with reasonably healthy patients, and longer consultation times than in practice. CCs prepared readiness in terms of efficiency and experience with complex patients but not for continuity of care or interprofessional engagement. CCs provided clients from diverse socio economic and cultural backgrounds. These new graduates still lacked understanding of clinical and professional competencies, experiencing interprofessional activities as formal and informal reciprocal referrals. They felt challenged in their communication and business aspects (EPC use) of the profession. They recommended inclusion of networking and learning within the professional environment for students. **Discussion/Conclusion:** UHC and CCs prepare for transition to practice in different ways. Most reported lacking understanding of industry standards and business aspects of practice. Curriculum development of chiropractic competencies related to professionalism and inter-professional clinical practice is indicated. (This is a conference presentation abstract and not a full work that has been published.)

#### **Chiropractic management of acute low back pain in a US Veteran with unilateral transtibial amputation: A case report**

*Lily Ho, Tyler Barton, Clinton Daniels*

**Objective:** To highlight the implications of unilateral below-the-knee amputation on the chiropractic management of a patient with low back pain. **Clinical features:** A 39-year-old male with a history of left transtibial amputation,

secondary to a primary blast-related injury 10 years prior, presented to the chiropractic clinic with acute on chronic axial low back pain. Intervention and Outcome: The patient was seen 6 times over 6 weeks with treatment consisting of flexion-distraction, high-velocity, low-amplitude spinal manipulation, and therapeutic exercises. Due to the amputation and prosthetic device, modifications to the evaluation and treatment approach were necessary. To assist in return to activities of daily living, which often provide challenges to lower limb amputees, therapeutic exercise targeted end-range spinal loading, and individualized functional movements including squat-to-bench and short angle hip hinging. Following the trial of care, the chief complaint was resolved and the patient was released to self-care. Conclusion: This case demonstrates successful modification of chiropractic care for the management of low back pain in a patient with a unilateral transtibial amputation. Low back pain is common for individuals with lower limb amputation and there is a paucity of relevant literature to guide clinicians. (This is a conference presentation abstract and not a full work that has been published.)

#### **Collaborative healthcare system benefits enhancing patient outcomes and satisfaction: A case report for a patient with neck pain and cervical radiculopathy**

*Kendal Hoard, Chris Arick*

Objective: This case report highlights the collaborative benefits of an integrative health care system increasing patient satisfaction and improved outcomes for a usual chiropractic patient presentation. Clinical Features: A 42-year-old female presented to the clinic with pain and paresthesia in the left lateral cervical spine, left posterior shoulder, and left lateral arm into the left ring finger. Interventions and Outcomes: Three visits of chiropractic care using cervical distraction techniques occurred to improve function and passive ROM of the cervical spine. Referral for MRI ordered, and subsequent orthopedic spine consultation with surgical removal of broad-based disc osteophyte complex. This surgical intervention resulted in elimination of radicular symptoms and posterior neck pain 2 weeks post-op. Six-week post-op resulted in no extremity pain, decreased shoulder pain and soreness, bilateral 5/5 upper extremity strength, sensation grossly intact, no lifting restrictions. The patient reported positive outcomes and the efficiency of the handling of her case. Conclusion: Efficient health care processes within an integrative health care system, including patient satisfaction and positive clinical outcomes. (This is a conference presentation abstract and not a full work that has been published.)

#### **Management of lumbar disc herniation in a 56-year-old male utilizing Cox technic distraction manipulation**

*Edward Johnnie*

Objective: To demonstrate the effect of utilizing Cox Technic distraction manipulation in the management of lumbar radiculopathy secondary to disc herniation. Clinical Features: 56-year-old male presented with complaints of low back pain and left-sided lower extremity pain to the left lateral ankle and paresthesia in the left outer calf. Patient underwent trial of physical therapy for 8 weeks consisting of resistance band exercises with minimal relief. Lumbar spine MRI findings included left sided disc herniations at L4/5 and L5/S1. Intervention and Outcome: The patient underwent an 8-week course of conservative care consisting of Cox Technic distraction manipulation and spine sparing strategies advice. Results of care showed a 60% reduction of low back pain from 8/10 to 2/10 on NRS with resolution of leg pain and paresthesia. At 6-month follow up, the patient continued to improve and rated his low back pain at 1/10 with no recurrences of leg symptoms. Conclusion: Conservative management of lumbar radiculopathy utilizing Cox Technic distraction manipulation was effective in reducing pain and radicular symptoms in a patient with lumbar disc herniation. (This is a conference presentation abstract and not a full work that has been published.)

#### **Trends in publications in the *Journal of Chiropractic Education*: World regions, academic affiliations, and study types**

*Claire Johnson, Bart Green*

Objective: The purpose of this study was to review publication trends in the *Journal of Chiropractic Education* (JCE). Methods: We searched PubMed for all articles from the JCE for the past 16 years from 2007 through October 2022. Authors' countries, academic affiliations, and study types were entered into an Excel spreadsheet and data were reviewed for trends. Results: There were 314 citations from 2007 through 2022. The number of publications increased over 4-year periods: 2007-2010 (51), 2011-2014 (78), 2015-2018 (80), 2019-2022 (105). The majority of authors were from USA (62.0%), followed by Canada (12.4%), Australia/New Zealand (11.7%), Europe (10.9%), Africa (1.9%), Asia (0.8%), and South America (0.4%). The most non-editorial publications were from Canadian Memorial Chiropractic College, Palmer Chiropractic College (Davenport), Palmer Chiropractic College (Florida), and National University of Health Sciences. Of all articles, the majority (79%) were quantitative, qualitative, or mixed method designs. Conclusion: This study shows that the trends in chiropractic education research publications continues to grow and increase in complexity. Over the past 16 years, there has been steady growth in the number of papers published in the JCE. (This is a conference presentation abstract and not a full work that has been published.)

#### **Global growth of chiropractic degree granting programs: a mapping study of the past 125 years to predict the number of programs in 2055**

*Claire Johnson, Bart Green*

Objective: The purpose of this study was to identify extant chiropractic programs and estimate the global growth rate of degree-granting programs. Methods: Current chiropractic programs and their year of initiation were identified using the Google search engine and websites of national organizations and professional associations. Current programs were charted, and the growth rate using trendline equations estimated the number of programs by 2055. Results: In 2022, there were 52 chiropractic degree-granting programs. The rate of growth of number of currently existing programs from 1895 to 2022 using an Order 3 polynomial trendline was  $y = 0.0414x^3 - 0.4213x^2 + 2.5293x + 0.8671$ , with  $R^2 = 0.9943$ . A change in slope was noted in the mid-1960s. An additional calculation of the data from 1965 to 2022 using a linear trendline showed  $y = 7.6857x + 4.6$ , with  $R^2 = 0.9925$ . Using the trendline and slope, there will be an estimated 80 chiropractic programs by 2055. Conclusion: This prediction model suggests that there will be 80 chiropractic programs by 2055. Consideration for this growth is needed as we plan for education programs, research, and scholarship that builds the future chiropractic profession workforce. (This is a conference presentation abstract and not a full work that has been published.)

#### **Case study: EEG P300 evoked response potential reported at pre, post, and 3.5 months following concussion in a chiropractic student athlete**

*Dale Johnson, Krista Ward, Monica Smith*

Objective: Research suggests the P300 evoked response potential (ERP) exhibit a delayed response time (P300T) and diminished electrical potential (P300V) following a concussion. In this case study of one rugby student-athlete, electroencephalography scans (EEGs) were acquired at baseline, following a concussive event, and at follow-up 3-1/2 months later. P300 latency and amplitude provide objective measures of changes associated with a concussion and after a period on recovery. Clinical Features: The student-athlete reported a history of 3 concussions prior to their baseline scan. Baseline P300T of 296 ms and P300V of 19.1  $\mu$ V were within age and gender normative ranges (248-322 ms and 9-22  $\mu$ V, respectively). Intervention and Outcome: Chiropractic care was provided by licensed faculty and student interns before and after the concussion. Comparing baseline, post-concussive, and follow-up scans: P300T did not change significantly but P300 amplitude decreased from 19.1  $\mu$ V to 12.7  $\mu$ V to 10.0  $\mu$ V. Conclusion: In agreement with the published literature, P300V is a more sensitive biomarker than the P300T for monitoring the changes in neural activity associated with concussion. This case study has investigated the utility of a P300 ERP study for the changes associated with a concussion. (This is a conference presentation abstract and not a full work that has been published.)

#### **The use of a Venn diagram in defining professionalism**

*Stuart Kinsinger*

Introduction: The scholarship defining professionalism has emerged through the literature on the principles and tenets that define patient care. Methods: A literature search focusing on professionalism in health care revealed early foundational papers followed by expanding publishing more recently. Discussion: Beauchamp and Childress published *Principles of Biomedical Ethics* in 1979. Practitioner and patient interaction was presented both academically and direct applied to the health care milieu. This was followed by scholarship contributing to an understanding of what defines professionalism principles. In addition to the ethics of care, the role of virtue and its meaning to individual caregivers has been included. Understanding of the practitioner's responsibility to set and maintain a healthy interaction in the presence of a power differential provides insight into a safe healing encounter. These 3 sub-domains: ethics, virtues and boundaries, are easily visualized with use of a Venn Diagram, showing how these overlapping principles intersect. Conclusion: The pursuit of optimal patient care in a safe and nurturing environment occurs by intent and design. Irrespective of specific healthcare disciplines, all providers have a professional duty to manage the interaction with patients and colleagues. (This is a conference presentation abstract and not a full work that has been published.)

#### **Prototyping a long-COVID study within a practice-based setting, testing procedural steps, outcome measures, and patient response to care**

*Lydia Knutson, Stephanie Sullivan, Fred Langenegger, Jennifer Massa, Emily Drake, Kate Hayes, Martha Herbert*

Purpose: To prototype the procedural steps, assessment methodologies, and participant response to care of a chiropractic practice-based research study. Methods: Following a single-arm trial design, participants experiencing protracted COVID-19 symptoms (>90 days) were recruited through social media advertisements, healthcare referrals, and emails to existing patients. Participants received 8 to 12 weeks of Axial Stability Method (ASM) chiropractic care and participated in 4 assessment time points. Participant response to care and baseline assessments included participant self-reports, cardiovascular recordings, spirometry, and balance. Results: Recruitment resulted in 30 inquiries; most individuals responded to Facebook advertisements (n=21). Seven participants (5 female) were enrolled in the study, average age 46. Study procedures were tolerated well, exempting spirometry.

Participants experienced improvement in fatigue, long-COVID symptoms, and quality of life. Mean participant fatigue (FACIT-fatigue) improved from the 76<sup>th</sup> percentile (US population) to the 25<sup>th</sup> percentile by the end of study. Cardiovascular responses tended towards normalization based on initial presentation e.g. hypertensive participants' blood pressures decreased. Balance results were mixed. Conclusion: Implementation of the study protocol was successful; investigators accounted for recruitment challenges, staffing needs, and scheduling. Participants reported improvement of long-COVID symptoms. Study design and small sample size limit response to care generalizability. (This is a conference presentation abstract and not a full work that has been published.)

#### **Chiropractic manipulative treatment to improve lower extremity function in elderly patient: A case study**

*Amy Koch*

Objective: Chiropractic management of 89-year-old male patient with perceived bilateral leg weakness, popliteal pain and left foot paresthesia. Clinical Features: An 89-year-old male patient presented with perceived bilateral gastrocnemius weakness, popliteal pain and paresthesia in the left foot. Initial exam indicated hyposensitivity for L5-S1 dermatome on the left. Lower extremity myotomes were within normal limits and DTRs +1 bilaterally. Cervical radiographs revealed 20-degree degenerative levoscoliosis of cervico-thoracic spine, neuroforaminal stenosis C3-C6, C3-C5 apophyseal arthrosis, and C5-C7 discogenic spondylosis. Intervention and Outcome: Treatments included cranial manipulation with low force, drop table assisted cervical and pelvic manual adjustments. G5 percussive massage therapy was also applied to the thoracic and lumbar spine regions. After 8 treatments over 2 months, patient reports significant improvement of pain levels reduced to 0-1/10 from 6/10. Lower extremity functional scale improved to a 49% disability from an initial disability of 75%. Patient reported decreased paresthesia to only the left great toe. Although patient's subjective complaint improved, the lower extremity neurological exam findings remained stable. Conclusion: Low force chiropractic manipulation may improve ambulation and function in elderly populations. (This is a conference presentation abstract and not a full work that has been published.)

#### **Stress fracture of the first rib in an 18-year-old baseball player: A case study**

*Misty Lagasse, Yahaira Roman*

Objective: To demonstrate the necessity for thorough examination and diagnosis of a stress fracture versus misalignment. Clinical Features: 18-year-old male baseball player presented with right-sided pectoral pain of insidious onset beginning 3 weeks prior, now constant and worsening. No trauma reported. Severe pain with Soto-Hall, lateral compression test, and tuning fork vibration prompted x-ray referral with suspicion of stress fracture. Images revealed nondisplaced fracture of the right first rib with periosteal reaction consistent with healing. Intervention and Outcome: The patient was referred for orthopedic consult with recommendation to abstain from athletics for 6 weeks. He was treated with cold laser and myofascial release of the surrounding soft tissue to decrease inflammation of the nearby musculature. A 6 week follow up x-ray revealed adequate healing and the patient resumed normal activities. Conclusion: A first rib misalignment is often adjusted in the chiropractic practice. Thorough critical thinking skills and examination allowed for the consideration of a stress fracture, preventing harm to the patient by taking x-rays before treatment. Though rib stress fracture is a rare occurrence, it is a possibility in athletes and must be ruled out by the chiropractor before rendering a thrust to the region. (This is a conference presentation abstract and not a full work that has been published.)

#### **Diagnosis and management of progressive neurological deficits in a young male patient presenting for evaluation by a chiropractor within a Federally Qualified Health Center**

*Kelsey Lewis, Jordan Mackner*

Objective: Highlight clinical features and management of a progressive spinal cord lesion. Clinical features: A 38-year-old male insured by Medicaid was referred by his primary care provider (PCP) to a chiropractor within a Federally Qualified Health Center for right sciatica. The exam was remarkable for absent right patellar deep tendon reflexes and hyperreflexia throughout with pathologic reflexes present. The patient was lost to follow-up before further testing could be obtained, but returned 4 months later with right foot drop, right quadriceps and intrinsic hand muscle wasting, hyperreflexia, and pathologic reflexes. The PCP ordered a neuraxis MRI demonstrating a lesion on C6-L2 and referred to neurology with an 8-month wait time. Intervention outcome: Patient was referred to the Emergency Department where he was treated with cervical decompression and immediate follow-up with neurology. He displayed improvements in gait and strength. Currently, his final diagnosis is still unspecified. Conclusion: This case describes the pertinent examination features of a spinal cord lesion necessitating emergent care. It also highlights health disparities making it challenging to see a neurologist in a timely fashion and the important role of the Emergency Department in expediting care for a patient

with progressive neurological deficits. (This is a conference presentation abstract and not a full work that has been published.)

#### **Providers' experience with artificial intelligence-based hand hygiene monitoring system during the COVID-19 pandemic: A rural medical center study**

*Joe Lintz*

Objective: This study explores providers' attitudes toward artificial intelligence (AI) among providers utilizing an AI-based hand hygiene monitoring system during the COVID-19 pandemic. In addition, it examines the relationship between providers' well-being and satisfaction with their use of that AI-based monitoring system. Methods: A self-administered questionnaire was mailed to 48 healthcare providers at a rural medical center in north Texas, with a 75% percent response rate (n = 36). Results: Results reveal that providers report sufficient satisfaction with monitoring system usage and that AI directly affects provider well-being. These findings indicate that lower satisfaction with AI can impact the well-being of providers. The findings also show that providers seek successful implementation of an AI-based tool that meets their expectations, but such implementation requires marked levels of consolidation to ensure that it fits within the existing workflows and is accepted by users. Conclusion: Future empiricism is needed to enhance the provider-AI experience through efficacious user-centered design approaches. (This is a conference presentation abstract and not a full work that has been published.)

#### **Motor variability in athletes: The effect of skill level**

*Emile Marineau, Janny Mathieu, Julien Ducas, Martin Descarreaux, Jacques Abboud*

Motor variability (MV) is the natural variation in posture, movement, and muscle activity observed during a task. Many factors may influence MV such as skill levels, pain, or fatigue. MV is a very trending subject nowadays, especially in the sports field. However, its effect on motor performance remains unclear. The aim of this scoping review was to quantify the role of MV on sports performance in athletes of different skill levels (novices vs. experts). An electronic search was conducted, using topics: Sports, Variability, and Instruments. From the 16,462 articles obtained, more than 100 fulfilled were included and analyzed. Those articles showed results from over 30 sports. The most studied sport was running followed by swimming and golfing. According to preliminary results, 46 articles concluded that athletes with higher skill level (expert) used less MV to perform their sports. Contrastingly, only 9 articles showed that athletes with higher skill level used more MV. Identifying the role of MV in preserving task performance with different skill levels, either through compensatory motor strategies or by stabilization of some movement could help understand the adaptation of MV in individuals with acute or chronic musculoskeletal pain. (This is a conference presentation abstract and not a full work that has been published.)

#### **Effectiveness and mechanisms of over-the-counter topical pain relievers: An umbrella review**

*Stuart McInosh, Mark Pfefer, Tyrone Tate*

Objective: Pain is common disabling condition. There is a need for adjunctive, non-addictive, cost-effective interventions and various topical pain relievers may be effective in filling this role. The aim of this review is to describe proposed mechanisms and evaluate the effectiveness of topical menthol-based and capsaicin-based over-the-counter pain relievers. Methods: A search was conducted of medical literature using MEDLINE, CINAHL, Cochrane Central Register, and Index to Chiropractic Literature. All eligible articles were reviewed then scored using the methodology for Joanna Briggs Institute (JBI) Umbrella Reviews. Two independent reviewers performed the scoring of articles. Results: Publications regarding mechanisms and effectiveness of topical agents for pain were located. Ultimately, 11 articles regarding menthol-based agents and 23 articles regarding capsaicin-based agents were included in this review. Menthol is a selective activator of transient receptor potential channels melastatin-8 and is also vasoactive. Capsaicin activates the transient receptor potential vanilloid 1 receptor of C nociceptors. Conclusion: A variety of over-the-counter topical menthol and capsaicin products are available in varying dosages and may be promising as an adjunctive intervention for ongoing pain relief. Recent publications highlight proposed mechanisms of action for various topical agents currently being used for pain relief. (This is a conference presentation abstract and not a full work that has been published.)

#### **The literature on treatment approaches utilized in the management of low back pain in the continent of Africa: A scoping review**

*Hiwot Melka, Raheleh Khorsan, James Whedon, Scott Haldeman, Robb Russell*

Objectives: The aim of this study is to describe the literature on the treatment approaches utilized in the management of LBP in the continent of Africa using a scoping review. Methods: A comprehensive literature search was conducted using EBSCO host platform for articles between January 1990 to March 2021. Boolean (AND,OR) and medical subject Headings (MeSH) including low back pain treatment, intervention, prevention and management were used. The scoping review used Arksey & O'Malley framework and results are reported with the PRISMA extension for scoping reviews (PRISMA-Sr). Results: The search yielded a total of 425 articles and 22 articles were included in this review.



Various disciplines are consulted for management of LBP including primary care providers, physiotherapists, chiropractors, pastors, and traditional healers. Management of LBP involves pain medication as the most common form of treatment. Herbal therapy and massage were the predominant alternative therapies. The findings suggest understanding cultural beliefs and biopsychosocial factors are equally important in managing LBP in Africa. Conclusion: The available literature on the treatment of LBP in Africa is limited. Due to lack of published literature greater emphasis on research needs to be considered in understanding LBP in the continent of Africa. (This is a conference presentation abstract and not a full work that has been published.)

#### **Current approaches to understanding discogenic pain: A narrative review encompassing pathoanatomy and innovative imaging techniques**

*Aidan O'Brien, Stacey Cornelson, Norman Kettner*

**Objective:** This narrative review identified the most innovative MRI techniques for the evaluation of discogenic pain. In addition, we examined recent literature addressing lumbar pathoanatomy of discogenic pain. This contemporary data will inform clinicians of current approaches in the etiology of discogenic pain. **Methods:** Selected search terms were utilized in multiple digital databases to identify recent imaging modalities assessing discogenic pain. The results of over 100 publications were analyzed, synthesized and summarized to provide a thorough but concise review. **Results:** MRI techniques such as MR spectroscopy and pulse sequences including T1 rho, T1 and T2 mapping and fat suppression explored the pathophysiology of discogenic pain. These MRI techniques may provide precise pain localization and offer potential for applications in the diagnosis and care of discogenic pain. **Conclusion:** This narrative review analyzed MRI techniques and pulse sequences with the most utility for detection of discogenic pain. These techniques focused on IVDs, cartilage and bone of the vertebral endplates. They serve to identify the elements of discogenic pain and endplate failure. The results of this narrative review advance our understanding of discogenic pain and will likely elevate the standards of care and outcomes in this patient population. (This is a conference presentation abstract and not a full work that has been published.)

#### **Evolution of our clinical internship experience management system**

*Christopher Petrie, Christopher Smoley, Katie Burns-Ryan*

The clinical internship experience encompasses the tracking of a myriad of graduation requirements, managing placement of interns amongst numerous clinicians and clinical sites, and tracking various trainings and certifications in addition to assessment data substantiating the graduates' competency across each of the 31 CCE meta-competencies. Historically this has required stakeholders to interface with and track data across multiple systems that did not integrate, while making aggregation across datasets difficult, if not impossible. We initially developed a system to collect and aggregate meta-competency assessment data utilizing a customizable electronic web-based forms tool to collect assessment data and a business intelligence (BI) suite to house and aggregate the assessment data. This process later evolved to utilize automated workflow tools to automate the movement of assessment data into the BI platform, while students gained direct access to their individual dashboards within the BI platform. With the inclusion of links to pre-populated forms within the tables of the BI system and workflows that update BI data based on those forms, we have arrived at a singular system that provided a one-stop place for students, clinicians, and staff to access and manage all the elements of the clinical internship experience. (This is a conference presentation abstract and not a full work that has been published.)

#### **Identification of barriers and facilitators to establish an interdisciplinary, inclusive, student-focused infant feeding clinic in a US chiropractic teaching clinic**

*Katherine Pohlman, Amy Miller*

**Objective:** This study explored barriers and facilitators with stakeholders who would be involved in the development of an evidence-based, patient-centered, interdisciplinary, inclusive, student-focused infant feeding clinic within a chiropractic teaching clinic at a US-based health sciences university. **Methods:** This qualitative study included stakeholder discussion occurring in 2 ways: 1) hybrid meeting with internal stakeholders and 2) One-on-one interviews with internal and external stakeholders. These open format meetings allowed for information and ideas to be exchanged. **Results:** Fifteen internal stakeholders attended the hybrid meeting with an additional 7 individuals attending one-on-one interviews to obtain specific information from inclusion experts with expertise on the organization or infant feeding. All stakeholders demonstrated passion and interest in the topic. Overall, this clinic was viewed as an important need for both education and clinical service provision. However, challenges were noted, predominantly around knowledge and skills required for development of key facets of the clinic and the time needed to develop collaborative relationships. **Conclusion:** Infant feeding is within the scope of several professions. As a public health issue, it should be included in healthcare professions programs. Establishing a focused, multifaceted clinic appears to be possible with the commitment and resources needed. (This is a conference presentation abstract and not a full work that has been published.)

#### **Systematic review of guideline-recommended medications prescribed for treatment of lumbosacral radiculopathy**

*Morgan Price, Kaelyn Mead, Alyssa Troutner, Tyler Barton, Sheryl Walters, Clinton Daniels*

**Objective:** The purpose of this systematic review was to summarize medications recommended in clinical practice guidelines (CPGs) for the management of lumbosacral radiculopathy. **Methods:** In September 2022, we searched PubMed, Cochrane Database of Systematic Reviews, Index to Chiropractic Literature, AMED, CINAHL, and PEDro for CPGs with recommendations on lumbosacral radiculopathy that were published between 01/2017 and 09/2022. We considered the following synonyms: sciatica, low back pain with leg pain, radicular pain, radiculitis, sciatica, and neuropathic pain. Two authors independently screened abstracts (and subsequently full texts) for eligibility. The following information was collected: recommendations for medication classes, references, indications, contraindications, harms, quality of evidence, and strength of recommendations. **Results:** Our search revealed 413 records; 39 full-text articles were reviewed. 13 CPGs were found to meet inclusion criteria. The included CPGs represented 8 countries from 3 continents as well as 1 aimed at a global presence. There were 9 classifications of medications discussed: acetaminophen, antibiotics, anticonvulsants, antidepressants, benzodiazepines, muscle relaxants, non-steroidal anti-inflammatory drugs, opioids, and oral corticosteroids. **Conclusions:** There was little to no consensus on guideline-recommended pharmacological management of lumbosacral radiculopathy. Anti-convulsants were commonly considered although many CPGs agreed that there was insufficient evidence to recommend them. (This is a conference presentation abstract and not a full work that has been published.)

#### **Diagnosis and management of lumbar compartment syndrome: A review**

*Katherine Reckelhoff, Mark Pfefer, William Owens, Sanam Bezanson*

**Objective:** Lumbar compartment syndrome (LCS) is rare but increasing in incidence, likely related to people over-exerting while performing weight lifting exercise. Besides overexertion, lumbar compartment syndrome occurs rarely following spine surgery. Like other compartment syndromes, this syndrome is characterized by raised pressure within a closed fibro-osseous space. Compartment syndromes lead to severe pain, disability, and if not treated can cause ischemia and tissue death. The aim of this narrative review was to describe current, best approaches for diagnosis and management of LCS. **Methods:** The search was performed in PubMed, SportsDiscus, and Index to Chiropractic Literature. Any studies regarding LCS and demographics, etiology, clinical features, diagnosis, management, and outcomes were included in this review. **Results:** Ultimately, we found 13 articles that met criteria. Excessive weight-lifting exercise accounts for the majority of LCS cases. Elevated creatine kinase and abnormal signal on MRI are often present. Approximately 50% of cases were treated with surgery, most often fasciotomy and approximately 50% of cases were treated conservatively, with no apparent differences in outcome. **Conclusion:** LCS is a rare but potentially serious condition that often requires urgent evaluation and co-management. Current best-practices diagnostic and management approaches are described. (This is a conference presentation abstract and not a full work that has been published.)

#### **Chronic exertional compartment syndrome: An umbrella review**

*Steven Reece, Mark Pfefer, Stuart McIntosh, William Owens, Diane Bartholomew, Sanam Bezanson*

**Objective:** Lower leg chronic exertional compartment syndrome (CECS) is commonly seen by chiropractors. CECS is an overuse injury associated with activity/exercise-related pain that can be disabling. The aim of this project was to review current diagnostic and management approaches. **Methods:** A search was conducted using MEDLINE, CINAHL, Cochrane central register, and Index to Chiropractic Literature. All eligible articles were scored using the methodology for Joanna Briggs Institute (JBI) Umbrella Reviews. **Results:** Ultimately, 11 articles were considered eligible for this review. Compartment pressure measurement and MRI are widely accepted as the gold standard to confirm diagnosis. Non-operative treatment options are often used in clinical practice but supporting evidence is limited. Surgical consultation should be obtained when pressures are high and when there are signs of significant tissue ischemia. Fasciotomy is considered gold-standard surgical management for severe CECS. Both 2-compartment and 4-compartment fasciotomy were associated with a 50% to 100% return activity rate. **Conclusion:** There is no confirmed consensus on the optimal management of CECS with insufficient evidence in the literature to support conservative or surgical management. If conservative management fails, fasciotomy appears to be an effective intervention for the majority of patients. (This is a conference presentation abstract and not a full work that has been published.)

#### **Chiropractic treatment of bilateral meralgia paresthetica: A case report**

*Christopher Roecker, Sachien Hewawasam, Matthew Skalski*

**Objective:** To describe the results of a U.S. veteran demonstrating bilateral meralgia paresthetica who was managed with chiropractic care. **Clinical Features:** A 40-year-old male was referred for chiropractic care in a VA Medical Center for the treatment of a 2-year history of bilateral anterolateral

high numbness, tingling, and burning pain rated as a 6/10. His pain was more intense on the left and made worse with direct pressure medial to the ASIS region while relieved when seated. Intervention and Outcomes: The initial intake was performed via video telehealth and a total of 3 face-to-face treatments followed, over a period of 6-weeks. Treatments included myofascial soft-tissue therapy to the anterolateral thigh, lumbo-pelvic spinal manipulation, and instructions for home stretching and conditioning activities were also provided. After 3 treatments, he reported 0/10 pain that only increased to 0.5/10 with direct pressure and his Global Impression of Change score was very much improved. A virtual follow-up occurred 1-month later, and he reported durable improvement and resolution of all symptoms. Conclusion: This report describes a short course of chiropractic care for the treatment of bilateral meralgia paresthetica with favorable outcomes in a U.S. veteran. (This is a conference presentation abstract and not a full work that has been published.)

#### **Chiropractic treatment of a 67-year-old Veteran with chronic low back pain utilizing cox technic flexion-distraction**

*Casey Rogers, Charles Elchert, Madeleine Hackney*

**Objective:** The purpose of this case report is to examine the treatment of an older Veteran with chronic low back pain utilizing Cox Technic flexion-distraction as a primary intervention for management. **Clinical features:** A 67-year-old male Veteran with chronic low back pain for several decades of life presented to the chiropractic clinic for evaluation. There were also reports of pain extending into the right lower extremity intermittently. The Veteran demonstrated significant degenerative changes in the lumbar spinal anatomy. He had never experienced chiropractic interventions for management for his condition. **Intervention and outcomes:** A trial of conservative care with Cox Technic flexion-distraction was applied as a primary intervention for management. Instrument assisted soft-tissue mobilization and moist heat were also applied to the low back for interventions. Despite having no changes in outcome assessments, the Veteran reported an improvement in his condition, reduced use of pain medication, and increased mobility after 4 sessions over a 4-week period. **Conclusion:** Cox Technic flexion-distraction was a beneficial chiropractic approach to pain management for an older Veteran suffering with chronic low back pain and intermittent lower extremity pain for several decades of life. (This is a conference presentation abstract and not a full work that has been published.)

#### **Research aspirations, interests, and skills exploratory ad-hoc committee (RAISE): Reflections on a developmental process**

*Stacie Salsbury, Lia Nightingale, Kira Baca, Brian Anderson*

**Objective:** Describe the development of an ad hoc committee to conduct scholarly evaluations surrounding faculty perceptions of the research environment at one chiropractic college. **Method:** Qualitative analysis of process-related documents. **Results:** Three developmental phases occurred over 15 months. During the Envisioning Phase, teaching and clinical faculty expressed the need for scholarship support to achieve professional promotion. A guidance team visualized a workgroup model to empower faculty to build research skills while completing a mixed methods study about the barriers and facilitators of faculty research at our institution. During the Sponsoring Phase, faculty co-chairs engaged collegiate leadership to secure an institutionally approved ad hoc committee of faculty members to complete the project. A prospectus was written which included a call to action, purpose and goal statements, membership, timeline, and requested resources and budget. During the Convening Phase, membership attributes were finalized, with an application process disseminated via faculty newsletter. Co-chairs reviewed 23 applications and CVs, with invitation letters sent to 13 faculty, across 2 campuses, with 12 acceptances. RAISE convened in July 2022 to begin our 18-month research journey. **Conclusion:** A faculty-initiated process created an ad hoc committee to support collaborative faculty research and scholarship. (This is a conference presentation abstract and not a full work that has been published.)

#### **Faculty research and scholarship at chiropractic colleges: Content analysis of ACC-RAC abstracts**

*Patric Schneider, Meredith Meyers, Michael VanNatta, Lia Nightingale, Kira Baca, Breanne Wells, Alex Margrave, Stacie Salsbury*

**Objective:** To describe the content of published conference abstracts on faculty research and scholarship within chiropractic educational programs. **Methods:** An 8-person team conducted a conventional content analysis of Association of Chiropractic Colleges Research Agenda Conference (ACC-RAC) abstracts published in the Journal of Chiropractic Education from 2007-2021. Abstracts were included if they addressed facilitators/barriers to faculty scholarship or described institutional initiatives to support faculty research at chiropractic programs. Sub-teams identified relevant abstracts, reached inclusion consensus, and thematically categorized topics. **Results:** Overall, 2355 abstracts were reviewed. 34 abstracts (27 Platform Presentations and 7 Poster Presentations) met criteria for inclusion (1.44%). Abstracts were classified into 5 categories: Publication (n=4; 11.76%), Promotion (n=5; 14.7%), Faculty Training/Skills Building (n=6; 17.65%), Research Infrastructure in Teaching Clinics (n=5; 14.7%), and Institutional Infrastructure (n=14; 41.18%). Methodologies included descriptive studies/needs assessments (n=15; 44%) and program/project evaluations (n=19; 56%). **Conclusion:** Faculty research at chiropractic

colleges comprised <2% of published conference abstracts over 15 years. Research is needed to determine individual motivators to engaging in scholarship, and facilitators to faculty research. This information may provide insight into improving the environment for scholarship and research in chiropractic education settings. (This is a conference presentation abstract and not a full work that has been published.)

#### **Nutritional intake and bone health: An umbrella review**

*Angie Segovia, Mark Pfefer, Ethan Couch, Llanet Sanchez, Emanuel Ajayi*

**Objective:** Osteoporosis is a common chronic problem characterized by decrease in bone mineral density, impaired bone strength, and an increased risk of fragility fractures. Fractures are associated with significant morbidity, mortality, and disability. In this review, we discuss current research regarding the role of diet, nutritional supplements, and dietary patterns in maintaining bone health. **Methods:** A search was conducted of medical literature using MEDLINE, CINAHL, and Cochrane central register, and Index to Chiropractic Literature. All eligible articles were reviewed then scored using the methodology for Joanna Briggs Institute (JBI) Umbrella Reviews. Two independent reviewers performed the scoring of articles. **Results:** Ultimately, 24 articles were considered eligible for this review. Calcium and vitamin D status are traditionally considered to be essential for bone health but recent studies have questioned the usefulness of both supplements. Recent studies have revealed that excessive calcium intake might increase risks of cardiovascular diseases. **Conclusion:** It is likely that calcium is best obtained from dietary sources rather than supplements. Adults might consider bones or bone meal in the diet or calcium supplements that have calcium-hydroxyapatite as an ingredient. Adults should also increase intake of vegetables, fruit, and foods rich in vitamin K. (This is a conference presentation abstract and not a full work that has been published.)

#### **Ultrasonography for diagnosis of distal biceps tendinosis: A case report**

*Dingbo Shi, Jessica Billham, Tyler Specht, Norman Kettner*

**Objective:** Distal biceps tendinopathy is a spectrum of conditions from a complete tear to biceps tendinosis. Patients with biceps tendinosis may experience pain and dysfunction inhibiting their activities of daily living. We describe the sonographic appearance of distal biceps tendinosis. **Clinical Features:** A 44 year-old male presented with a new complaint of insidious, intermittent becoming continuous, right shoulder and elbow pain after playing racquetball. There was no history of traumatic injury. Orthopedic examination of the right shoulder was provocative with Speed's test and 4/5 resisted muscle testing of the biceps. Three weeks after failing trial of care, diagnostic ultrasound was performed on the patient's elbow identifying distal bicep tendinosis. **Intervention and Outcome:** Patient management included Graston therapy, therapeutic ultrasound, at-home icing, and rest. The patient was seen 7 times in 8 weeks with minimal improvement and self-discharged. He was lost to follow-up. **Conclusion:** Ultrasonography is useful for visualizing distal biceps tendinosis, providing an alternative technique with many benefits compared to MR imaging. Sonographic findings of heterogenous hypoechoic changes with tendon thickening at the insertional site and no fiber disruption may assist in the diagnosis of distal biceps tendinosis differentiating the more common distal biceps tendinopathy. (This is a conference presentation abstract and not a full work that has been published.)

#### **Regulatory challenges of establishing a profession-led chiropractic college in a university dominant environment**

*Patrick Sim, Kym Davis, Billy Chow*

**Objective:** A private Australian Chiropractic program has been established with numerous challenges on regulatory fronts. Such challenges and how they were overcome are outlined. **Method:** A private college indicated as most suitable for its ability to deliver greater financial and professional returns. To develop, the designers required a strong grasp of regulation of the sector particularly regulatory processes, model and structure of proposed program and extensive application processes. Registration with 2 governing organisations, Tertiary Education Quality and Standards Agency (TEQSA) and the Council of Chiropractic Education Australasia required with both symbiotically required. **Results:** The TEQSA application process was resource intensive necessitating a specific skill set and unexpected timelines. The independent experts' stage can encounter subjectivity affecting progress and approvals and unexpected financial burdens; however, appeals process was well articulated. Both TEQSA (2019) and CCEA (2022) approvals with conditions were granted. **Conclusion:** Legislative, bureaucratic and professional regulation for a new program proved daunting presenting significant hurdles. For private institutions, this process is costly and subject to bias. Establishment requires high governance and educational standards, connections with professional and HE sector experts, and a clear driving purpose for educational and professional change. (This is a conference presentation abstract and not a full work that has been published.)

#### **Professional challenges of establishing a profession-led chiropractic college in a university dominant environment**

*Patrick Sim, Kym Davis, Billy Chow*

**Objective:** The establishment of a private college requires intersection of several professional spheres presenting unique challenges. **Method:** The chiropractic

landscape was examined via previous surveys, informal interviews, desktop research and industry knowledge for insight to potential challenges and support. The profession spheres were isolated to: Presence of intra-professional support, identified niche, presence of domestic or global benchmarks, and appropriately levelled academics. Results: Professional and political elites dissatisfied with current programs but strongly support traditional chiropractic principles. Public support same principles. Academic elite strongly oppose existence of traditional principles. University programs exhibit retreat from traditional principles indicating educational niche. Global network of similarly oriented programs accessed. Funds and supply of curriculum ensues. Academic leadership and faculty exist within the philosophical scope required. From regulatory applications, hostile elements from established programs lobbied via political and regulatory means to stop establishment causing a year-long delay and considerable financial costs. Overwhelming support and financial backing from the profession eventually overcame this challenge. Conclusion: The profession provided momentum and support but also the greatest challenges. ACC is the only PhD led program in Australia. (This is a conference presentation abstract and not a full work that has been published.)

#### **Promoting professionalism in lab exams: Lessons learned from a preclinical OSCE held during COVID**

*Jodell Skaufel*

As an affective competency, professionalism can be difficult to promote in lab exams. Behavior may be improved by how assessments are structured. Historically, this institution has utilized an OSCE formatted to resemble a traditional patient visit to assess preclinical skills, including professionalism. In past years, COVID-19 pandemic restrictions required 3 modifications to the OSCE format: the location of the exam, which was moved from the clinical environment to the classroom environment, the use of standardized patients, which was replaced with the use of students from the assessed cohort acting as model-patients, and the student attire requirements which were altered to allow examination gowns and shorts rather than the traditional clinical attire expected in prior iterations of the exam. Observation by faculty evaluators reported a perceived reduction in students' professional behavior. This presentation will detail the COVID-related OSCE modifications utilized by the institution, findings associated with professionalism, and the considerations to facilitate professionalism within the lab setting. (This is a conference presentation abstract and not a full work that has been published.)

#### **Creating a responsive clinical internship remediation process**

*Christopher Smoley, Christopher Petrie, Katie BurnsRyan*

Remediation is an integral component of the intern learning experience, facilitating continuous progression toward the goal of clinical competency by graduation. The clinical education team developed a unique model leveraging technology and academic faculty. The design promotes shared responsibility amongst stakeholders, removal of evaluator bias, timely learner support, and a built-in feedback loop between the clinical and didactic portions of the curriculum. The remediation process, termed a learning supplement at this institution, also employs a sliding threshold for triggering remediation as interns progress through the clinical experience. The progressive learning supplement threshold ensures student interns do not plateau at the skill level between remediation and graduate-level competency. The assessment platform automatically generates alerts to the student and clinical education based on the applicable thresholds providing timely intervention to get learners back on track. Academic faculty conducting the remediation creates separation between the assessor identifying the need and the remediator working with the learner. It also facilitates dialog between clinical and academic faculty regarding gaps in curriculum and competency expectations. The presenter will walk attendees through the current intern learning supplement process, the technology supporting the process, and the refinements made over time. (This is a conference presentation abstract and not a full work that has been published.)

#### **How do chiropractors explain spinal manipulation to patients: A descriptive literature review**

*Alexander Sundin, Matthew Thronson, Michele Maiers*

Objective: To identify how chiropractors communicate the mechanism(s) of spinal manipulation to patients. Methods: A comprehensive search was performed in Academic Search Premier, AMED, PubMed, and Index to Chiropractic Literature. Only articles in English were included. Search strategy keywords included patient education, communication, spinal manipulation, and chiropractic. Citations were screened by 2 authors independently for relevance; disagreements were discussed until consensus, and a third author was consulted as needed. The grey literature, including chiropractic trade publications, was also searched. Results: Our search of peer-reviewed literature yielded 186 papers. A search of Google Scholar using the same keywords did not produce any additional citations. After screening abstracts, 23 papers were read fully. A single study from 1994 reported the communication of a single chiropractor, with a lone patient, describing the mechanism as moving the bones. A search of the grey literature revealed no additional information. Conclusion: Current research suggests that patient beliefs affect outcomes, and what doctors say during a patient encounter influences patients' beliefs. Given the highly

variable, public-facing explanations about the mechanism of spinal manipulation online, it is increasingly important to ensure a consistent evidence-based message for clinical care and chiropractic education. (This is a conference presentation abstract and not a full work that has been published.)

#### **May-Thurner syndrome in pregnancy: A case study and review**

*D'sjon Thomas, Mark Pfefer, Haley England, Tiara Schmidt*

Objective: Iliac vein compression syndrome (May-Thurner syndrome = MTS) is an anatomically variable condition in which the left common iliac vein is compressed between the right common iliac artery and the underlying spine. This anatomical variant results in increased incidence of left iliac or iliofemoral vein thrombosis. Clinical Features: A 28-year-old woman, G1P0, at 24 weeks of gestation presented to a chiropractor with low back pain, left leg pain and stating that her symptoms were consistent with a prior diagnosis of sciatica, several years ago, that responded well with chiropractic care. On examination, the left lower extremity was markedly edematous. Deep venous thrombosis (DVT) was suspected. The patient was sent to an emergency department and ultrasound revealed no thrombosis but dilated vessels were present. MRI demonstrated severe compression of the common and external iliac veins. Intervention and Outcome: Enoxaparin for DVT prophylaxis was prescribed throughout pregnancy. The patient required no further anticoagulation after vaginal childbirth at 39 weeks. Conclusion: MTS is rare but predominantly affects young women with a higher incidence during pregnancy. MTS can be a life-threatening condition due to development of pulmonary embolism and prompt emergency department referral is indicated when suspected. (This is a conference presentation abstract and not a full work that has been published.)

#### **Chronic foot pain complicated by post-surgical and degenerative changes: A case report emphasizing value of extracorporeal pulse activation technology and class IV laser**

*Ashley Vogt*

Objective: Bilateral foot pain with history of multiple surgeries, tarsal tunnel syndrome, toe dislocation and advanced osteoarthritic changes. Patient unable to stand more than 15 minutes. Previous trials of physical therapy yielded minimal improvement and patient presented seeking alternative approach. Clinical Features: 80-year old female presented to a chiropractic teaching facility with 2-year history of bilateral foot pain. Gait disturbances noted upon inspection. A contracture of the 2nd metatarsal was noted on the right foot associated with surgical hardware at metatarsal-phalangeal joint confirmed by portable ultrasound examination. Hammer toe deformities present on the left proximal 3rd-5th phalanges. All foot and ankle ranges of motion restricted and painful. LEFS was performed and patient scored a 60% disability. Intervention and Outcome: Patient treated using Extracorporeal Pulse Activation Technology (EPAT) over the course of 4 visits, followed by 4 visits of Class IV laser treatment. Following intervention, patient reported a 60% decrease in subjective pain level and was able to begin exercise regimen without debilitating pain. Conclusion: Extracorporeal Pulse Activation Technology and Class IV laser treatment is an efficient and effective method of conservatively treating chronic foot pain. (This is a conference presentation abstract and not a full work that has been published.)

#### **Evidence-supported proposal for improved documentation of SDoH-related "Z codes" within the chiropractic patient record**

*Krista Ward, Donna Odierna, Monica Smith*

Objective: The International Classification of Diseases 10th revision (ICD-10-CM) now includes Z codes to allow for better documentation of social determinants of health (SDoH). This ACCRAC conference contribution presents a selection of current evidence relevant to chiropractic practice and education. Methods: We offer examples from online webinars and implementation studies identified in PubMed as being purposeful toward improving the use of non-billable Z codes. Z codes document SDoH related to literacy, employment, and access to food, housing, and transportation. Results: Z-coding improvements with targeted educational interventions may vary by type of healthcare setting (e.g. primary care vs tertiary hospital) and type of patient visit (e.g. medical vs mental health). Healthcare facilities also serving as teaching clinics could potentially take the lead in Z-code utilization, including incorporation into Electronic Health Records. Conclusion: Center for Medicare and Medicaid Services encourages addition of SDoH data in patient records to identify opportunities for advancing health equity and value-based care. Quality improvement initiatives of chiropractic providers and teaching institutions should include appropriate SDoH documentation. We will demonstrate chiropractic relevant examples, using the Centers for Disease Control and Prevention ICD-10-CM browser tool to search for Z codes and appropriate code usage. (This is a conference presentation abstract and not a full work that has been published.)

#### **P300 amplitude as a biomarker for concussions in student athletes: A review of the literature**

*Krista Ward, Monica Smith*

Objective: Secondary prevention is needed to identify concussions and help guide return to play in chiropractic student athletes at risk for head injuries. The



P300 amplitude event-related potential detected on electroencephalograms (EEGs) may be a useful biomarker for aiding concussion management and this study aimed to review relative literature. Methods: We reviewed studies identified in Pubmed using the search terms P300 and concussion. We selected observational studies published before December 2021, used EEGs to detect P300 amplitude data, and included adult participants with a sports-related concussion history and healthy controls. Results: We found 37 studies and 17 met our criteria. Fourteen studies found a statistically significant reduction in p300 amplitude for participants with a concussion compared to controls. The time between concussion and EEG varied between 24 hours and 28 years. The range of P300 amplitudes ( $\mu\text{V}$ ) for control groups varied from 7.14 - 18.47  $\mu\text{V}$  and the range of post-concussion amplitudes varied from 3.36 - 14.5  $\mu\text{V}$ . Conclusion: It is difficult to compare P300 amplitudes between studies due to methodological differences however P300 amplitudes were consistently decreased in athletes post-concussion compared to controls suggesting this may be a helpful biomarker for concussion management. (This is a conference presentation abstract and not a full work that has been published.)

#### **The benefits of using digital assessment and data collection in a practical skills lab environment**

*Christie Weibel-Maanum*

Objective: Paper assessments in practical skills labs hinder analysis of student performance. This paper describes the successful implementation of digital assessment in chiropractic methods courses. Methods: Microsoft Forms was used to implement a digital assessment tool across multiple methods courses. Appropriate competencies were identified for each course with a uniform rubric used across cohorts. Instructors created Microsoft Forms for assessment within their own courses. Faculty and teaching assistants assessed manual skills demonstrated by students during weekly lab sessions, every time adjustments were attempted. The student's device was used to perform the assessment via a QR code that led the assessor to the appropriate Microsoft Forms evaluation at the time of student evaluation. Results: The Microsoft Forms application delivers immediate formative feedback to each student via email, upon submission of a completed assessment. Faculty now has instantaneous cohort data, in the form of a graphing dashboard, which allows for changes in course content delivery based on aggregate data from Microsoft Forms. Conclusion: Use of digital data has become a powerful tool to assess competencies and identify gaps among cohorts. The cohesive use of Microsoft Forms allows all methods instructors to share information on student performance. (This is a conference presentation abstract and not a full work that has been published.)

#### **Survey of attitudes towards interprofessional education and practice**

*Anna-Marie Ziegler, Jason Napuli, Matthew Knieper, Ross Mattox*

Objective: Integrating of chiropractic services into federal and private hospitals is becoming increasingly common, causing need for training chiropractic students for engaging with other healthcare providers in an integrated setting. This descriptive survey facilitates describing views and attitudes of educators teaching in doctor of chiropractic Programs (DCPs) towards interprofessional education and practice. Identify competencies relating to interprofessional relationships in integrated settings currently being used in DCPs. Methods: An IRB-approved investigator designed survey was distributed via email as a Google Form to educators (faculty, clinicians, resident/fellows, administrators) employed at chiropractic educational programs with CCE accreditation. Closed-ended questions were descriptively analyzed in Excel. Responses to open-ended questions were analyzed by grouping similar responses into categories and identifying over-arching themes. Results: Results indicate that there is variability in interprofessional education competencies among those surveyed. Conclusion: Results of this survey will assist to further the understanding of how these concepts are implemented across DCs and allow for development strategies and consensus to be considered in the future. (This is a conference presentation abstract and not a full work that has been published.)

#### **FUNDING AND CONFLICTS OF INTEREST**

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#### **About the organization**

The Association of Chiropractic Colleges is comprised of accredited chiropractic educational programs in North America and affiliate member institutions worldwide. The Association of Chiropractic Colleges serves to advance excellence in education by leading a mutually supportive chiropractic academic community, and by supporting student learning, research, and evidence informed practice. Contact information may be found at <https://www.chirocolleges.org/>.

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