# CONFERENCE PROCEEDINGS

## Association of Chiropractic Colleges Educational Conference and Research Agenda Conference 2024: The Healthcare Evolution

Association of Chiropractic Colleges

ABSTRACT

This conference was convened by the Association of Chiropractic Colleges in San Diego, CA from March 21–23, 2024. The theme for this Association of Chiropractic Colleges Educational Conference and Research Agenda Conference (ACC-RAC) program was *The Healthcare Evolution*. This proceedings document includes the names of the Peer Review Committee members and all platform and poster abstracts presented at the 2024 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 San Diego, CA from March 21 through 23, 2024. The theme for this Association of Chiropractic Colleges Educational Conference and Research Agenda Conference (ACC-RAC) program was *The Healthcare Evolution*. 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 2024 ACC-RAC.

#### ACC-RAC Peer Review Committee

For the 2024 conference, the call for peer reviewers was widely distributed in July 2023. Each peer reviewer was invited to review a batch of between 20 to 30 abstracts within one topic domain. They were informed that the peer review process will help to provide a fair judging environment and improve congruence among the ratings. Reviewers were asked to review all assigned abstracts, however, if they were an author or co-author, to recuse themself and not rate that abstract.

The primary purpose of the peer review committee was to decide which abstracts were appropriate for the conference and of sufficient quality. Reviewers were invited to review more than one topic domain if they wished to sign up for more than one topic. After the abstracts were received, screened for completeness, and sorted into their topics, the reviewers were assigned to their topics. To improve transparency, the peer review chair sent the committee members regular updates, which included the steps being taken during the process.

There were 124 ACC-RAC peer review committee members who submitted their ratings and formative comments on time. The ACC commends the peer review committee members and the peer review committee chair for their excellent scholarly work and steadfast professional service. Following are the volunteers who provided peer review services for the 2024 ACC-RAC, listed alphabetically by last name:

Ilija Arar, Kira Baca, Tyler Barton, Patrick Battaglia, Judy Bhatti, Jessica Billham, Charles Blum, Gina Bonavito-Larragoite, Kelly Brinkman, Renee Broughten, Kathryn Brown, Paul Bruno, Casey Buns, Kara Burnham, Robert Butler, Alice Cade, Marni Capes, Beth Carleo, Cynthia Chapman, Chin-Suk Cho, Munyeong Choi, Zachary Cupler, Stuart Currie, Brian Davis, Faye Deane, Marshall Deltoff, Callyn Dittmar, Jonathan Emlet, Roger Engel, Amberly Ferguson, Marina Fox, Leslie Fuller, Geoff Gelley, Brian Gleberzon, Jordan Gliedt, Christopher Good, Whitney Graff, Sarah Graham, Joseph Guagliardo, Brett Guist, Billie Harrington, Shawn Hatch, Navine Haworth, Shawn He, Charmaine Herman, Nate Hinkeldey, Kathryn Hoiriis, Greg Hollandsworth, Dana Hollandsworth, Ramona Houston, Adrian Hunnisett, Thomas Hyde, Fiona Jarrett-Thelwell, Edward Johnnie, Jane Joyce, Martha Kaeser, Ashlee Kates-Ascioti, Stuart Kinsinger, Suzanne Lady, Misty Lagasse, Dana Lawrence, Ian Le, Craig Little, Ashley Long, Christine Major, Barbara Mansholt, Emile Marineau, Janny Mathieu, Gajkowski Matthew, Heather Meeks, Hiwot Melka, Kevin Meyer, Meredith Meyers, Michael Moore, Ryan Muller, Lia Nightingale, Aidan O'Brien, Anjum Odhwani, David Paris, Steven Passmore, Kevin Percuoco, Katherine Pohlman, Lynn Pownall, Morgan Price, Mohsen Radpasand, Macy Randolph, Muhamad Faizzuddin Razali, Katherine Reckelhoff, Anthony Rosner, Robert Rowell, Brent Russell, Stacie Salsbury, Alec Schielke, Gary Schultz, Samuel Schut, Margaret Sels, Zac Shannon, Dingbo Shi, Margaret Sliwka, Monica Smith, Christopher Smoley, Eugene Spilker, Carina Staab, Timothy Stecher, John Stites, Kent Stuber, Stephanie Sullivan, Mark Thomas, Steven Torgerud, Elissa Twist, Michael VanNatta, Robert Vining, Ashley Vogt, Amanda Vozar, Krista Ward, Breanne Wells, Timothy Whiting, Michael Wiles, Shari Wynd, Kenneth Young, Niu Zhang, Nicole Zipay. Peer Review Chair: Claire Johnson. *Journal of Chiropractic Education* Editor-in-Chief: Bart Green.

The ACC thanks all participants for their hard work, perseverance, and dedication to advancing the education and research for the chiropractic profession. 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

#### The lived experience of pregnant women under chiropractic care

*Joel Alcantara, Elizabeth Emmanuel, Sandra Grace, Stephen Myers*

Objective: To examine the lived experience of pregnant women under chiropractic care. Methods: With criterion sampling (ie, the woman was currently pregnant and under chiropractic care, English speaker with access to Zoom or Skype), data was generated using semi-structured interviews. The interviews were recorded and conducted until data saturation was achieved. Transcripts of the interviews were analyzed using a transcendental phenomenology lens. Results: A total of 10 pregnant women were interviewed. Their mean age was 30.9 years and presented for chiropractic care at a mean week of gestation at 15.44 weeks. Six themes emerged from our analysis: (1) Motivations for chiropractic care, (2) Barriers to and (3) Facilitators to chiropractic care, (4) Safety attitudes towards chiropractic, (5) Benefits of chiropractic care and (6) High patient satisfaction. The themes were multifaceted and interconnected giving rise to the essence of the lived experience of pregnant women to achieve self-determination, an enhanced pregnancy experience, support, and transformation of the women towards a focus on health and wellbeing. Conclusion: The findings of this study demonstrates that chiropractic care results in significant impact on the pregnant woman beyond addressing their pregnancy-related musculoskeletal complaints. (This is a conference presentation abstract and not a full work that has been published.)

#### Bilateral leg pain in a high school soccer player: A case report

*Jose Balseca, Amanda Balseca*

Objective: The objective of this case study is to describe the history, physical examination findings, chiropractic treatment plan, and clinical outcomes of an adolescent

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male soccer player. Clinical Features: A 17-year-old soccer player presented with bilateral lower leg pain. The complaint was present for 2 years with no positive outcomes. Complaint is sharp with numbness/tingling into the feet and exacerbates with activity. He notes the legs feel "swollen" and are sore the day after activity. The patient was evaluated by an orthopedist 2 years prior and diagnosed with chronic exertional compartment syndrome. Inspection revealed pronation of the right foot and bilateral internal rotation of the hips. Hypertonicity noted in the lower extremity anterior and posterior compartments bilaterally. Lower extremity ranges of motion were within normal limits and pain-free. Lower Extremity Functional Scale (LEFS): 65/80. Intervention/Outcome: Treatment consisted of chiropractic extremity manipulation; soft tissue therapies (instrument assisted, pin and stretch); post-isometric relaxation stretching; acupuncture. Eight chiropractic and 3 acupuncture treatments were provided over 4 weeks. Patient reported improvement of his symptoms, LEFS score of 78/80. Conclusion: It is possible to have success with conservative care for the treatment of chronic exertional compartment syndrome. (This is a conference presentation abstract and not a full work that has been published.)

### Chiropractic triage at primary care for degenerative cervical myelopathy: A case report

*Derrick Bark, Jevinne Khan, Patrick Battaglia*

Objective: Diagnostic delay for degenerative cervical myelopathy (DCM) is problematically 2 years. Chiropractors have expertise in spinal differential diagnosis and triage, so integration within primary care could improve outcomes in DCM due to prompt diagnosis and management. Case Presentation: A 55-year-old female presented to primary care within a Community Health Center for evaluation of neck and back pain. This health center has attending chiropractors available for scheduled care, and a chiropractic resident available one-day per week for warm handoffs. The patient was seen the same day by a chiropractic resident for evaluation. Chart review revealed bilateral carpal tunnel release for hand paresthesia in 2004 and 2019, without improvement. At chiropractic evaluation, the patient reported bilateral hand numbness, had ataxia and hyperreflexia with loss of hand dexterity. Referral from the resident to attending chiropractor was made, and baseline radiographs and subsequent MRI confirmed the diagnosis of DCM. The patient was referred to neurosurgery. Conclusion: Delay in diagnosis is common and problematic with DCM. This case demonstrates the value of chiropractic triage within primary care in early detection and management of DCM. Future work could explore same-day chiropractic availability within primary care for various spinal complaints. (This is a conference presentation abstract and not a full work that has been published.)

### Hospital-based chiropractors and interdisciplinary care training: An education descriptive report

*Katie Benson, William Foshee, Jason Moss, Keilah Brown, Joseph Chung, Brandon Meseberg, Breanna Leach, Chelsea Frank, Jeff Miller, Adam Wilkerson, Eric Daniel*

Objective: The purpose of this education descriptive report is to present the viewpoints of chiropractors working in a multi-clinic, hospital-based chiropractic organization. There are scant entries in chiropractic literature to inform educators about this practice type. Methods: Author inquiry was structured as a qualitative-constructivist design to capture these clinicians' education and employment backgrounds, interdisciplinary training opportunities in DCP clinical education, and post-graduation learning through on-the-job training. Results: The contributors for this report (n=9) represented 6 DCP whose practice experience ranged from 0.5–15 years. A summary report was aggregated to identify common themes. Recent graduates reported more interdisciplinary oriented pre-clinical education and internship opportunities. Additional responses included completion of an interdisciplinary internship (n=6), barriers to collaborative care due to perception of the chiropractic profession (n=6), and lack of other providers' knowledge of the chiropractor's scope of practice (n=5). Relevant professional development in the workplace included communication about the value proposition of chiropractic practice on a hospital campus (n=7) with an additional component of sharing and utilizing research (n=3) with other providers. Conclusion: Additional research is warranted to better understand practice outcomes and experiences for new graduates entering the chiropractic workforce in hospital-based practices. (This is a conference presentation abstract and not a full work that has been published.)

### Forecasting the use of chiropractic services within the Veterans Health Administration

*Victoria Bensel, Kelsey Corcoran, Anthony Lisi*

Objective: To model future use of chiropractic services within the Veterans Health Administration (VA) over the next 5 years. Methods: We extracted chiropractic use data from VA's Corporate Data Warehouse for fiscal years (FY) 2017 through 2022 (10/1/2016–9/30/2022). We calculated the proportion of VA chiropractic users—via care provided on-station and/or purchased from Community Care Network (CCN) providers—compared to overall VA healthcare users for each FY. We calculated the historical year-over-year compound annual growth rate (CAGR), which was used to predict use in FY2023 through 2027 (10/1/2022–9/30/2027). Results: VA's chiropractic use rate increased from 1.4% in FY2017 to 3.2% in FY2022, at which point 2.04% of VA users received only CCN chiropractic care, 1.29% only on-station, and 0.17% both. During the 6-year observation period, the CAGRs were overall 17.9%, CCN only 23.8%, on-station only 12.4%, and both 27.7%. Using those rates to extrapolate, by the end of FY2027 overall use will be 7.3%, with 5.94% only CCN, 2.91% only on-station, and 0.58% both. Conclusion: Results provide context for planning VA chiropractic resources and illustrate the need for advanced modeling approaches including other factors that could influence the predictions. (This is a conference presentation abstract and not a full work that has been published.)

### The prevalence of axial spondyloarthritis in patients treated for chronic back pain in chiropractic clinics: The Oregon chiropractic axial spondyloarthritis study

*Shireesh Bhalerao, Cydney Keller, David Perham, David Panzer, Kim Phung Nguyen, Rosy Quinn, William Malatestinic, Rebecca Bolce, Theresa Hunter, Atul Deodhar*

Objective: Non-rheumatology settings often lack evidence-based screening for Axial Spondyloarthritis (axSpA), in chronic back pain (CBP) patients, which may lead to delay in diagnosis/underdiagnosis. The objective of this study was to assess the prevalence of undiagnosed axSpA in patients attending chiropractic clinics with a primary or secondary complaint of CBP and referred according to the Assessment of Spondyloarthritis International Society referral strategy. Methods: Patients were identified in 4 chiropractic clinics in Portland, OR, from November 2021 through November 2022. Adults with CBP starting before age 45, without prior diagnosis of SpA, were eligible. Protocol-trained chiropractors used an eligibility questionnaire and a validated screening questionnaire to refer patients to a rheumatologist for assessment of suspected axSpA. Results: In total, 3,103 chiropractic visits were recorded, in 426 patients. Seven out of the 10 most common primary complaints were related to "spine pain". 115 patients were referred to a rheumatologist. Of those, 65 were eligible, consented, and were fully assessed. Eight patients had SpA. Conclusion: Twelve percent of CBP patients referred from chiropractic clinics had undiagnosed SpA. Targeted screening and referral strategies in chiropractic settings are needed and may lead to earlier diagnosis, intervention, and improved health outcomes. (This is a conference presentation abstract and not a full work that has been published.)

### The relationship between stress scores, a single-session of chiropractic care, and electroencephalography patterns

*Courtney Bliese, Emily Drake, Margaret Sliwka, Stephanie Sullivan*

Objective: This study aimed to assess the relationship between self-reported stress scores and P300 patterns using electroencephalography (EEG) and to evaluate change after a single chiropractic session. Methods: Thirty individuals (15 M, 15 F) with average age of 28.57 (+4.02) years completed the Weekly Stress Inventory, Hamilton Anxiety Rating Scale, Connor Davidson Resilience Scale, Severity of Acute Stress Symptoms, Brief Resilience Scale, and auditory oddball task at baseline and at a one-week follow-up. All individuals received a single chiropractic session at baseline using the Activator Basic Scan protocol. Results: Twenty-one datasets met EEG data quality standards. Moderate correlations were found between P300 amplitude and the Severity of Acute Stress Symptoms ($\tau$=0.34), Brief Resilience Scale ($\tau$=−0.32), Weekly Stress Inventory ($\tau$=0.28), and Hamilton Anxiety Rating Scale ($\tau$=0.27). Paired Wilcoxon tests showed significant changes ($p<0.05$) in the Hamilton Anxiety Rating Scale and Weekly Stress Inventory after a single chiropractic session. At one-week, P300 analysis demonstrated a 30.4% decrease in amplitude and a 32.3% increase in latency. Conclusion: This study demonstrated moderate relationships between baseline stress scores and P300 patterns along with changes in stress scores and P300 amplitude following a single session of chiropractic care. (This is a conference presentation abstract and not a full work that has been published.)

### Use of chiropractic care in Alberta: Evidence for the restoration of diagnostic imaging funding

*Cecilia Bloxom, Natalie Carrington, Kelly Fleck*

Objective: In 2020, the Alberta government sought to decrease costs by limiting which practitioners could order publicly funded diagnostic imaging (DI), extending that ability only to medical doctors. Prior to this change, chiropractors were able to order publicly funded DI. The total cost of these DI orders from chiropractors and physiotherapists was between $5–8 million dollars, a small portion of the total $1 billion spent on imaging yearly within the province. In advocating to restore publicly funded DI for chiropractors, the Chiropractic Association of Alberta commissioned research to understand chiropractic use within Alberta and the weight of this government decision on the accessibility of care. Publicly available Statistics Canada data from the Canadian Community Health Survey was analyzed, which tracked the utilization of various healthcare providers from 2001 to 2018. This research found that Alberta chiropractors were the preferred provider for musculoskeletal disorders (primarily back problems and arthritis), with a utilization rate of 19.1% in 2015. In terms of general access to healthcare, chiropractors were second only to medical doctors. This research highlights the importance of multiple streams of care within the public healthcare system and ultimately changed policy to regain publicly funded DI for chiropractors. (This is a conference presentation abstract and not a full work that has been published.)

### Healthcare provider perspectives of integrating a comprehensive spine care model in an academic health system: A cross-sectional survey

*Wren Burton, Stacie Salsbury, Christine Goertz*

Objective: This cross-sectional study explored clinician perceptions about integration of guideline-concordant spine care (GCSC) within 1 academic healthcare system. Methods: 26 spine care clinicians (55% response) completed a 25-item survey via Qualtrics on barriers and facilitators to delivering GCSC. Data analysis included descriptive statistics and content analysis. Results: Guidelines were implementable within the healthcare system, but no spine care guideline was used across provider types. Guideline access and integration with electronic records were barriers to use. Respondents (91.7%) agreed most patients would benefit from physical therapy or chiropractic before specialty referrals. Providers perceived spine patients expected diagnostic imaging (95.6%) and medication (82.6%) over manual therapies. Providers agreed with receiving imaging (91.6%) and opioids (69.5%) benchmarks but may not change orders if nudged by best practice advisories. Optimal spine care workforce required more chiropractors and primary care providers, current numbers of physical therapists, and maintained/fewer neurosurgeons and orthopedists. Qualitative responses regarded patient expectations/satisfaction, provider confidence with referral pathways, access issues, and evolving role of spine surgery as barriers to GCSC implementation. Conclusion: Despite general support for GCSC, first-line treatments such as physical therapy and chiropractic may require targeted implementation support. (This is a conference presentation abstract and not a full work that has been published.)

### Quality of life in chiropractic students pre- and post-COVID-19 lockdowns utilizing the short-form health survey-36

*Alice Cade, Kirk Stevens, Elly Whittaker, Reid Midanik*

Objective: We measured New Zealand (NZ) chiropractic students' quality of life (QOL), using the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) survey pre/post the COVID lockdowns. Methods: Previously recorded NZCC students' SF-36 questionnaires were collected before (2019) and after (2022) the NZ COVID lockdowns. Time points were compared using unpaired Wilcoxon Signed Rank tests and compared to age-matched and NZ normative data. Results: Eighty-one pre-COVID (51.9% female) and 120 post-COVID (60.8% female) datasets were returned. All pre-COVID years and scores were significantly higher than reference data ($p \leq .050$), except for emotional wellbeing (year 1: $p=.070$), pain (year 1: $p=.176$, year 2: $p=.630$), and general health (year 1: $p=.876$, year 2: $p=.673$), which were comparable to reference data. Post-COVID scores dropped drastically ($p \leq .050$) below pre-COVID and reference data—up to 74%, notably in emotional (from 90.3% to 23.5%) and fatigue (from 69.9% to 27.0%) domains. Only post-COVID physical functioning/limitations and social domains were comparable to previous data ($p > .050$). Conclusion: This study suggests that pre-COVID NZ-based chiropractic students perceived their QOL as the same/better than the average New Zealander or similarly aged person. Post-COVID most QOL scores dropped substantially with emotional/energy-related domains showing the greatest decline. (This is a conference presentation abstract and not a full work that has been published.)

### Examination of student and curricular time requirements for faculty

*Kristy Carbonelli-Cloutier, Mehrsa Harati, Dana Hollandsworth, Chris Malaya*

Objective: To evaluate the course time requirements for university faculty across a variety of domains. Methods: From January 2nd to April 14th (2023) Parker University asked faculty in the College of Chiropractic to log their hours across a variety of scholastic domains. Hours were logged securely using an online service (Clockify™) and collated into a single large, de-identified dataset. Results: Data showed that course-related (course development, course meetings, curricular management) and student-related (student interactions and activities) hours increased exponentially when class size reached 125 students. On further investigation, course development and course meetings remained static, while curricular management drove the noted changes above. Similarly, the increase in student-related hours was driven entirely by student interaction time, while faculty involvement in student activities actually decreased at 125 students. Conclusion: Class sizes of 125 students appear to be an inflection point above which faculty curricular time demands exponentially increase. Further, this appears to be inversely related to a decrease in faculty availability for student activities. This study did not examine whether the decrease in faculty availability for student activities reflected worse outcomes for students, but future research is being developed to answer this question. (This is a conference presentation abstract and not a full work that has been published.)

### Public health emergencies: Addressing the mobilization of complementary and integrative and allied health professionals

*Cynthia Chapman, Ian Coulter, Patricia Herman*

Objective: The COVID-19 pandemic necessitated an unprecedented call to action to mitigate the impacts of the virus and highlighted a need for a larger workforce capacity. However, it appears that complementary and integrative health (CIH) and allied health professionals had limited participation in the public health response to COVID-19 due to barriers such as absence of opportunities. The purpose of this study was to investigate how CIH and allied health professionals successfully mobilized in the past and to provide recommendations for future possible support/participation in public health emergencies. Methods: A literature review and mixed methods qualitative research interviews of professional organizations were utilized to understand past mobilizations and lessons learned. Results: The results of the literature review revealed a scarcity of publications regarding CIH and allied health professions past mobilizations for response to public health emergencies. The qualitative interview results discovered core concepts of collaboration, communication, workforce capacity, learning, leadership, and ethics/values as essential for successful mobilization and response to public health emergencies. Recommendations for improving public health emergency response include streamlined and collaborative communication channels, building a culture of interest in public health through academic institutions, post-graduate training, and research, and advanced vetting for local volunteer opportunities. (This is a conference presentation abstract and not a full work that has been published.)

### The use of rehabilitation exercises in conjunction with chiropractic care for neck pain

*Hay Yeung Cheng, Christina Cunliffe, Adrian Hunnisett*

Objective: The study aimed to investigate chiropractors' use, perspectives & attitudes on the use of rehabilitation exercises for addressing patients with neck pain. Method: Following ethical approval, a previously validated online questionnaire was distributed to practicing chiropractors via a UK chiropractic association mailing list. The survey used closed and standard multiple-choice questions to elicit quantitative data for analysis. The required sample size was estimated as 79. Results: A total of 89 responses were received with a majority (85%, n=76) using rehabilitation exercises alongside chiropractic treatment. Within this group, 93% (n=71/76) prescribed rehabilitation exercises for neck pain and was generally in line with that in other areas. A combination of home-based rehabilitation exercise and chiropractic intervention was considered most effective in treating neck pain, but patient compliance tended to present the biggest limitation. Posture correction exercises were considered the most effective rehabilitation exercise. Conclusion: This study indicated that practitioners considered that neck pain responded well to the combination of rehabilitation exercise and chiropractic treatment, and patients responded to treatment faster when compliant in completing prescribed home rehabilitation exercises. Further research into ways of improving and monitoring patient compliance is indicated. (This is a conference presentation abstract and not a full work that has been published.)

### Applying universal design for learning to health care education

*Michael Ciolfi*

Objective: Can Universal Design for Learning (UDL) be advantageous to promote learning in the health sciences? UDL is derived from architectural principles that remove barriers, enabling everyone to access all areas of a structure. UDL removes barriers, creating flexibility for learning and assessment. Methods: As part of an institutional wide objective, faculty applied to participate in a UDL certification program consisting of 8 3-hour sessions. Additional time was invested by participants to participate in discussion threads and complete assignments. Final selection of faculty was determined by the institutional administration to represent the 3 colleges within the university. Results: Following program completion, semi-structured interviews revealed that faculty began reducing learning barriers, making lessons more engaging, and motivating. Content changes included the use of virtual simulation, small/large group discussions, and case studies. Videos, podcasts, and other audio-visual resources linked to real world experiences also proved effective. Conclusion: The use of UDL concepts of engagement, representation, action, and expression can be effectively applied to learning to create inclusive, effective, and motivating learning experiences. UDL provides students with options on how to engage effectively within all health care learning experiences including how and when they will be assessed. (This is a conference presentation abstract and not a full work that has been published.)

### Identifying documentation of patient reported outcome measures in Veterans Health Administration chiropractic care using rule-based natural language processing

*Brian Coleman, Kelsey Corcoran, Anthony Lisi, Cynthia Brandt*

Objective: To evaluate a rule-based natural language processing (NLP) model for identifying outcome measure use in Veterans Health Administration (VHA) chiropractic care notes. Methods: A random, representative sample of 300 notes was obtained from a note corpus from VHA chiropractic care visits from 10/1/2017 to 9/30/2020. Outcome measures were electronically annotated in the notes by 2 reviewers using a validated annotation guide. A rule-based NLP model was developed to automate outcome measure identification in the clinical text. NLP model evaluation statistics were calculated comparing the rule-based model to the human annotated gold-standard in span matching (soft- and strict-boundaries) and binary note classification. Results: There were 76 outcome measure spans identified in 53 notes in the gold-standard and 111 spans identified in 58 notes by the NLP model, with 70 notes identified in at least one of the sets. Soft-boundary matching model performance was fair (precision=48%, recall=68%, F-measure=56%) and strict-boundary matching performance was poor (precision=26%, recall=38%, F-measure=31%).

Binary note classification was fair-to-good (precision=71%, recall=77%, F-measure=74%, accuracy=90%). Conclusion: Rule-based NLP identified outcome measure documentation with fair-to-good performance. Performance was likely limited by a low prevalence of outcome measure use in the corpus and a small sample size. (This is a conference presentation abstract and not a full work that has been published.)

### Complexity of veterans within a Veterans Affairs chiropractic clerkship using the Charlson co-morbidity index

*Michael R. Cole II, Charles Penza*

Objective: The purpose of this study was to assess the case complexity of Veterans encountered by chiropractic clerks within VA Chiropractic Clerkship Program using the age adjusted Charlson Co-morbidity Index (CCI). Methods: Data to calculate CCI scores were collected through a retrospective chart review conducted on new patients scheduled with one attending within a VA Chiropractic Clerkship over a 2-month period from July 1, 2022, to August 31, 2022. Charts of Veterans were excluded if the chiropractic clerk was not involved in the initial evaluation or follow-up care. Results: A total of 58 Veterans were included. The mean age was 51.9 years, with a range from 23 to 79 years. The CCI scores ranged from 0 to 13, with a mean CCI score of 2.46 (95% CI = 1.7, 3.2). Overall, 62.1% of patients had a CCI score greater than 0, 39.7% had a score greater than 2, and 15.5% had CCI scores greater than 5. The most common condition not including age was diabetes (22.4%). Conclusion: We were able to measure case complexity of Veterans within a VA Chiropractic Clerkship using the CCI. VA Chiropractic Clerkships offer exposure of complex cases to chiropractic students. (This is a conference presentation abstract and not a full work that has been published.)

### Radial nerve schwannoma diagnosed with point of care ultrasound at a chiropractic school outpatient clinic: A case report

*David D. Crespo-Rivera, Jake Halverson, Mayda Serrano-Alvida*

Objective: This case report illustrates the use of point of care ultrasound in a chiropractic clinic, to expedite the diagnosis and management of a radial nerve schwannoma. It emphasizes the benefits of conservative chiropractic care for these lesions. Clinical features: A 22-year-old male presented with localized pain in the posterior left upper arm. The patient had experienced these symptoms for a year, and nothing relieved the pain. Digital and ultrasound probe pressure exacerbated the symptoms, resulting in sharp, stabbing pain rated 10/10 on the verbal rating scale. All neurological and orthopedic tests were within normal limits. Intervention: The lesion was initially identified using a Sonon 300L ultrasound probe. We promptly managed the patient with conservative chiropractic care and physical therapy modalities, which would have otherwise been delayed. The patient's symptoms were reduced to 2/10 within 6 office visits. The patient was also referred for comanagement by a neurologist. Conclusion: Schwannomas are the most common benign tumors of the peripheral nerves and may clinically mimic other painful musculoskeletal conditions. Point of care ultrasound is a powerful tool that can generate high resolution images of the musculoskeletal soft tissues, allowing for expedited diagnosis and management. (This is a conference presentation abstract and not a full work that has been published.)

### Experiential learning: Evolution and pandemic changes

*Scott Dunham, David Starmer*

Objective: The shift towards competency-based education (CBE) and pandemic-necessitated change in delivery methods have had a profound impact on Chiropractic education. The purpose of this study is to analyze Experiential Learning for 4 time periods—the 2009–2010, 2013–2014, 2019–2020 and 2023–2024 academic years at a chiropractic institution. Methods: Academic course calendars and syllabi from 4 academic years were analyzed to identify instances and types of Experiential Learning. The number of hours and proportion of the pre-clerkship curriculum for different delivery methods was calculated. Results: The proportion of pre-clerkship active learning experiences increased from 35% to 53% from 2009 to 2023. The overall curriculum also increased in hours from 3607 to 4574 (27%) during the same period. The type of Experiential Learning evolved post-pandemic with changes to infrastructure, (addition of a simulation lab), delivery methods (in-person, online), formative assessments (live/virtual clinical simulations), and complex summative assessments. Conclusion: Experiential Learning has become more prominent and situated earlier in a student's education. Changes to delivery methods over time and because of the COVID-19 pandemic has revealed additional opportunities to leverage the benefits of Experiential Learning. (This is a conference presentation abstract and not a full work that has been published.)

### Evolving healthcare education to address whole health leadership

*Jonathon Egan, Winmar Way, Michael Ramcharan*

Objective: The National Academy of Medicine's 2023 report on "Achieving Whole Health: A New Approach for Veterans and the Nation" noted an urgent need for a whole health approach in healthcare systems, a call echoed in the 2023 Surgeon General's Perspective. The purpose of this narrative review is to explore how a professional doctorate degree program rooted in partnerships and focused on Whole Health may prepare graduates to become change agents and leaders in healthcare systems. Methods: A literature review was conducted on whole health, systems change, clinician leadership development, and educational partnerships. A market review of existing doctoral programs that addressed themes from the Whole Health Report was conducted. Results: Several themes emerged, including the importance of leadership development for clinicians to be prepared to engage in systems change, a lack of educational offerings that prepare clinicians to become change agents in whole health, and the potential of partnerships to address this lack. Conclusion: Partnerships between clinicians, higher education institutions and professional organizations can foster innovation in whole health education and leadership development. Educational programs created from these collaborations can equip practitioners to extend their clinical skills to make systemic changes across health systems. (This is a conference presentation abstract and not a full work that has been published.)

### Non-surgical management of post vasectomy pain syndrome: A case study involving chiropractic care

*Antonio Figueroa, Jr., Nathan Hinkeldey, Heather Meeks, Mandy Wong, Jeffrey Remsburg*

Objective: To provide a case of successful management of post-vasectomy pain syndrome (PVPS) via multimodal chiropractic care Clinical Features: A 34-year-old Caucasian male presented to a hospital-based chiropractic clinic with aggravation of chronic pain in the suprapubic, groin, and testicle following vasectomy. This aggravation resulted in constant, severe pain. Acupuncture, gabapentin, and physical therapy were trailed without relief. Surgical evaluation recommended orchidectomy, but he was seeking additional interventions prior to consideration. Intervention/Outcome: Following evaluation, he was provided extension in lying with left overhang which immediately reduced the pain in clinic. Myofascial release to the psoas with home exercise program to include the kneeling psoas stretch. Three week follow up illustrated only one day of pain. Two weeks later he presented pain free and was discharged. He was able to re-engage fully with exercise. Conclusion: A combination of psoas myofascial release, hip flexor stretching, and extension in lying provided complete, sustained relief of symptoms diagnosed as PVPS in this case. (This is a conference presentation abstract and not a full work that has been published.)

### Reviewing prior imaging in a chiropractic radiology practice: Influences on recommendations for additional diagnostic testing

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

Objective: To explore the influence of reviewing prior imaging on recommendations for more imaging in an academic chiropractic radiology practice. Methods: We retrospectively reviewed radiology reports generated over 1-year in a United States chiropractic college clinic system. The radiology process included automated searching for prior images in an internal database. Images from a regional health system database were sought when a finding with clinical implications was unclear or the clinical history suggested a problem could be clarified with prior imaging. Data were abstracted to a secure adaptive electronic questionnaire. Results: We reviewed 1712 x-ray, and 165 ultrasound reports for 978 (52%) female and 899 (48%) males with a mean age of 41 years (range: 2–93). Prior imaging review was noted in 417 (22%) reports. Of these 417 reports, 192 (46%) identified images obtained from an external database. Prior imaging was credited with answering a clinical question in 98 (24%), and a radiographic question in 228 (55%), reports. Reviewing prior images led to additional imaging recommendations in 18 (4%) reports while the need for any follow-up recommendation was negated in 119 (29%). Conclusion: We observed a net reduction in follow-up imaging recommendations when reviewing prior imaging. (This is a conference presentation abstract and not a full work that has been published.)

### Utilization rates by referral pathway and managed care profile in a multi-state, hospital-based chiropractic organization

*William Foshee, Jason Moss*

Objectives: This analytical report describes utilization rates by defined patient acquisition pathway with individual clinic and provider, regional market, and managed care profile as variables for additional analysis. Methods: The analysis was conducted using supervised machine learning through decision tree modeling to identify variables that affect the probability of a patient completing a 12-visit care plan. Patient demographics (n=11333) were retrieved from the organization's EHR for analysis. Secondary analysis was conducted utilizing a simple linear regression model. Results: The decision tree model indicated the mean number of visits for patients utilizing commercial insurance plans (n=8256), Medicaid (n=804), and self-pay (n=379) is 7.6. Personal injury and Medicare have a mean of 12 visits. Attorney referrals only accounted for 3% of all new patient acquisitions and have a mean of 14 visits per case. Patients are seen for 2 more visits for injury care when referred by an attorney. All other patient referral pathways were seen 8.1 times. The linear regression model supports these findings with an RSE of 0.4137 and p-value of $< 2.2e-16$. Conclusions: There are limited statistics available on chiropractic utilization rates for comparison. Additional research on predictors for average patient visits is warranted. (This is a conference presentation abstract and not a full work that has been published.)

### Chiropractic as complementary care for patients with multiple sclerosis: A case report

*Maria Elena Garcia-Carballo, Maria Eugenia Dueño Berrios, Mayda Serrano Alvira*

Objective: To present chiropractic care as complementary treatment for a multiple sclerosis (MS) case with numerous complicating factors and concomitant medical treatment. Clinical Features: A 61-year-old female presented with uncoordinated gait, migraines, cervical, thoracic, lumbar, and pelvis/sacrum pain; as well as weakness, numbness, tingling, burning, and often shock-like sensations of the arms and legs. Past medical history included osteoporosis, laminectomy procedure at L4/L5 with incidental finding of multiple sclerosis (MS) prior to procedure, and internal fixation surgery for right malleolus fracture. Past medical history also included 12 years of MS treatment and 3 different medications for MS, with symptoms remaining or worsening. Physical examination revealed spinal biomechanical segmental dysfunction. Intervention/Outcome: Conservative chiropractic manual, flexion/distraction, and instrument assisted therapies were provided to address spinal biomechanical segmental dysfunction; and lifestyle change recommendations were offered to complement medical treatment. Functional assessment re-evaluation questionnaires demonstrated 40% and 44% improvement and the patient reported major improvement in quality of life. Conclusion: Chiropractic proved to be an effective complementary care for MS, as it improved quality of life and decreased pain intensity. This case report demonstrates that chiropractic care can and should be complementary to medical treatment of MS. (This is a conference presentation abstract and not a full work that has been published.)

### Motor performance of participants with chronic neck pain and asymptomatic participants pre- and post-spinal manipulation using separate eye and head movement fitts tasks

*Geoffrey Gelley, Steven Passmore, Brian MacNeil*

Objective: To examine the effects of cervical spine manipulation (SM) on eye and head movement tasks in chronic neck pain (CNP) participants who were symptomatic or asymptomatic at the time of the study. Method: This observational study provided a single cervical SM to symptomatic (n=20) and asymptomatic (n=20) groups. Participants completed separate eye and head movement Fitts tasks (FT) with increasing indexes of difficulty before and after cervical SM, to identify changes in the primary outcomes of eye and head movement times (MT) during specific amplitude and width conditions. Results: During the eye movement FT, there was no significant effect of SM on MT. During the head movement FT, there was a significant SM x Group interaction (p=0.022) on MT of the symptomatic group (p=0.011). There was a significant effect of SM on MT during the amplitude (p=0.008) and width conditions (p=0.011) within the symptomatic group. Conclusion: There was no effect on the time to complete the eye movement task following SM, but in contrast there was an effect for the head movement task in those with symptomatic CNP. Targeted region movement facilitation occurred, indicating potential neuromuscular recruitment or control improvement. (This is a conference presentation abstract and not a full work that has been published.)

### Neural connectivity alterations in people with chronic low back pain receiving chiropractic care

*Usman Ghani, Imran Khan Niazi, Nitika Kumari, Imran Amjad, Samran Navid, Kelly Holt, Moeez Ashfaque, Amit Pujari, Ernest Kamavuako, Heidi Haavik*

Objective: This study investigated the modulation of functional neural connectivity (FNC) in resting-state electroencephalogram (EEG) in response to chiropractic adjustments in individuals with chronic low back pain (CLBP). Methods: 67 CLBP (mean age: 43±13 years, 33F) individuals were randomly assigned to either 4 weeks of chiropractic care with usual care (chiro+usual care) or usual care alone. Resting EEG data was collected before (Pre), immediately after (Post), and after 4 weeks (Post-4W) for intervention or control groups. Cluster-based permutation analyses were done to compare Phase Locking Value (PLV) matrices across these time points for FNC. Results: Significant alterations in FNC patterns among the intervention group in Pre vs. Post-4W yielded 2 distinct positive clusters within the alpha frequency band (p=0.02, p=0.04), which involved following EEG sensor pairs F3-O2, F3-P8, FP2-P8, FP1-P7, FZ-O2, FZ-P8, FZ-P7, P8-Pz, O1-Pz, O1-P4, O1-FP2, O1-FP1, and O2-C4. However, no immediate effects were observed post-intervention. The control group showed no significant PLV changes at any time point. Conclusion: These findings underscore the nuanced impact of chiropractic care on neural connectivity, potentially emphasizing the significance of extended intervention periods to detect notable neural connectivity alterations in people receiving chiropractic care. (This is a conference presentation abstract and not a full work that has been published.)

### In-vivo ultrasound measurement of spinous process separation during axial distraction

*Maruti Ram Gudavalli, Ralph Kruse, Bret A. White, Stacey L. Rider*

Objective: Although Spinal Manipulative Therapy (SMT) is beneficial in helping low back pain patients, the mechanism of SMT is not well understood. The objective of this study was to quantify the separation of spinous process using ultrasound during axial distraction of lumbar spine under 12 lbs (53.4N) and 25 lbs (111.2N) traction force using Cox flexion-distraction treatment protocol. Methods: To achieve our objective, we recruited 30 asymptomatic volunteers (mean age of 32 years old; 16 males and 14 females). The volunteers were asked to lie prone on a chiropractic table and ultrasound images were obtained from L3-S1 spinous processes. The volunteers were distracted using the Cox flexion distraction table in automated setting of 12 lbs (53.4N) of traction and 25 lbs (111.2N) of traction. Measurements were made and recorded by identifying the tips of the spinous processes and distances between L3-L4, L4-L5, and L5-S1. Results: Increase in separation distance between the spinous processes is similar at all 3 levels with mean increase of 1.25–1.28 mm under traction load of 12 lbs and 1.98–2.2 mm at 25 lbs of traction. Conclusions: This study demonstrates the importance of measuring movements inter-segmentally in the lumbar spine that provides insight into the mechanisms of chiropractic traction procedures. (This is a conference presentation abstract and not a full work that has been published.)

### The impact of class attendance on both individual and collective exam performances

*Xiaohua He*

Objective: This study was aimed to investigate the impact of attendance on performance of individual exam and collaborative exam. Methods: This was a retrospective study. There were 2 types of exams used, collaborative exam and individual exam. The Independent t test was used to compare the difference between groups, and Pearson correlation was used to reveal if there was correlation between rate of attendance and performance. Results: The average percentage of absence was 18% (4 times). When comparing the rate of absence between high grade group (90%) and low grade (less than 70%) group of individual exams, there was a significant difference between 2 (high: 5.36%, low: 19.53%, $p<.05$, 95% CI: low −23.6, high −3.5). Pearson correlation suggested that there was a moderate correlation between attendance and grades ($r = .289$, $p<.005$). When comparing the grades between attendance 18% above and below, there was a significant difference (above 18% 38.82±7.53, below 18% 33.64±5.28, 95 CI low −7.38, high −0.97). However, there was no correlation between attendance and performance in collaborative exam. Conclusion: The correlation between class attendance and academic achievement varies with different types of exams. (This is a conference presentation abstract and not a full work that has been published.)

### Analyzing the implications of employing global scoring in chiropractic license examinations

*Igor Himelfarb, Nai-En Tang, Bruce L. Shotts*

Objective: The NBCE aims to introduce global scoring for the Part I and II chiropractic exams in 2024, replacing the current 6-domain scoring system. This study assesses the impact of this change on pass/fail outcomes through a simulation analysis. Method: Six exam administrations were analyzed, employing norming group examinees to eliminate examinee-related variables, with sample sizes ranging from 600 to 1200. Domain scoring calculates separate scores for each domain (40 items), generating 6 domain scores for both exams. Exam scores were derived using Item Response Theory (IRT) and the Expected A Posteriori (EAP) Approach. Theta scores were transformed into a board score scale (125–800) with a cut score of 375. Results: Part I Exam: Fail rates decreased from 23%–38% (domain scoring) to 9%–18% (global scoring), reducing by 14%–20%. Part II Exam: Fail rates decreased from 29%–38% (domain scoring) to 9%–14% (global scoring), a reduction of 20%–24%. Pass/fail decision consistency rates between domain and global scoring ranged from 80%–86% for Part I and 76%–81% for Part II. Conclusion: Comparing fail rates and decision consistency between the current domain scoring model and global scoring method consistently favored the latter, endorsing its adoption for both exams. (This is a conference presentation abstract and not a full work that has been published.)

### Management of foot drop with instrument assisted soft tissue manipulation: A case report

*Nathan Hinkeldey, Chloe Goodwin, Aaron Meyer, Heather Meeks, Jeffrey Remsburg, Mandy Wong*

Objective: To describe successful management of foot drop with instrument assisted soft tissue manipulation (IASTM) in a case presenting with peroneal nerve entrapment. Clinical Features: A 56-year-old male presented with foot drop, paresthesia over the anterolateral aspect of the left calf, and point tenderness at the left fibular head presented to a hospital-based chiropractic clinic. His condition was complicated with comorbid diagnoses of transient ischemic attack, peripheral neuropathy, s/p lumbar laminectomy, and lumbar radiculopathy. Initial PROMIS Pain Interference (PI) 6B score was 23. Examination findings included hypoesthesia in the left lateral leg, pain in the lateral leg during Slumps at terminal flexion and observed foot drop. Intervention/Outcome: Treatment included IASTM focused in the fibular head area and lateral leg. It included unloaded and loaded active movements during performance for 5 visits over 7 weeks. His PROMIS PI 6B improved to 15. Full ankle dorsiflexion strength was restored, and foot drop was eliminated. Conclusion: In this case, IASTM was used and resulted in a successful treatment of symptoms associated with the diagnosis of peroneal nerve entrapment. (This is a conference presentation abstract and not a full work that has been published.)

### The effectiveness of clinic versus home-based, artificial intelligence-guided therapy in patients with low back pain: A non-randomized clinical trial

*Benjamin Holmes, Kenan Alzouhayli, Nathan Schilaty, Takashi Nagai, Luca Rigamonti, April McPherson, Nathaniel Bates*

Objective: Home-based therapy is a low-cost option for treating low back pain (LBP), but there is a lack of data on how it compares to therapy in clinical settings. It was hypothesized that when using artificial intelligence (AI) guided therapy, supervised in-clinic interventions would have a greater influence on patient-reported outcomes and strength than unsupervised, home interventions. Methods: This non-randomized controlled trial of 51 patients (28 females, 23 males) compared an 8-week, core-focused exercise intervention in a Clinic (supervised) versus Home (unsupervised) setting. Outcome variables included strength measures, performance, and function-based patient-reported outcomes. Generalized linear regression ($p < 0.05$) was used to evaluate outcomes relative to sex, intervention setting, and time. Results: Males exhibited greater strength ($p \leq 0.02$) but not better patient-reported outcomes ($p \geq 0.30$) than females. Clinic group exhibited greater lateral pull-down strength ($p = 0.002$), greater eccentric phase range of motion during overhead press ($p < 0.01$), and shorter concentric phase duration during bench press ($p < 0.01$) than Home group. Significance between groups was not observed in any other strength, performance, or patient-reported outcome ($p \geq 0.11$). Conclusion: AI-guided, telehealth exercise produced comparable outcomes in both home and clinical settings. Telehealth options may offer a lower-cost alternative to clinic-based exercise therapy for patients with nonspecific LBP. (This is a conference presentation abstract and not a full work that has been published.)

### Mapping chiropractic services within US federally qualified health centers

*Holli Kells, Charles Sawyer, Andrea Albertson, Michele Maiers*

Objective: Federally Qualified Health Centers (FQHCs) provide comprehensive primary care to underserved populations. While the presence of Doctor of Chiropractic (DCs) in these multidisciplinary systems is of growing interest, little is known. The purpose of this study is to identify and map where DCs are employed or providing care within FQHCs. Methods: Content analysis of websites for every FQHC clinic network identified by the Health Resources and Services Administration ascertained whether chiropractic services are offered and/or a DC is employed. Outreach via a chiropractic online community identified additional providers. Results: We identified a total of 232 DCs working full- or part-time in 135 of 1537 (8.7%) FQHC networks. Chiropractic services are delivered at FQHCs in 27/53 US states/territories, and in over 20% of networks in CA, CT, IN, MN, WI and SC. We were unable to identify chiropractic services in 26 states/territories. Limitations of this study include the accuracy of FQHC websites regarding services and providers. Conclusion: This study provides important baseline information about the presence of chiropractic within FQHCs. Future research includes exploring the roles DCs fulfil within FQHCs, skills necessary for successful collaboration, and barriers to incorporating chiropractic services within these systems. (This is a conference presentation abstract and not a full work that has been published.)

### The 4Ms of age-friendly healthcare system: A qualitative study of what matters most to chiropractic students

*Lisa Killinger, Stacie Salsbury, Judy Bhatti, Elissa Twist*

Objectives: This qualitative study explored chiropractic students understanding of best practices for older patients using the 4Ms of Age-Friendly Healthcare Systems (4M-AFHS): asking patients what matters most, assessing mobility, medication safety vigilance, and cognitive health screenings. Methods: Three student cohorts (n=294) completed pre/post-test surveys following 4M-AFHS training. An open-ended question asked which elements were most important to implement into chiropractic practice. Qualitative content analysis identified salient themes. Results: 124 students provided responses. Medication safety (n=41) included checking medications, knowing side effects, and understanding how aging impacts drug use/interactions. Mental health (n=32) included screening/recognizing signs of depression, dementia, and acute confusion/delirium. 28 responses highlighted "asking what matters most" during visits over chief complaints. Mobility (n=23) identified movement/balance screenings, fall prevention, injury awareness, assistive devices, and exercise. Referral partners included prescribing providers, pharmacists, physical therapists, office staff, and community resources. Office modifications included ergonomic features/handrails, 4Ms-focused patient education/forms, and offering snacks/water. Conclusions: Chiropractic students trained in 4M-AFHS identified action steps to incorporate these best practices into their future practices. Clinical training should provide opportunities for students to develop patient-centered relationships with aging patients and gain skills in medication evaluation, mental health screenings, and intervening with mobility challenges. (This is a conference presentation abstract and not a full work that has been published.)

### Prevalence of neck pain and disability in mild traumatic brain injury (concussion)

*Jeff King, Mike Schneider, Minnie Sundaram, Greg Kawchuk, Charity Patterson, Anthony Kontos*

Objective: The aim of this study is to identify the prevalence of reported neck pain and associated impact on neck function in mTBI/concussion patient population. Methods: A multi-site survey was done in 2 academic medical center's concussion clinics. A convenience sample of new patients presenting for evaluation at these clinics were administered an electronic survey. The survey consisted of questions regarding demographics, type of injury, numeric pain rating scale (NPRS), neck disability index (NDI), location of neck pain and headache pattern. Data was stored electronically in REDCap. We performed descriptive statistics to report demographics and clinical characteristics. Results: 295 adults completed the survey. 181 patients (61%) reported having comorbid neck pain, with a mean NPRS score of 5 (SD ± 2) and mean NDI score of 38 (SD±18). Of patients who reported neck pain, 62% identified as a female with a mean age was 39.2 years (SD±16.1), and the most common mechanisms of injury were whiplash (38%) and direct impact head injury (51%). Conclusion: The findings of this study reveal a high prevalence of comorbid neck pain and disability in patients with mTBI highlighting the importance of screening for neck pain in this population (This is a conference presentation abstract and not a full work that has been published.)

### The use and misuse of a health care professionals' power: A study of 32 professional misconduct cases

*F.Stuart Kinsinger*

Objective: While clinical knowledge and skills are readily taught, translating professional values presents a challenge in teaching and learning the key tenets that professionals uphold. This paper explores power, including its good and beneficent use by a health practitioner and provides examples of misuse and abuse. Methods: A search of various licensing regulators' websites was undertaken in 6 northeast jurisdictions. Different professions were selected with websites searched for past findings of practitioner misconduct; all published in the public domain. The categories of misconduct were noted, but not ranked by severity; neither were penalties considered. Results: A total of 32 professional misconduct cases were selected. Practitioner sexual abuse of patients and financial abuse (fraud) were found in all jurisdictions. Other types of misconduct identified included scope of practice, misrepresentation, and obstruction. Conclusions: All professionals employ clinical expertise for the benefit of others. The Social Contract facilitates and empowers a practitioner's use of their position to help the public. Practitioner misconduct is predicated on misuse of this power. The authors explore educational approaches to facilitate a learner's emerging professional identity including strategies to mitigate against misuse and abuse of power. (This is a conference presentation abstract and not a full work that has been published.)

### Neck Disability Index scores at 3 and 12-month follow-up for treatment of post-surgical cervical symptoms utilizing flexion distraction chiropractic manipulation: A case series

*Ralph Kruse, Maruti Gudavalli, Jason Klamson*

Objective: The objective of this case series is to report changes in disability utilizing the Neck Disability Index (NDI) at 3 and 12 months in cervical Post-Surgical Continued Pain (PSCP) patients treated with Cox Technic Flexion Distraction Decompression Manipulation (CTFDD). Methods: Fourteen patients who had previous cervical spine surgery and continued to experience or developed pain of cervical etiology, were treated by Doctors of Chiropractic (DCs) certified in CTFDD during a multi-center prospective study. NDI patient questionnaires were collected during the initial visit, and at 3 and 12 months. This study is based on a larger study including 61 cervical and lumbar PSCP patients. Results: Fourteen eligible patients from 11 chiropractic clinics were included in this study. The patients received a mean (SD) of 10.75 (6.04) treatments during a mean (SD) of 63.83 (25.5) days. NDI Questionnaires documented a mean (SD) reduction of 6.43 (6.98) and 3.38 (5.09) at 3 and 12 months, respectively. Conclusion: The results of this prospective case series revealed a reduction in NDI scores at 3 and 12 months in cervical PSCP patients after onset of CTFDD chiropractic care. Additional larger studies are warranted for this specific cohort of patients. (This is a conference presentation abstract and not a full work that has been published.)

### Effectiveness of a peer mind body medicine training program on faculty stress responses

*Suzanne Lady, Katie Lockwood, Kara Burnham, Chad Lambert, Christine Major*

Objective: Trained facilitators are necessary for the continued growth of mind-body medicine (MBM) courses. The purpose of this pilot study was to determine the efficacy of a peer training program. Peer educators were trained using the Georgetown University School of Medicine MBM program. Methods: Effectiveness of the peer training was assessed via surveys administered pre- and post-training. Survey items were derived from previously validated stress, resilience, and mindfulness survey questions. 5 questions were rated on a Likert-scale and 5 were open-ended. Results: Peer training of MBM practices improved the perceived personal well-being of the 5 faculty members who participated in the training. Prior to training, 38% of respondents were able to experience inner peace during stressful situations, this increased to 80% post-training. Prior to training, 25% of respondents expressed difficulty recovering from stress, following training none of the respondents expressed difficulty recovering. Conclusion: Peer educators, trained in MBM practices, effectively educated their colleagues to improve their personal stress responses. This provides evidence that this type of peer training is feasible, yet it is unknown if all faculty trained in this peer educated program can serve as effective facilitators for student MBM courses. (This is a conference presentation abstract and not a full work that has been published.)

### Clinical correlates of pressure pain thresholds in 98 patients with uncomplicated low back and leg pain: A retrospective consecutive case series

*Robert Leach, Kate Hayes, Stephanie Sullivan*

Objective: Paraspinal tenderness has been a suspected mediator of back pain, yet a clinical operational definition remains elusive. We explored whether tenderness correlates with commonly used pain, disability, and provocation tests in a private practice setting, as potential mediator variables of segmental dysfunction/subluxation. Methods: After IRB approval, analysis of data collected ex-post facto from 98 consecutive patients with lower back and/or leg pain >=2/10 and Oswestry score >=20% and meeting preset inclusion and exclusion criteria were evaluated. Sample collection and statistician analyses [Python (v. 3.9) Pingouin (v. 0.5.3); Microsoft Excel (v.2307)] were blinded, with preset Bonferroni correction [alpha = 0.05/29 = 0.001724]. Results: Reduced Oswestry correlated moderately with reduced left/right paraspinal asymmetry [rmcorr = 0.43] and strongly/inversely with increase in pressure pain thresholds [PPTs] assessed 3 cm to the R [rmcorr = −0.59] and L [rmcorr = −0.61] at L5 after a month of spinal manipulation. Novel use of Modified Kemp as a provocation test also revealed moderate correlations with PPTs at L5. Conclusion: Increased PPT thresholds and decreased asymmetry after chiropractic should be further explored to determine whether they mediate spinal lesions, which may aid practice specificity and improve outcomes. (This is a conference presentation abstract and not a full work that has been published.)

### A qualitative study investigating the challenges and opportunities for building research capacity in sports-focused research in the chiropractic profession

*Alexander Lee, Lara deGraauw, Ali Masoumi, Bradley Muir, Melissa Belchos, Kaitlyn Szabo, Christopher deGraauw, Scott Howitt*

Objectives: To investigate the challenges and opportunities for building research capacity in sports-focused research in the chiropractic profession. Methods: A qualitative description study was conducted utilizing semi-structured interviews with 20 sports chiropractic researchers from 8 countries and focus group interviews with 12 sports chiropractic leaders from Canada. Interviews were transcribed verbatim, and participants reviewed and provided input to their transcripts. A qualitative content analysis using an interpretivist perspective identified themes and subthemes. Results: Four major themes related to research capacity building were identified – 1) Affiliations and Collaborations, 2) Human Resources, 3) Financial Resources, and 4) Operational Resources. Key challenges within these themes included a lack of collaborations, limited researchers, minimal available funding, and an uncoordinated research strategy. Strategic opportunities identified included focusing on pursuing collaborations, creating researcher development pathways, participating/pursuing funding actions, and creating a strategic research plan that includes a dissemination network. Conclusions: To our knowledge, this is the first qualitative investigation to study research capacity within sports-focused research in the chiropractic profession. These findings will inform research capacity development initiatives and inform the development of a strategic plan to advance the research impact potential of the sports chiropractic field. (This is a conference presentation abstract and not a full work that has been published.)

### Cost-effectiveness of spinal manipulation for back or neck pain

*Brent Leininger, Gert Bronfort, Roni Evans, James Hodges, Eva Enns, Karen Kuntz*

Objective: Our primary objective was to estimate the incremental cost-effectiveness of spinal manipulation, exercise therapy, and self-management for spinal pain from both societal and healthcare perspectives using quality-adjusted life years (QALYs), pain intensity, and disability as effectiveness measures. Methods: We used individual patient data to conduct standardized cost-effectiveness analyses. We estimated incremental cost-effectiveness ratios (ICERs) using 8 randomized trials from the U.S. We planned on conducting a 2-stage individual participant data meta-analysis to estimate ICERs with quality-adjusted life years (QALYs) as the effectiveness measure; however, due to heterogeneity in ICER and other cost-effectiveness measures, the findings from individual trials were reported separately. Results: We found the cost-effectiveness of SMT varied by population and comparison. When compared to or added to home exercise, cost-effectiveness findings were favorable for acute neck pain, chronic neck pain in older adults, and chronic back-related leg pain; however, SMT was not likely cost-effective for chronic back pain. When compared to or added to supervised exercise, cost-effectiveness findings were favorable for chronic back pain in multiple age groups (adolescents, adults, older adults) and older adults with chronic neck pain. For adults with chronic neck pain, findings were mixed where SMT was not likely cost-effective relative to supervised exercise, but maybe cost-effective when added to supervised exercise. Conclusion: This work contributes to the understanding of the cost-effectiveness of complementary and integrative approaches including spinal manipulation in U.S. healthcare settings. (This is a conference presentation abstract and not a full work that has been published.)

### The psychological impact of the pandemic on primary healthcare providers: Perspectives from a primary care clinic

*Joe Lintz*

Objective: The aim of this study was to determine the psychological impact of the COVID'19 pandemic on primary healthcare providers at a primary care clinic. In addition, the research gathered information about respondent characteristics vis-a-vis the work-related psychological impact among providers. Methods: A self-administered questionnaire was mailed to 62 primary healthcare providers at a primary care clinic in north Texas, with a 69% percent response rate (n = 43). In addition, multiple logistic regression was conducted to determine characteristics related to presence of work-related stressors. Results: Results revealed that the main psychological manifestations perceived by providers were work-related stress, anxiety, and uncertainty (67%). Additionally, the results showed that those primary healthcare providers working as subspecialists and chiropractic physicians were significantly more likely to report that the pandemic negatively impacted their quality of life than their peer providers. Conclusion: The findings suggested that it is necessary to offer providers the necessary support to reduce the psychological impact derived from the pandemic. Future studies should include providers from diverse geographic locations, particularly among chiropractic professionals whose methods of practice have been changed due to the pandemic in the sample for a better understanding of this phenomenon. (This is a conference presentation abstract and not a full work that has been published.)

### A case of kidney injury secondary to a drug-drug interaction presenting as low back pain: A case report

*Nicolas M. Littzi, Amy Kowalczyk*

Objective: Describe a case of kidney injury secondary to a drug-drug interaction presenting as low back pain. Clinical Features: A 21-year-old male ice hockey athlete presented to a sports medicine clinic with sternal pain following direct impact with sideboards resulting in a diagnosis of costochondral separation. He was administered 60mg of intramuscular (IM) Toradol (double the typical dosage) after already self-medicating with 60mg of aspirin 2 days prior. He returned 48 hours later with acute onset low back pain which lacked specific provoking and palliative characteristics, including antalgic posturing secondary to sharp pain, absent low back tenderness upon palpation, constipation, and bloating. Lab work revealed elevated creatinine and low glomerular filtration rate (GFR) levels. Intervention/Outcome: The patient was diagnosed with acute kidney injury secondary to an adverse interaction between a high dose of Toradol and aspirin. Intravenous fluids were administered and creatinine and GFR were assessed. The patient was discharged and told to follow-up with primary care. He fully recovered without complications. Conclusion: Drug-drug interactions may contribute to manifestations of acute onset low back pain. Healthcare providers, especially those in sports medicine settings, should be aware of the potential for these interactions to occur. (This is a conference presentation abstract and not a full work that has been published.)

### The relationship between satisfaction of work-related needs and forms of motivation for the pursuit of scholarly activity in chiropractic faculty

*Christine Major, Melinda Novak, Sarah Visconti, Kathryn Ross, Kara Burnham*

Objective: Distinct types of motivation: intrinsic, introjected, and extrinsic, are driven by different factors. Intrinsic motivation is the most autonomous form of motivation. According to self-determination theory (SDT), faculty whose work-related needs of autonomy, competence, and relatedness are satisfied are more likely to be intrinsically motivated. This study sought to test this theory regarding the motivation of chiropractic faculty to pursue scholarly activity. Methods: Anonymous surveys, adapted from validated instruments, were administered to faculty at 2 chiropractic institutions. Items assessed whether faculty perceived their autonomy, competence, and relatedness needs as met as well as which motivation type they displayed. Pearson correlation was used to measure the relationships between satisfaction of the work-related needs and intrinsic motivation. Results: Satisfaction of each of the work-related needs was positively correlated with intrinsic motivation (autonomy: r = 0.3385, p = 0.0673; competence: r = 0.5152, p = 0.0036; relatedness: r = 0.3432, p = 0.0633). Conclusion: Although satisfaction of the 3 work-related needs was positively correlated with intrinsic motivation, competence satisfaction showed a significant moderate correlation indicating that as the need for competence is satisfied faculty are more likely to be intrinsically motivated to pursue scholarship. (This is a conference presentation abstract and not a full work that has been published.)

### Assessing treatments delivered by Veterans Affairs chiropractors in a multi-site pragmatic trial on patients with chronic low back pain

*Ryan Muller, Cynthia Long, Kei-Hoi Cheung, Harini Bathulapalli, Christine Goertz, Anthony Lisi*

Objective: To assess treatments delivered by study clinicians in the Veterans Response to Dosage in Chiropractic Therapy (VERDICT) trial, and relationships between clinical findings and treatments. Methods: Enhanced structured data from VERDICT participant chiropractic visits are captured by an electronic health record template. We extracted and analyzed history, examination, and treatment data from all visits of the first 200 participants with complete initial 10-week follow-up. Relationships between clinical findings and treatments were assessed using stepwise logistic regression. Results: Any high-velocity low-amplitude (HVLA) manipulation was delivered to 71.0% (lumbar: 58.0%, thoracic: 53.0%, cervical: 17.5%) of participants, any drop-assisted manipulation to 35.5%, and any impulse instrument to 34.5%. Greater than half of participants received soft-tissue therapy (68.0%), therapeutic exercises (55.0%) and advice/education (52.5%). History of low back surgery

decreased the odds of receiving any manipulative therapy (Odds Ratio (OR): 0.37, 95% Confidence Interval (CI) 0.14–0.97) and lumbar HVLA manipulation (OR: 0.28, 95% CI 0.11–0.71). Positive facet provocation increased the odds of receiving lumbar HVLA manipulation (OR: 5.64, 95% CI 2.70–11.80) and flexion-distraction manipulation (OR: 3.34, 95% CI 1.54–7.24). Conclusions: We present a novel level of detail showing trial chiropractors' treatments were multimodal and associated with clinical findings. (This is a conference presentation abstract and not a full work that has been published.)

### Extensive isolated paraspinal atrophy: A case report and literature review

*Hang Nguyen, Sherman Rhee*

Objective: Discuss the etiology, pathophysiology, and management of a patient with extensive isolated paraspinal atrophy. Clinical features: 54-year-old female Army veteran with chronic low back pain, forward-leaning posture, and dyspnea. Physical examination demonstrated forward posture, antalgic gait leaning to the left, limited lumbar motion in extension and rotation, and tenderness of the thoracic and lumbar paraspinal regions. X-rays revealed decreased lordosis and disc degeneration. Severe bilateral paraspinal muscle atrophy from T7 to L5 was noted on MRI. Aldolase, CPK, and TSH were normal. Pulmonary Function Testing revealed low vital capacity. EMG showed short motor unit potentials in the left thoracic and lumbar paraspinal muscles and neurogenic changes in a few limb muscles. Intervention/Outcome: Physical therapy and acupuncture yielded some improvement in back pain, but no improvement in back strength or posture was noted. Conclusion: Isolated paraspinal atrophy is rare and can occur as an isolated paraspinal myopathy but can also be a sign of a widespread acquired or hereditary neuromuscular disorder. As a diagnosis of exclusion, comprehensive workup should be aimed to fully evaluate primary and secondary causes of myopathies and exclude associated neuromuscular conditions. Deliberate selection of well-defined rehabilitation goals can improve quality of life. (This is a conference presentation abstract and not a full work that has been published.)

### The impact of chronic neck pain on oculomotor performance during near point convergence and Fitts tasks

*Steven Passmore, Michayla Esteves*

Objective: To evaluate oculomotor convergence and performance in chronic neck pain participants compared to controls. Methods: A Royal Air Force ruler measured near point convergence (NPC), a convergence insufficiency measurement. Questionnaire data included the neck disability index (NDI) and convergence insufficiency symptom survey (CISS). Reaction time (RT) was assessed using an oculomotor Fitts's Law task with alterable levels of difficulty. All methods compared those with chronic neck pain (n=12) to an age/gender matched asymptomatic (n=12) group and were approved by the university research ethics board. Results: Significant NPC differences were found between groups for neutral and rotated left positions. Neck pain hampered convergence performance. Reaction time (RT) increased for targets at shorter amplitudes for the symptomatic group, indicating motor planning challenges. Significant correlations were found between CISS and NPC scores, additionally between CISS and NDI scores, indicating CISS scores may identify convergence performance deficits. Greater NDI scores related to larger CISS scores, correlating to increased CI symptoms. Conclusion: Chronic neck pain decreased oculomotor convergence performance and negatively impacted low difficulty Fitts's task RT. Rehabilitation for either oculomotor deficits or chronic neck pain may occur in isolation or have reciprocal ramifications if both are comorbid. (This is a conference presentation abstract and not a full work that has been published.)

### Development of a faculty-driven mixed methods exploratory study of a collegiate research climate

*Kevin Percuoco, Alex Margrave, Patrik Schneider, Breanne Wells, Michael VanNatta, Kara Shannon, Meredith Meyers, Amberly Ferguson, John Crouse, Kira Baca, Brian Anderson, Dustin Derby, Lia Nightingale, Stacie A. Salsbury*

Objective: To describe the process of developing a research study on faculty perceptions of the research climate at 1 chiropractic college. Methods: Fourteen faculty across 2 campuses joined weekly 50-minute meetings to develop a mixed method approach to data collection. Key activities included literature searches; completing scoping review; creation of study sub-teams; modifications of existing instruments; constructing qualitative interview schedule; identifying implementation issues, including recruitment and data collection platform; forming beta tester pool; and completing institutional review board application. Results: The quantitative team developed an open-ended and multiple-choice survey around 8 domains: professional characteristics, promotion, institutional expectations, research capacity/culture, research barriers/motivators, workload, research experience, and demographics. The survey will be distributed to all faculty across 3 campuses using SurveyMonkey. The qualitative team developed interview schedules for individual interviews or focus groups with 5 to 10 faculty. Interview domains include scholarly aspirations, college mission, personal meaning of scholarship, individual strengths/struggles in conducting research, life priorities, rewards/recognition, and departmental/supervisor support. Potential implementation issues included faculty schedules/workload, privacy/research process concerns, recruitment challenges, survey distribution, and incentives for participation. Conclusion: A faculty-initiated committee meeting over 1-year created a mixed-methods application to investigate barriers and facilitators to faculty scholarship. (This is a conference presentation abstract and not a full work that has been published.)

### Comparison of force-time characteristics of prone cervico-thoracic spinal manipulative therapy between chiropractic interns and experienced chiropractors

*Francois Perron, Martha Funabashi, Jean-Luc Gauthier, Isabelle Pagé*

Objective: To compare the force-time characteristics of posterior-to-anterior cervico-thoracic spinal manipulative therapy (CT-SMT) performed by experienced chiropractors and chiropractic interns. Methods: 25 participants performed a total of 48 CT-SMT on a human-shaped manikin (HAM®, CMCC), fixed to a force-sensing treatment table (FSTT, CMCC). Participants performed the CT-SMT with 3 levels of force (light, usual and high), alternating contact hands at each CT-SMT application. Mixed-model analysis of variances was employed to assess the effect of groups, force levels, and contact hand on force-time characteristics, and on the variability of these characteristics. Statistical significance was set at $p<0.05$. Results: No significant differences were observed in force-time characteristics between interns (n=10) and chiropractors (n=15), nor in the SMT delivery with the right or left hand (p-values>0.05). Significant effects of force levels were noted for almost all force-time characteristics (p-values<0.05). Moreover, interns displayed more variability than chiropractors for the force at thrust initiation ($p=0.02$). Conclusion: This study revealed that interns and chiropractors apply comparable force-time characteristics when delivering CT-SMT, with forces applied by interns being less consistent. It is unknown if similar results would be observed with the CT-SMT application in living humans. (This is a conference presentation abstract and not a full work that has been published.)

### Spinal ependymoma presenting as subtle neurological findings in a Veterans Administration chiropractic clinic: A case report in differential diagnosis and appropriate use of diagnostic imaging

*Olivia Poppen, Alyssa Troutner, Christopher Farrell, Lindsay Rae*

Objective: Lhermitte's sign is a nonspecific historical and exam finding that carries with it a differential diagnosis of cervical myelopathy, multiple sclerosis, intradural tumors, or other central nervous system pathology. This case report aims to demonstrate the diagnostic pathway and decision-making process of a positive Lhermitte's sign in a chiropractic clinic. Clinical Findings: A 67-year-old male Veteran presents to a Veterans Affairs (VA) outpatient chiropractic clinic with an insidious 6-month onset of neck pain with historical description of a positive Lhermitte's sign, a single episode of bladder incontinence, and mild changes in upper extremity manual dexterity. Orthopedic testing revealed inconsistencies in reproduction of the chief complaint. Outcome: These subtle historical findings prompted referral for a brain and cervical spine MRI, revealing an ependymoma in the cervical spine. Urgent neurosurgical referral was made, and the patient underwent C3-C7 laminectomy, C3-T2 fusion, and tumor resection. Conclusion: This case represents an example of clinical reasoning in a VA chiropractic clinic when presented with subtle neurologic findings and discusses the differential diagnoses and decision-making process to pursue imaging that resulted in appropriate neurosurgical management. (This is a conference presentation abstract and not a full work that has been published.)

### Improving patient safety in the chiropractic teaching clinic setting: A qualitative analysis of stakeholder suggestions

*Bryan Porter, Alex Lee, Cameron Borody, Eric St-Onge, Martha Funabashi*

Objective: To describe clinic personnel's suggestions to improve patient safety in the chiropractic teaching clinic setting. Methods: Clinic personnel (students, supervising clinicians, and administrative staff) from 4 chiropractic institutions responded to an electronic survey regarding patient safety and provided open text suggestions to improve patient safety in the teaching clinical setting. A qualitative thematic content analysis was used. Pairs of calibrated reviewers, independently coded responses, regularly met to reach coding consensus, and organized codes into themes. Results: Analysis of 189 responses resulted in 29 codes that were further grouped into 5 themes: Clinician workload described how clinician/intern workload can affect safety. Communication included suggestions of open communication about safety-related topics. Facilities and equipment described the quality and safety of the environment and equipment surrounding patient visits. Administration described organizational-level development and oversight of policies, procedures, curriculum, staffing, and financial considerations. Professional behaviors and standards included adherence to evidence-based standards of clinical care, values, ethics, and responsibilities. Conclusion: Areas of improvement were identified and can inform the development of specific strategies to advance patient safety in this setting. (This is a conference presentation abstract and not a full work that has been published.)

### Treatment of chronic myofascial pain following schwannoma resection: A case report

*Jeffrey Remsburg, Heather Meeks, Mandy Wong, Nathan Hinkeldey*

Objective: To report a favorable outcome of unresolved thoracolumbar region myofascial pain that started after schwannoma resection. This patient responded favorably to a combination of manual therapy and therapeutic exercise within a Veterans Affairs

outpatient chiropractic clinic. Clinical Features: A 66-year-old male with approximately 3 years of chronic thoracolumbar pain. This pain started after T12-L1 laminectomy for schwannoma resection. This pain had not been present prior to surgical intervention. Examination suggested surgical scar site as contributing factor to the patient's myofascial pain. Intervention and Outcome: Treatment consisted of instrument assisted soft tissue mobilization and therapeutic exercise during 5 visits over a 5-week period. He reported subjective improvement in perceived pain and improvement in the ability to sleep through the night. The PROMIS Pain Interference 6B also improved from a 14 to 6 during the treatment period. Conclusion: The treatment resulted in important symptomatic relief and improved functional ability for this patient. This report provides a case illustrating the importance of considering scar tissue as a contributing factor to myofascial pain. (This is a conference presentation abstract and not a full work that has been published.)

### The impact of what matters most: Activity goal setting on pain and disability ratings of older veterans receiving chiropractic care for chronic low back pain

*Casey J. Rogers, Lisa Zubkoff, Katharina Echt, Madeleine E. Hackney*

Objective: To investigate the efficacy of using a standard tool for setting a goal in adjunct to chiropractic care on reducing pain and disability in older adult Veterans with chronic low back pain (cLBP.) Methods Participants were recruited at the Birmingham, AL VA chiropractic clinic. After exclusion criteria, 12 participants were randomized into 2 groups, a control group receiving a trial of standard chiropractic care (SC) and an experimental group receiving SC plus identifying an individualized specific goal. All participants answered outcome questionnaires at baseline and again after 6 treatment sessions. Results 10 participants completed the trial. Two were lost to follow up. Both groups had a perceived benefit of care from chiropractic. The experimental goal setting group had greater improvement in outcome measures compared to the control group. The goal setting group all achieved their exclusive goals. The goal setting group reported reduced pain while performing those goals and reduced fear to engage in those goals. Conclusions Older Veterans with cLBP had a perceived benefit from chiropractic interventions. Further investigation and larger studies would be beneficial in determining the extent that chiropractic interventions may have on achieving goals and reducing pain and disability in older adults. (This is a conference presentation abstract and not a full work that has been published.)

### Correlation between student performance in NBCE-Part I and the innovative curriculum in the doctoral chiropractic program from Universidad Central del Caribe in Puerto Rico

*Kimberleve Rolón-Reyes, Yomarie Rivera-Román, Janisse Salas-Luciano*

Objective: The School of Chiropractic (SoC) at Universidad Central del Caribe (UCC), in Puerto Rico is innovative and evidence-based. The SoC has a strong component in basic sciences. After the first 2 academic years focused in basic sciences, students are required to take board Part I of the national boards for chiropractic examiners which evaluates the following components: General Anatomy, Spinal Anatomy, Physiology, Chemistry, Pathology and Microbiology. This study aims to correlate the DCP students' performance in NBCE Part I to their performance in the basic sciences courses. Methods: Data collected from 52 students; 19 students from cohort 1, 17 students from cohort 2 and 16 students from cohort 3 was used to perform the present study. Results: Our data shows that there is correlation in student performance in the basic sciences courses with the scores obtained in the board part I. Conclusion: Understanding the correlation of student performance in board Part I with the basic sciences courses from first and second year is an opportunity for the identification of areas that can be strengthened and reinforced to guarantee the success of our students in NBCE Part I. (This is a conference presentation abstract and not a full work that has been published.)

### Measuring adjustment forces: Applied compared to transmitted loads

*Brent Russell, Edward Owens, Lydia Dever, Ronald Hosek, Kevin Tran*

Objective: To compare applied forces measured with Novel Loadpad (LP) sensors to transmitted forces measured with a force plate. Methods: We tested the LP L-3113 model, intended for finger thrusts with a 25×35 mm sensor area, applying cyclic loading and thrusts into a Bertec force plate, using 3 contact methods: a wood block matching the dimension of the LP, an investigator's thumb, and an index finger edge. Test surfaces included thin padding, a stack of felt, a roll of felt, and a mannequin cervical spine. Data recorded on both systems simultaneously was merged and compared in Microsoft Excel. Results: Block: in steps from 10–140 N, LP values slightly exceeded plate values. Thumb: LP and plate were closely matched for steps and thrust peaks. Felt roll: for steps, plate measures were slightly higher; for thrusts, plate measures were 60–70% higher. Mannequin: plate values for press-release cycles and thrusts were double those of the LP. Conclusion: For well-controlled contact areas, the LP tracked force changes well, in comparison to the force plate. For finger contacts, it is likely some force application occurred outside the sensor area. Contact areas need to be within the LP sensor edges. (This is a conference presentation abstract and not a full work that has been published.)

### Describing congruence between CPT codes and medical record text in Veterans Health Administration chiropractic notes

*Samuel M. Schut, Sarah E. Graham, Anna R. Sites, Brian C. Coleman, Anthony J. Lisi*

Objective: To describe congruence between Current Procedural Terminology (CPT) codes and text documentation of procedures from chiropractic notes in the Veterans Health Administration (VHA). Methods: Manual chart review of national electronic health record data. We randomly sampled 1,000 on-station VHA chiropractic visits occurring from 10/01/2017–9/30/2018 among patients without visits in the previous year and extracted CPT codes and procedures documented in note text. We excluded evaluation and management procedures and mapped therapeutic procedures to 6 categories. We used a rating system to evaluate congruence between CPT codes and text documentation. Results: We analyzed data from 790 complete notes. CPT codes were fully congruent with text in 33.4%, contained less information than text in 49.9%, and contained more information in 5.2% of cases. When patient education was omitted from the analysis CPT codes were fully congruent with text in 55.4%, contained less information than text in 26.3%, and contained more information in 7.5% of cases. Conclusion: CPT coding and text documentation within VHA chiropractic clinics illustrate variable congruence, especially with respect to patient education, demonstrating the need for further study and improvement. (This is a conference presentation abstract and not a full work that has been published.)

### Correlation between chiropractic manipulative therapy class cumulative grade point average and clinic spinal manipulation exit exam grade

*Michael Sheppard, John Ward*

Objective: To determine if chiropractic college clinic graders are demonstrating contrast bias as they grade students on their final spinal manipulation exit exam from the college. Contrast bias is when a grader will evaluate a student differently based on comparing them to other students or a pool of students. Researchers were testing the hypothesis that students in their final trimester of the chiropractic program would receive their spinal manipulation exit exam grade based more on their trimester number (Tri-10) and less on their actual skillset. Methods: 99 students that completed all 4 chiropractic manipulative therapy (CMT) classes and graduated from the same chiropractic college between fall 2019 to fall 2021 had their data analyzed. The CMT-only GPA of the chiropractic students was determined by averaging all 4 of the CMT classes together. The correlation between CMT-only GPA and their clinic spinal manipulation exit exam grade was determined. Results: Pearson's correlation was 0.301 ($p = .002$) indicating a "weak correlation" between the 2 variables. Conclusion: All students appeared to be receiving similar grades on their spinal manipulation exit exam and there was minimal correlation between students' past graded performance in CMT-specific classes. Contrast bias is plausible. (This is a conference presentation abstract and not a full work that has been published.)

### Integrated chiropractic-medical management of neurogenic bowel syndrome in a syringomyelia case in India: A case study

*Tanmay Shinde, Charles Henderson, Monica Smith*

Objective: Describe pioneering management of Neurogenic Bowel Syndrome (NBS) in a syringomyelia case utilizing non-invasive vagus nerve stimulation (nVNS) with an integrated chiropractic and medical treatment approach in India by an MD, DC practitioner. Clinical features: 30-year-old Indian-male complained of markedly reduced lower-limb motor control resulting from tubercular meningitis 7-years ago and NBS secondary to syringomyelia. His bowel movements (BMs) decreased over the past year to an average of once/week which were unaffected by diet and daily activities. Prior/ongoing medical care: Successful anti-tuberculosis medical regimen; on-going anti-hypertensives, muscle-relaxants, and laxatives. Intervention and outcome: Integrative care plan: Chiropractic care (Activator, Diversified, and Thompson techniques) and medical care (nVNS) for 2 visits/week during the first 4 weeks followed by 1-visit/week for 4 weeks. After 3 visits, the patient reported improved motor control in both legs and improved BM frequency (twice-a-week continuing till present). Conclusion: The treatment results suggest that an integrated approach may significantly ameliorate symptoms of NBS. The complex nature of NBS progression involves upper-motor-neuron lesions affecting the gut. A more rigorous study design could evaluate interconnections between the autonomic nervous system and the gastrointestinal tract and the clinical utility of the nVNS modality with chiropractic care for this condition. (This is a conference presentation abstract and not a full work that has been published.)

### Effect of suspension of chiropractic treatment during the COVID-19 mandated shutdown on patients' reported symptoms and function: A retrospective case study

*Igor Steiman, Silvano Mior, Chadwick Chung, Lauren Ead, Dan Wang*

Objective: The Canadian Memorial Chiropractic College hospital-based intern clinic was in "lockdown" March 16–August 5, 2020, during the COVID-19 pandemic, defaulting patients to self-management strategies for neuromusculoskeletal (NMSK) disorders. We aimed to describe the patients, their treatments and self-management strategies, and compared their clinical course pre- and post-lockdown. Methods: We conducted a retrospective case series study, reviewing electronic charts of patients

treated January 2–March 16, 2020, and who were re-assessed after clinic re-opening August 5th. We excluded patients discharged before March 16 or presenting with new complaints. We compared demographics, NMSK and comorbidity diagnoses, pre-lockdown treatment, and lockdown NMSK management in patients who worsened, remained unchanged, or improved post-lockdown, using non-parametric statistics. Results: We included 183 patients. Upon returning, 34% reported worsening, 17% remained unchanged, and 15% improved in symptoms. Patients who worsened had more NMSK diagnoses, more pre-lockdown treatments (longer duration, higher dosage, more often with spinal manipulation), and more severe pain during lockdown. Conclusion: For most patients, self-management during lockdown did not improve NMSK symptoms. Pre-lockdown, patients with worse pain and multiple NMSK conditions, who received more treatments, including manipulation, may have specifically benefited from manipulation for pain management. (This is a conference presentation abstract and not a full work that has been published.)

### Chiropractic student perceptions of rehabilitation knowledge and skill level improve after incorporation a video-based group learning activity in an advanced rehabilitation course

*James Strange, Cortney Williams, Christine Major*

Objective: This study sought to determine if the addition of a video-based group learning activity in a chiropractic advanced rehabilitation course improved student perceptions of their rehabilitation-related knowledge and skill set. Methods: An observational group activity was implemented into an advanced rehabilitation course during weeks 2 and 9. During this activity students took observational notes while watching a recording of a patient performing an exercise. Students then worked in small groups to discuss their observations. A class-wide debrief with the instructor about the video concluded the activity. A 5-question survey designed to assess student perceptions of rehabilitation knowledge and skill level was administered following the activity each week. Results: Following the activity in week 2, 69 students (51%) agreed or strongly agreed that they felt prepared to create a comprehensive active care management plan whereas 28 students (20%) reported feeling unprepared. Following the week 9 activity, 80 students (85%) reported feeling prepared to create a rehabilitation management plan with only 7 students (0.07%) reporting feeling unprepared. Conclusion: Addition of an observational video-based group activity in an advanced rehabilitation course improved chiropractic student perceptions of their preparedness to develop a comprehensive active care management plan. (This is a conference presentation abstract and not a full work that has been published.)

### Evaluating the effectiveness of team-based chiropractic applied clinical neuroscience care on self-reported depression and cognition for medication-resistant depression: A pilot study

*Stephanie Sullivan, Michael Longyear, Dominic Fetterly, Emily Drake, Mitchell Ferguson, Dylan Saulsbery*

Objective: Evaluate study implementation and treatment effectiveness of a team-based chiropractic applied clinical neuroscience (ACN) approach for individuals with medication-resistant depression. Methods: Individuals with medication-resistant depression were randomized to immediate treatment (IT) or wait-list control (WL) groups, each receiving 6 weeks of ACN care. Monthly, ACN clinicians met with a multidisciplinary advisory team. Primary outcomes were the Depression, Anxiety, and Stress Scale (DASS-42), Oxford Happiness Questionnaire (OHQ), and event-related electroencephalography (P300), administered at weeks 0, 6, 12, and 18. Results: Twelve of twenty-one (57%) participants (10F,2M; average age 38) completed the study; no adverse events were reported. Mean DASS-42 and OHQ scores improved over time in both groups. Following treatment, IT demonstrated an average improvement in depression scores (DASS-42) from severe to moderate ($27.2 \pm 12.9$ to $18.2 \pm 5.9$) while WL improved from moderate to mild ($17.3 \pm 10.5$ to $11.3 \pm 10.4$). Eight baseline and 6-week datasets met P300 data quality standards. IT (n=4) demonstrated decreased latency (6 milliseconds) and amplitude (0.93 microvolts) for P300. WL P300 (n=4) demonstrated decreased latency (110 milliseconds) and increased amplitude (0.33 microvolts). Conclusion: Although future studies should address recruitment and data quality challenges, participants demonstrated self-reported improvement and P300 changes following ACN care. (This is a conference presentation abstract and not a full work that has been published.)

### Association between pregnancy and spontaneous cervical artery dissection: A propensity-matched retrospective cohort study

*Robert Trager, Clinton Daniels, Zachary Scott, Regina Marie Casselberry, Jamie Perez*

Objective: We hypothesized that pregnancy would increase the risk of spontaneous cervical artery dissection (sCeAD). Methods: We queried a United States network of medical records and claims of >115 million patients (TrinetX, Inc.) for women aged ≥18, excluding those with conditions potentially causative of sCeAD (eg, trauma). Data were de-identified per University Hospitals Institutional Review Board "not human subjects" determination (STUDY20230450). We divided cases into 2 cohorts: (1) first trimester ultrasound and subsequent labor, delivery, or full-term pregnancy, and (2) gynecological examination without pregnancy. Propensity matching was used to control for variables associated with sCeAD (eg, age, hypertension). We calculated the risk ratio (RR) of sCeAD affecting carotid/vertebral arteries over one-year follow-up from ultrasound/exam. Results: The incidence of sCeAD was 8.5/100,000 person-years in the pregnancy cohort and 4.4/100,000 in the non-pregnancy cohort, yielding a risk ratio (95% CI) of 1.95 (1.14–3.43; P=.0134). Per cumulative incidence graph, sCeAD occurred more frequently during pregnancy than postpartum. Conclusion: Women have nearly double the risk of sCeAD during pregnancy and postpartum compared to matched non-pregnant women. Further research is needed to assess the role of maternal comorbidities and clarify when pregnant women are most at risk for sCeAD. (This is a conference presentation abstract and not a full work that has been published.)

### Examination of chiropractic students' force and speed in delivery of chiropractic adjustments

*Mara Trowbridge, Finnley Parsons, Krista Ward, Monica Smith*

Objective: Evaluate changes in chiropractic students' adjusting force and speed from the beginning to end of an academic quarter and compare pre-post differences based on students' adjusting club participation. Methods: Students were recruited using campus-wide flyers and club announcements. Participants performed 12 mannequin adjustments and force and speed were measured using Force Sensing Table Technology (FSTT). Pre-post changes in medium thrust adjustments to the cervical and thoracic spine were assessed with paired t-test and sign tests. Wilcoxon rank-sum test was used to test the association between club participation and changes in speed and force. Results: 20 students agreed to participate, and pre-post data was collected for 17 students (13 club members). Time to peak speed decreased and adjustment forces increased from quarter beginning to end. Ex. Cervical adjustment Mean Impulse Peak Force increased from 73.82 to 87.38 Newtons (p=.003). No statistically significant differences were observed between students based on club participation. Conclusion: It is feasible to use FSTT in our Doctor of Chiropractic program to document student improvements in adjusting force and speed. Future research with a larger sample size is needed to evaluate student characteristics associated with adjustment improvements. (This is a conference presentation abstract and not a full work that has been published.)

### Chiropractic care for a posterior tibialis tendon rupture in transgender male athlete: A case report

*Faith Truthan, Noah Hass, Aidan O'Brien, Daniel Haun, Norman Kettner*

Objective: To present clinical features and management of a patient with posterior tibialis tendon injury concurrent with hormone replacement therapy (HRT) for gender affirming care. Clinical Features: 31-year-old transgender male presented to a chiropractic clinic with spontaneous, right medial foot pain following running that day. Medical history revealed bilateral congenital pes planus and administration of testosterone for 8 years. Physical examination revealed swelling and tenderness around the medial and lateral malleoli, anterior ankle, and along the medial longitudinal arch. Plantar flexion and dorsiflexion strength measured 4/5. An 8/10 pain level affected weight bearing activities and sleep. Lower extremity functional scale (LEFS) measured 81%. Intervention and Outcome: Ultrasonography revealed a grade 2 posterior tibialis tendon tear adjacent to the medial malleolus. An orthopedist ordered an MRI revealing a longitudinal tear within the tendon. Patient-elected chiropractic care following surgical recommendation. Management included neuromuscular reeducation using whole body vibration therapy, therapeutic exercise, and ankle mortise joint mobilizations. LEFS measured 24.5%. Multi-tendon ultrasonography revealed additional sites of tendinosis. Conclusion: Although our patient was 31, HRT is recognized as a risk factor for tendinosis in older adults. Understanding the correlation between tendinosis and HRT could optimize patient outcomes. (This is a conference presentation abstract and not a full work that has been published.)

### Chiropractic consultation requests from a neurosurgery service in a 1A Veterans Affairs health care system

*Robert Walsh, Alec Schielke, Ellen Chevillet*

Objective: The purpose of this study was to review the demographic characteristics of Veterans Affairs (VA) neurosurgery patients referred to a VA chiropractic service. Information regarding volume of requests and patient complexity were obtained to provide insight on the demand of chiropractic consults with the integration of a chiropractic resident in a neurosurgery service Methods: A purposeful sample from the time of chiropractic resident integration was collected from the Computerized Patient Record System at the VA Palo Alto Health Care System. Results: A retrospective chart analysis was conducted on 42 cases referred for chiropractic consultation. Preliminary results showed patient age ranged from 34–87 years old, a majority male, with common diagnoses including radiculopathies as well as cervical and lumbar spinal canal stenosis. A secondary aim was to perform quality assurance, assessing patient outcomes through a retrospective cross-sectional analysis. Conclusion: The VA chiropractic patients in this study differed from traditional VA chiropractic patients with regard to neurologic complexity. This departmental quality improvement assessment identified a patient subset not typically referred for chiropractic services and demonstrates potential improvement in patient centered care with incorporation of chiropractors into interdisciplinary teams. (This is a conference presentation abstract and not a full work that has been published.)

### Spinal manipulation effect on standing balance on a force plate of individuals with neck and low back pain

*John Ward, Jesse Coats, Carol Longo*

Objective: Determine if spinal manipulation positively impacted balance parameters of individuals with neck and low back pain. Methods: At baseline 54 participants with neck (2.8 + 1.2 Numeric Rating Scale, mean + SD) and low back (3.2 + 1.4 NRS) pain had their standing eyes-closed balance assessed for 30 seconds on a force plate with their feet shoulder-width apart. During the test participants engaged in serial processing by counting backwards by 7s from 500 to mentally tax them further. Participants then stepped off the force plate and received diversified spinal manipulation to the areas of pain in their cervical and lumbar regions. Afterwards participants had their balance reassessed on the force plate for another 30 seconds. Anterior-to-posterior center of gravity (COG) sway and medial-to-lateral sway were measured and compared pre to post using 2 paired samples t-tests. Results: Anterior-to-posterior COG decreased by post-test (p=.014) from 3.95 cm to 3.33 cm. Medial-to-lateral COG decreased from 2.37 cm to 2.13 cm but did not reach statistical significance (p=.354). Conclusion: Anterior-to-posterior COG sway decreased from baseline to post-test in participants with neck and low back pain that received spinal manipulation. A decreased COG sway demonstrates improved standing stability. (This is a conference presentation abstract and not a full work that has been published.)

### Exploring the acute effects of spinal manipulation on handgrip strength and reaction time relative to anxiety and neck pain level

*John Ward, Carol Longo*

Objective: To determine if spinal manipulation can improve isometric handgrip strength and reaction time, relative to degree of pain and anxiety. Methods: 47 students during final exam week were evaluated for state-anxiety with the Perceived Stress Scale, trait-anxiety with the Beck Anxiety Inventory, and neck pain using a Numeric Rating Scale (NRS). Next, their reaction time was analyzed using an online platform, measuring click speed following the appearance of a visual stimulus. Participant isometric handgrip strength was measured using a computerized dynamometer. All participants then received cervical spinal manipulation. Participant reaction time and handgrip strength were measured again. Results: Handgrip isometric strength improved 3.03% after spinal manipulation in the neck pain group, but the improvement did not reach statistical significance (p=.242). Sub-analysis of respondents with 18+ Perceived Stress Scale score demonstrated an increase in handgrip strength (p=.010). Sub-analysis of participants with 3+ NRS neck pain also demonstrated a statistically significant increase in handgrip strength (p=.008). Female participant post-treatment handgrip strength increased significantly compared to males. No change in reaction time was observed. Conclusion: In this pilot study, spinal manipulation positively affected handgrip strength amongst respondents with elevated stress or pain level. (This is a conference presentation abstract and not a full work that has been published.)

### Chiropractic student attributes and perspectives about their future

*John Ward, Osiel Pena*

Objective: To gain a better understanding of the attributes of chiropractic college students and their beliefs about their future. Methods: Through a group consensus process an anonymous in-person paper survey was developed to measure the attributes of chiropractic college students and their perceptions about their future. The survey was distributed to trimester 2, 5, and 9 students and summarized using descriptive statistics. Results: Survey respondents' average age was 27.3 years, 14.5% were married, 17.1% had children, and 19.7% spoke Spanish. The initial salary they believed they would receive upon graduation was $83,640 for Tri2s, $68,333 for Tri5s, and $74,907 for Tri9s, with males believing they would make approximately $9,000 more than females on average. Furthermore, 38.2% wanted to go into an integrated practice with a MD/DO, 23.7% desired to go into teaching, and the average student had 2.1 years of managerial experience before attending chiropractic college. When answering the question if they had to start all over again would they choose a chiropractic college, 10.5% said they would not. Conclusion: Chiropractic college students possess several unique characteristics that chiropractic colleges should be aware of to optimize programs for them. (This is a conference presentation abstract and not a full work that has been published.)

### Research capacity and culture at the Canadian Memorial Chiropractic College: A mixed methods study

*Carol Ann Weis, Diane Grondin, Danielle Southerst, Sam Howarth, Mark Fillery, Christine Bradaric-Baus, Janet D'Arcy, Silvano Mior*

Objective: Fostering institutional culture that enables, values, and supports research activity is essential to building research capacity. Our study aimed to explore the views, attitudes, and experiences of faculty regarding research. Methods: We conducted a sequential explanatory mixed methods study. Quantitative data were collected using the Research Capacity and Culture (RCC) survey. Survey results guided the qualitative data collected from 4 faculty focus groups with varying levels of research experience. Quantitative data were analyzed using descriptive statistics; whilst qualitative data were analyzed for emergent themes. Results: 42.4% responded. Institutional support for evidence-based clinical practice and peer-reviewed publication of research were rated the highest (median = 9/10). Lowest rated items were related to supports/pathways for research-related career development and mentorship (median = 5/10). Research motivators included keeping the brain stimulated, developing skills, and increasing job satisfaction. Lack of time, other work roles and desire for work/life balance were reported barriers. Emergent themes provided further insight and included interpersonal issues, institutional matters, ability to secure funding, mentorship, availability of research hours, and ideas to promote and sustain research. Conclusion: This study identified key factors impacting research culture and capacity and may help guide future institutional planning. (This is a conference presentation abstract and not a full work that has been published.)

### Women's health and chiropractic: Educational audit and development of core competencies

*Carol Ann Weis, Danica Brousseau, Chantal Doucet, Cecilia Bergström, Barbara Drake-Land, Deborah Kopansky-Giles, Nichelle Gurule, Francesca Wuytack, Katherine A. Pohlman*

Objective: This study reviewed women's health (WH) curricula at accredited chiropractic colleges and developed WH core competencies for the chiropractic profession. Methods: Instructors of chiropractic colleges who taught WH-related course(s) were contacted to complete a survey that gathered pertinent material, including course objectives and targeted competencies. Information from the survey was used to develop an initial set of WH competencies. These were presented at an international conference workshop for feedback from attendees. An e-Delphi panel was convened to finalize the core competencies that required 80% or greater consensus for approval of each statement. Results: Based on surveys from 7 institutions and 13 courses, 11 individuals at the international conference workshop recommended 10 core competencies subsequently evaluated by 42 e-Delphi panelists. After one round, all competencies met consensus. Conclusion: The competencies developed in this study will help to facilitate the establishment of a set of core competencies within chiropractic curricula to specifically address knowledge about the unique set of health care challenges experienced by women of all ages. These competencies go beyond women's reproductive health and consider gender at all ages and situations is a social determinant of health impacted by social condition and other factors. (This is a conference presentation abstract and not a full work that has been published.)

### Trends in utilization of non-pharmacological pain therapies under Medicare

*James Whedon, George Zakhary*

Objective: The objective of this study was to examine temporal trends in the utilization of non-pharmacological therapies (NPT) under Medicare. Methods We examined data compiled by the Centers for Medicare and Medicaid Services. We analyzed by HCPCS procedure code to elicit temporal trends in utilization, allowed charges, and payments for somatic NPT procedures under Medicare for the years 2000–2021. We included procedure codes for spinal manipulation, osteopathic manipulation, acupuncture, therapeutic exercise, manual therapy, massage therapy, and neuromuscular reeducation. Results In general, utilization of NPT increased over time over the 22-year study period but dropped off in 2020 coincident with the COVID-19 pandemic. In 2021, Medicare recorded utilization of 127,459,396 NPT procedures. The most commonly utilized treatment in 2021 was therapeutic exercise, with 58,730,355 allowed services. Acupuncture had the lowest rates of utilization with 220,148 allowed services. Total Medicare payments for NPT in 2021 totaled $2,697,433,907 (approximately 3 tenths of one percent of all Medicare spending in 2021). Conclusion Trends in utilization of NPT under Medicare varied by procedure. In 2021, Medicare beneficiaries received more than 127 million somatic NPT procedures. (This is a conference presentation abstract and not a full work that has been published.)

### Racial and ethnic representation among complementary and integrative health graduates

*Margaret Whitley, Nipher Malika, Patricia Herman, Ian Coulter, Margaret Chesney, Michele Maiers, Emma Bianculli*

Objective: To advance educational equity in complementary and integrative health (CIH), we studied diversity in programs for licensed CIH professions: Doctor of Chiropractic (DC), acupuncture, traditional Chinese medicine (TCM), naturopathic doctors (ND), direct-entry midwifery (DEM), and massage therapy (MT). Methods: Using 2009-21 Integrated Postsecondary Education data, we calculated proportions of Latino, American Indian/Alaska Native (AIAN), Asian, Black, Native Hawaiian/Pacific Islander (NHPI), and White graduates. Averages were calculated and compared across programs, to the US population, and to conventional providers (RN/MD/DO/PT). Results: There were 6,819 observations from licensed CIH programs; 87% were MT. We examined significant ($p<0.05$) over- and underrepresentation of CIH graduates versus the US population: Latino: underrepresented in all CIH programs Black: underrepresented in all but MT AIAN: overrepresented in MT Asian: underrepresented in DEM, MT; overrepresented in Acupuncture, TCM NHPI: underrepresented in DC, overrepresented in acupuncture, MT White: overrepresented in DC, TCM, DEM, MT Latino, Black and Asian representation increased over time in CIH and conventional healthcare. Excluding MT, diversity in CIH

mirrors conventional care, although Asian students have greater CIH representation. Conclusion: Racial/ethnic diversity among licensed CIH graduates remains insufficient. CIH training programs should continue strengthening pathway programs and retention. (This is a conference presentation abstract and not a full work that has been published.)

### What are the wider health benefits of chiropractic care

*David Wilmott, Christina Cunliffe, Adrian Hunnisett*

Objective: To investigate the short-term effects on general well-being and quality of life in patients undergoing chiropractic care. Method: Following ethical approval, a prospective observational study was undertaken on patients attending a UK chiropractic college clinic. Each participant completed a specific PROMIS-29 questionnaire at initial consultation and following a 4-week course of chiropractic for MSK problems. PROMIS-29 is a 29-point questionnaire that examines 7 health-related Quality-of-Life domains. PROMIS-29 scores were compared between the 2 points to assess any changes in participant well-being. Results: 129 new patients were recruited and, following screening, 75 were deemed eligible and completed a month-long course of care. Results showed significant improvements in pain interference ($p<0.001$) and social satisfaction/activities ($p=0.038$); and mild improvements in anxiety and sleep disturbance domains ($p=0.059$). No significant improvements were demonstrated for depression ($p=0.10$), physical function ($p=0.17$) and fatigue domains ($p=0.89$). Conclusion: Chiropractic care may have positive impacts on aspects of quality-of-life, even in the short-term, and should be considered as another approach for quality-of-life improvement. In addition, the results indicate implications for assessing progress, as they imply that pain score improvement is not the only component that should be considered. (This is a conference presentation abstract and not a full work that has been published.)

### Assessing the impact of an early program intervention on student board examination performance

*Jon Wilson, Joni Johnson, Emily Ford*

Objective: Starting in spring 2020, any DCP student with a GPA below 3.0 at the end of the first term was required to attend mandatory intervention sessions focusing on time management and study skills. Prior data demonstrated first-time board pass rates for NBCE Part I were lower for those students. This follow-up study will measure the effectiveness of the intervention in raising first-time pass rates. Methods Deidentified data for students who both started the program in or after fall 2019 and who have completed their first attempt at Part I boards were exported from the Student Information System (SIS). The percentage of students in GPA groups who passed all of Part I was calculated and compared to the pass rates for each group prior to the intervention. Results Data for 316 students met the inclusion criteria. Students who completed the intervention had an increased first-time pass rate on Part I. Two groups (lower than 2.75 GPA) increased 5%, while one group (2.76–3.0 GPA) increased 24%. Conclusion The intervention appears highly effective for those students who have between a 2.76–3.0 term one GPA. Additional options should be available for other student groups. (This is a conference presentation abstract and not a full work that has been published.)

### Comparing balance and kinematic effects of standard athletic taping of the ankle during jumping activities

*Shari Wynd, Rachiel Torrence, Todd Riddle, John Ward*

Objective: To compare the balance and kinematic effects of standard athletic taping on the ankle in female subjects performing vertical jumping. Methods: A total of 10 athletic female subjects with a history of ankle instability were recruited to perform vertical jumps. A motion analysis system (VICON 6 0.3 MP cameras) was used to collect functional range of motion (ROM) for the right ankle. Center of pressure data was collected during the performance of single leg stance with eyes open (COP-EO) and eyes closed (COP-EC). Paired t-tests were performed to examine the pre- and post-taping effects on balance and ankle ROM. Results: The mean ankle ROM with tape was significantly reduced ($p<0.01$) when compared to the ankle ROM without tape $32.3\pm4.0$ degrees and $42.1\pm9.9$ degrees, respectively. There were no differences between the COP-EO with or without tape. COP-EC could not be computed due to the inability for the participants to stand on one foot for greater than 10 seconds. Conclusion: Ankle taping appears to reduce range of motion but does not appear to alter the ability of the ankle to accommodate postural challenge during single leg stance. (This is a conference presentation abstract and not a full work that has been published.)

### The effects of study time, sleep duration, perception of course difficulty, and grade satisfaction on final exam scores

*Niu Zhang, Xiaohua He*

Objective: To evaluate the effects of study time, sleep duration, perception of course difficulty, and grade satisfaction on final exam scores. Method: A 4-item questionnaire was administered to 354 third-quarter students during finals week. Students were asked to report their study time, sleep duration the night prior to the exam, and perception of course difficulty as well as grade satisfaction both using a 5-point Likert scale prior to taking the exam. The relationship between exam scores from the Immunology and Endocrinology courses and those 4 items were analyzed. Results: We found positive correlations between final exam scores and both the grade satisfaction as well as sleep duration (Immunology: $p = .000$, $r = .569$ and $p = .001$, $r = .174$; Endocrinology: $p = .000$, $r = .410$ and $p = .000$, $r = .262$) and a negative relationship between exam score and perceptions of course difficulty (Immunology: $p = .005$, $r = -.147$; Endocrinology: $p = .000$, $r = -.317$). Study time didn't correlate with the exam scores. Conclusion: Adequate sleep the night prior to an examination was positively associated with the exam scores. The instructors can motivate students spacing out their studying. (This is a conference presentation abstract and not a full work that has been published.)

## POSTER ABSTRACTS

### An exploration of the relationship between quality of life and associated factors in women attending care in a chiropractic practice-based research network

*Joel Alcantara, Andrew Whetten, Elizabeth Emmanuel, Sandra Grace, Stephen Myers*

Objective: To assess the important predictors of quality of life (QoL) domains as measured by PROMIS-29. Methods: An array of random forest regression models were constructed using socio-demographic variables, clinical covariates, and psychometric measures from the Multidimensional Health Locus of Control (MHLOC), SOC-29, General Self-Efficacy (GSE), and Interpersonal Process of Care Experience (IPC-18). Most of the RF regression models failed to have viable predictions for the QoL domains of PROMIS-29 except for Depression and the Health Utility Index Mark 3 (HUI-3) as derived from PROMIS-29. Results: For HUI-3, the variable importance plots revealed that the subdomains of SOC (ie, comprehensibility, manageability and meaning) along with Internal MHLOC, and number of patient visits were highly predictive of HUI-3. The subdomains of SOC along with GSE, and Internal HLOC were predictive of depression. Partial dependence plots revealed the subdomains of SOC predicts HUI-3 in a logistic growth manner while Internal HLOC and number of visits have a linear and asymptotic relationship with HUI-3. For depression and its predictive variables, a logistic decay relationship was found. Conclusion: This study identified and characterized the important predictors for QoL as measured by HUI-3 and the depression domain of the PROMIS-29. (This is a conference presentation abstract and not a full work that has been published.)

### A 5 1/2 month old female treated for plagiocephaly/brachycephaly with Sacro Occipital Technique cranial protocols: A case report

*Olga Alvarez*

Objective: To present how care of 5 1/2-month-old female was successfully treated for plagiocephaly/brachycephaly with sacro-occipital technique (SOT) cranial protocols Clinical Features: A 5 1/2-month-old female presented with a left-head tilt, preference to look right and flattening along the right side of the head. Parents observed flattening at 2 months and shared she did not tolerate tummy time. At 4 months, she could roll from back to belly. Also noted, mother labored for 48 hours, baby's head was "lodged" into the mother's right-hip and was delivered via emergency cesarean. Methods/Interventions: SOT cranial/spinal adjustments were performed including occipital/upper cervical dural release, balancing of sphenobasilar, frontal-zygomatic, maxillary-zygomatic, and frontal bone molding and CSF technique. Photographs/measurements using a Mimos craniometer and measuring tape were taken every 6th visit. After the 12th office visit a right-internal-frontal adjustment was added to treat the patient's brachycephaly. The patient was treated for 5 months and during that time was seen for 23 office visits. As the patient's head measurements improved during that 5-month period of care her parents concurrently noted that she was reaching her developmental milestones. Conclusion: Greater research is indicated into chiropractic cranial care for pediatric plagiocephaly/brachycephaly type presentations since they can offer a low-risk effective option for care. (This is a conference presentation abstract and not a full work that has been published.)

### Effects of chiropractic care on sputum and hair cortisol levels in children with subclinical spinal pain: A randomized controlled trial

*Imran Amjad, Imran Khan Niazi, Nitika Kumari, Usman Rashid, Usman Ghani, Kelly Holt, Heidi Haavik*

Objective: To investigate the effects of chiropractic care on sputum and hair cortisol levels in children with subclinical spinal pain. Method: A pre-specified analysis of outcomes from a parallel group RCT. 85 children (10–18 years; 61F) with subclinical spinal pain, were randomly assigned to receive 12 weeks of chiropractic adjustments or sham. Resting sputum and hair samples were collected at baseline, post-intervention (12 weeks), and follow-up (16 weeks). Cortisol concentration was determined using ELIZA kits, and data were analyzed using a linear multivariate mixed effects model. Results: Within both groups, there was a significant increase. (This is a conference presentation abstract and not a full work that has been published.)

### Paraffin bath therapy for de Quervain's tenosynovitis and arthritis after failed injection therapy: A case report

*Isabehl Ascher*

Objective: This case aims to describe management of 72-year-old male patient with De Quervains tenosynovitis and arthritis who failed cortisone shot treatment. Clinical case: He presented with left thumb pain, reduced range of motion, and reduced ability to perform daily activities after sustaining blunt force trauma by a metal bar 2.5 years prior. Initially he reported 8/10 pain 80% of the time. Joint play was reduced with crepitus, and he had inability to pluck a blade of grass. He saw 2 previous providers with radiography and injection therapy. Three shots failed and bled out spontaneously, one provided 6 months of relief. Diagnoses from these providers were tendonitis and arthritis. At our clinic, he received laser therapy with wrist and hand diversified adjustments. Outcomes: He showed some improvement and plateaued after 3 weeks. Paraffin therapy was added with passive stretching and symptoms greatly improved. After 8 weeks, he reported 0/10 pain at rest and 3/10 pain maximum with near full restoration of range of motion. He reported the ability to pluck a blade of grass without pain. Conclusion: This case and literature review shows how paraffin bath therapy is a viable option for patients with tenosynovitis and extremity arthritis. (This is a conference presentation abstract and not a full work that has been published.)

### Management of atypical lumbar radicular pain only provoked with neck rotation movements in a Veteran: A case report

*Shery Assal, Mickey Tyler Acker*

Objective: To present the case management of a 58-year-old with atypical presentation of lower extremity radicular pain and multidisciplinary approach to management. Clinical Features: A 58-year-old male veteran presented with radicular pain in the right lateral lower leg when rotating the neck bilaterally. He denied back or leg pain and described the symptoms as tingling along the right lateral leg when turning the neck to the left or right with no other aggravating movement. The physical examination reproduced leg tingling with Spurling and slump test, but otherwise normal. History revealed multiple ankle injuries. Symptoms were decreased when turning neck while stabilizing ankle and. Differential diagnosis includes sciatic neural tension, peroneal entrapment. Intervention and Outcome: A multidisciplinary approach consisting of chiropractic and physical therapy was utilized. The plan of management included spinal manipulation, nerve glides and ankle stabilization. Conclusion: This case study demonstrates a multidisciplinary management of an atypical lower extremity radicular pain from cervical neural tension and highlights the importance of working on a broad list of differential diagnoses, especially when the signs and symptoms are atypical for radicular pain. We encourage further exploratory strategies to characterize mimickers and atypical presentations of lumbar radicular pain. (This is a conference presentation abstract and not a full work that has been published.)

### Chiropractic management of a 38-year-old male veteran with acute low back pain presenting to the emergency department: A case report

*Annie Babikian, Robert Walsh, Alec Schielke*

Objective: This case study describes the management of acute low back pain by a chiropractor in the Emergency Department (ED) of a Veterans Affairs Hospital. Using imaging as clinical support in this setting, rather than the reliance of examination, is discussed. Guidelines regarding plain film radiographs are abundant in the chiropractic profession, though may not be appropriate for the ED setting. Clinical features: 38-year-old patient presents with acute low back pain. The symptoms were representative of true severity, warranting an ED visit. The physical and orthopedic examinations were not helpful due to severity and limitations. Review is focused on the importance of guideline-concordant care and utilization of imaging guidelines in an interdisciplinary setting. Intervention/outcome: MRI of the lumbar spine was ordered, and clinical decision was made based on imaging. Passive modalities and spinal manipulative therapy were performed with subjective and objective improvement. Conclusion: This case was managed by a chiropractor in the ED of a 1A facility. It offers consideration of imaging that directs care, where physical examination is challenging. The importance of the clinical picture and appropriate imaging should be considered in the acute care setting. (This is a conference presentation abstract and not a full work that has been published.)

### Developing and validating scales phase 1: Radiographic visual perception test

*Michele Bahadoor*

Objectives: The majority of radiographic errors are perceptual in nature, but when choosing radiology trainees there is no objective measure of perceptual ability. The present work completes the first phase to develop and validate a visual perceptual test catered to the radiographic interpretation process. This measure is unique in that it uses radiographic images of novel objects to measure inherent visual perceptual ability. Methods: Defining radiographic visual perceptual lead to the development of a construct domain, dimensions, and content domain. A 45-item assessment survey was created and evaluated by content-experts and end-users for content validity. Results: The 8 expert-panel judges validated the comprehensiveness and relevance of the construct domain, dimensions, and the majority of the content domain (41 out of 45 items). The 2 end-user students validated the clarity and understandability of the content domain. Conclusion: The study concluded with completion of Phase 1 of Boateng et al's protocol for development and validation of a psychometric test. (This is a conference presentation abstract and not a full work that has been published.)

### A quality improvement project to develop and implement a comprehensive chart review and communication tool for Veteran Affairs chiropractic trainees

*Tyler Barton, Alex Pham, Clinton Daniels*

Objective: This report aims to describe a quality improvement project to develop and implement a comprehensive chart review and communication tool for Veteran Affairs chiropractic student trainees. Methods: We developed a checklist to aid efficiency and comprehensiveness of the initial encounter electronic health record chart-review process. The checklist was designed in a "do-confirm" format using 4 distinct categories: 1) consult, 2) relevant note review, 3) imaging/labs/surgical reports, and 4) cover sheet. Each category consisted of 2 to 4 items to be confirmed. Once the checklist was completed in its entirety by the trainee, a clinical discussion was to be initiated with the supervising chiropractor using an SBAR (situation, background, assessment, recommendation) communication technique to aid trainee clinical discussion. We piloted with the checklist and communication tool with a single trainee. Results: Feedback was solicited from a trainee following 12 weeks of implementation. They reported the structured approach improved their understanding of the medical chart and their confidence when engaging with complex case presentations. Conclusion: Our pilot implementation demonstrated potential benefit of structured checklists to improve trainee efficiency and confidence in approaching complex cases. Future projects should be implemented on a wider scale and formally survey trainee feedback. (This is a conference presentation abstract and not a full work that has been published.)

### Morphometric and non-morphometric evaluation in a pathology skull collection: A pilot study

*Megan Beveridge, Emily Speer, Katie Manley-Buser, Judy Bhatti, Roger Hynes, Steve Duray*

Objectives: A preliminary analysis of morphometric and non-morphometric characteristics of 25 skulls from a chiropractic college pathology osteological collection containing 150 skulls was conducted to develop a systematic protocol to catalogue the remaining collection for use in future anatomical research. Foramen magnum and overall skull dimensions were collected to test the reliability of sex determination from foramen magnum size alone. Methods: A literature review was conducted, focusing on the management of osteological collections and the forensic analysis of skeletal remains. Categories and measurement protocols for systematically documenting skull features were developed. Morphometric measurements of the cranium and foramen magnum for sex determination were recorded. Data on non-morphometric sexually dimorphic characteristics of the skull (eg, supra-orbital ridge, mandibular morphology) were collected independently by 2 team members, using a consensus process for disparate sex determinations. Visible pathologies were also documented. Results: The preliminary study using the described methodology was determined to be applicable to the remaining 125 specimens, measuring morphometric and non-morphometric skull characteristics. Many skull pathologies were already noted. Conclusion: The preliminary process developed for analyzing and documenting the legacy collection of skulls offers detailed information; continuation of the project will benefit future research goals. (This is a conference presentation abstract and not a full work that has been published.)

### Chiropractic and dental integrative care for 52-year-old male stroke victim suffering from chronic temporomandibular joint dysfunction: A case report

*Thomas Bloink, Charles Blum*

Objective: The value of integrative care for a stroke victim suffering from chronic TMJ dysfunction (TMJD). Clinical Features: 52-year-old male was referred to this clinic 3-year post-stroke from a local stroke-rehabilitative center. He had suffered a right-sided stroke affecting the left-side of his body, with left hypertonicity/contraction of left-calf, shoulder, arm and TMJD. Significant improvement following extensive rehabilitation was found except for his TMJD. He continued to experience left-TMJ crepitus with pain radiating to his left-ear and frontal bone regions. He had difficulty chewing and his pain was 9/10. Intervention and Outcome: Sacro-occipital technique diagnosis revealed left-pelvic torsion with SIJ restriction (category-one) and sphenomaxillary and left-temporal bone cranial distortions. Patient was treated for 10-visits over 3-month period. Cranial-dental co-treatment with a lower occlusal splint and was also treated with red-light therapy. By the 10th visit he reported his pain reduced to 3/10. His left-sided frontal bone and ear pains were eliminated, and he was able to chew and eat normally. There was still some residual contraction of his masseter muscle, however significantly less than before. Conclusion: Chiropractic and dental integrative care can play an important part of care for patients suffering from post-stroke related residual TMJD. (This is a conference presentation abstract and not a full work that has been published.)

### Treatment of a grade III anteriolisthesis of a 28-year-old female: A case report

*Charles Blum*

Objective: Chiropractic treatment for a patient with a grade-3 L5/S1 anteriolisthesis. Clinical Features: A 28-year-old female patient presented for chiropractic care secondary to a traumatic event causing her severe lower extremity radicular syndrome and weakness. She was scheduled for a surgical intervention but was encouraged to be seen at this office for a second opinion. Intervention and Outcome: The patient was treated with sacro-occipital technique orthopedic blocking procedures specific for anterolisthesis, release of psoas muscle tension to L5, suction cupping to draw L5 in a posterior direction, and a series of exercises to encourage directing abdominal muscles to stabilize L5 in a posterior direction on all body movements. After 2 weeks of care the patient cancelled her surgery and after 2 months of care, seen 1–2 times per week she was fully functional with no limitations or pain in movement or lifting heavy objects. At the 3-month mark she was being seen once a month for supportive care and a follow-up x-ray was taken which revealed no change in the grade 3 anterolisthesis. A 10-year follow up MRI also revealed no change in the anterolisthesis, suggesting that her condition was stable. Conclusion With stable anterolisthesis cases it may be important to focus on improving function rather changing vertebra position. (This is a conference presentation abstract and not a full work that has been published.)

### A scoping review of cervical mechanical traction protocols, effectiveness and use in virtual care

*Frank M. Bucki, Clarice Wallert, Jessica Tom*

Objective: Review the literature for evidence of cervical mechanical traction effectiveness, protocols, and virtual care. Methods: Medline database search keywords mechanical cervical traction, cervical traction, neck pain, cervical radiculopathy, disability, telerehabilitation, telehealth, virtual. Data and risk of bias captured using modified Cochrane data extraction template, PRISMA-ScR checklist, and Cochrane risk of bias tool. Outcomes, statistical measures, protocols, risk of bias from the included studies populated in summary of findings table. Results: 256 studies culled, resulting in 8 studies (n = 676). Sample sizes 39 to 216. Most studies found improvements in pain, disability, and ROM for both traction and comparison groups. Four studies resulted in significant benefit with the addition of mechanical traction compared to exercise and multimodal. The other 4 studies found no difference between mechanical traction and comparison groups. Studies risk of bias varied widely ranging low to high. Protocols demonstrating benefit were mostly intermittent cycles that ranged 2–3X/week over 4–6 weeks using 12–30 lbs or 10–20% body weight. No evidence was found regarding virtual. Conclusion: The literature suggests improved benefit using similar cervical mechanical traction protocols compared to standard care alone. There is no evidence regarding cervical mechanical traction in a virtual setting. (This is a conference presentation abstract and not a full work that has been published.)

### Clinical manifestation of peripheral neuropathy with elevated vitamin B12: A case report

*Gina Budjak, Victora Bowe-Fisher, Christopher Arick, Eric Kirk*

Objective: There is extensive literature on the clinical characteristics of vitamin B12 deficiency, however limited research exists on B12 toxicity and its clinical manifestation. This case documents one patient's reduction of paresthesia and muscle twitching with simultaneous decrease in elevated levels of vitamin B12. Clinical features: A 49-year-old female patient presented to a chiropractic clinic with paresthesia and muscle twitching in her upper and lower extremities. Advanced diagnostics utilizing MRI and EMG did not reveal clinical explanation. Laboratory findings revealed significantly elevated serum B12 levels at <2,000 pg/mL, over twice the upper reference limit. Intervention/outcome: The patient was advised to discontinue consumption of cyanocobalamin supplement and energy drinks with B12 along with dietary modification. Collaborative care between her chiropractor and primary care physician resulted in monitoring B12 levels and ordering new lab work 3 months following initial laboratory findings. Results showed B12 levels still elevated, however significantly decreased at 1,270 pg/mL while her symptoms improved. Conclusion: This case study documents improvement of paresthesia symptoms with vitamin B12 testing and management through lifestyle recommendations. Health care professionals may consider the use of vitamin B12 testing when managing similar patients. (This is a conference presentation abstract and not a full work that has been published.)

### The impact of neck pain on gait health: A systematic review and meta-analysis

*Wren Burton, Yan Ma, Brad Manor, Jeffrey Hausdorff, Matthew Kowalski, Paul Bain, Peter Wayne*

Objective: Despite neck pain being the second most common musculoskeletal pain condition, limited evidence explores the impacts of neck pain on measures of gait health (GH). The aims of this work were to systematically review the current evidence of the associations between chronic neck pain (CNP) and measures of GH and conduct meta-analysis. Methods: PRISMA guidelines were followed. Observational studies consisting of exposure groups with CNP and control groups without CNP were included. GH outcomes were extracted. For meta-analysis, random-effects models were used to derive Hedge's g and depicted with forest plots. Results: Search yielded 1918 articles; 12 met final eligibility criteria. Outcomes were grouped by 5 gait domains: pace, rhythm, asymmetry, variability, and postural control; and by the tested walking conditions. Meta-analyses revealed large effect-sizes for speed and cadence, indicating that individuals with chronic neck pain had slower speed and lower cadence. Conclusion: Findings of this systematic review and meta-analysis suggest a negative impact of CNP on measures of GH under various walking conditions. Dual task walking conditions were particularly sensitive to the impact of CNP, and future work is needed to understand how pain disrupts this important functionality of the locomotor system. (This is a conference presentation abstract and not a full work that has been published.)

### Chiropractic clinical registries: A scoping review

*Joel Carmichael, Kent Stuber, Katherine Pohlman, Amy Ferguson, Michele Maiers*

Objective: To map the literature reporting on chiropractic clinical registries. Methods: The PRISMA-ScR and JBI Evidence Synthesis Manual guidelines were followed. Our protocol is registered. Concepts for the search strategy were broadly inclusive without restrictions on design or types of evidence. Editorials and letters to the editor were excluded. A research librarian searched MEDLINE (Ovid), CINAHL (EBSCO), Index to Chiropractic Literature (ICL), Alt Healthwatch (EBSCO), and SPORTDiscus (EBSCO) with a peer-reviewed search strategy. Two reviewers pilot tested data extraction on 5 random abstracts with 100% agreement. Independent title/abstract screening and full text review followed using a third reviewer as referee. Results: After 4 duplicates were removed, 296 titles/abstracts were screened from a June 2023 literature search. Fifteen full-text studies were assessed for eligibility and 3 were included. Two studies reported chiropractic utilization within non-chiropractic-focused registries. One study reported pilot data from a proprietary online data collection system for a chiropractic network. Conclusions: There are few studies reporting research that utilized chiropractic clinical outcomes registry data. The curation of a productive chiropractic clinical outcomes registry represents a significant opportunity to nurture professional, educational, and research growth, as well as health policy expansion for the chiropractic profession. (This is a conference presentation abstract and not a full work that has been published.)

### Scapular pain in cervical radiculopathy: A scoping review

*Joel Carmichael, Kenneth Weber II, Sidney Rubinstein, Ellie Svoboda, Michael Bade*

Objective: To perform a scoping review of the presence of scapular pain in the diagnosis of cervical radiculopathy. Methods: This review used the JBI Manual for Evidence Synthesis and PRISMA-ScR guidelines. The protocol was registered. Included evidence focused on symptom distribution in cervical radiculopathy. Comorbidities producing secondary radiculopathy were excluded. Information sources included Ovid MEDLINE, Embase, Cochrane Library, Web of Science Core Collection, and CINAHL. The search was conducted by a research librarian. Two reviewers completed pilot testing on a random sample of 125 abstracts with over 75% agreement. Independent title/abstract screening and full text review followed using a third reviewer as referee. No selection tool was utilized. Single case studies, non-English articles, and articles without abstracts were excluded due to feasibility. Results: The January 11, 2023, search yielded 4021 abstracts. Of these, nearly one fourth of 490 full-text reviews qualified for data extraction to map radicular pain. Preliminary analysis revealed 65% of papers reporting scapular pain, often as the initial symptom. Conclusion: Articles carefully describing subjective pain distribution in cervical radiculopathy are likely to include scapular pain. Importantly, scapular pain often precedes arm pain in cervical radiculopathy. (This is a conference presentation abstract and not a full work that has been published.)

### Access to chiropractic services and spinal manipulation for Medicaid patients: A critical analysis

*Cynthia Chapman*

Objective: Low back pain has been experienced by many, plays a significant role in quality of life, and is a frequent cause of disability for those of lower socioeconomic status (SES). Access to spinal manipulation as a nonpharmacological treatment for low back pain has been increasing for those of lower SES, though barriers still exist. The purpose of this literature review and critical analysis is to identify and characterize the current patterns of and barriers/facilitators to access of chiropractic services among Medicaid recipients and make evidence-based policy recommendations regarding chiropractic services. Methods: A literature review was conducted using PubMed, Medline, CINHL, and Scopus for peer-reviewed articles relevant to Medicaid and chiropractic. Articles were also included that discussed barriers in other government funded health systems and comparison professions. Extracted articles were reviewed to identify current use, issues around barriers to access to care, and indications for access improvements. Results: The barriers include themes of disparities, poor communication and understanding of policies, low reimbursement, limitations on coverage, lack of awareness of services and benefits, patient limitations, and access limitations. Conclusion: Multilevel policy interventions, in particular those that address access to care, are needed to reduce these disparities and improve care. (This is a conference presentation abstract and not a full work that has been published.)

### Chiropractic students' perception of readiness for clinical practice following a Veterans Affairs chiropractic clerkship: A pilot study

*Michael R. Cole II, Brittany Pase, Charles Penza*

Objective: The objective of this study was to measure the change in perception of chiropractic clerks perceived confidence and readiness for clinical practice following the completion of a Veterans Affairs (VA) Chiropractic Clerkship Program. Methods: Chiropractic students entering a VA Chiropractic Clerkship Program were administered a 9-question, 5-point Likert questionnaire measuring their perceived confidence and understanding in various aspects of clinical practice including diagnosis, management, and treatment. Students were administered the questionnaire within the first week of their VA Clerkship and at the completion of their clerkship. Results: A total of 5 chiropractic students completed the questionnaire. All students reported an overall increase in their perceived confidence and readiness for clinical practice following the completion of their VA Chiropractic Clerkship. Conclusion: VA Chiropractic Clerkships appear to be an effective clinical setting for preparing chiropractic students for readiness in clinical practice. Future studies are needed to validate the survey and compare VA Chiropractic Clerkships to other educational clinical settings including school clinics, DOD clerkships and other community-based preceptorships. (This is a conference presentation abstract and not a full work that has been published.)

### Management of diabetic neuropathy with low level laser therapy in an 81-year-old male: A case report

*Callyn Dittmar*

Objective: This paper describes management of diabetic neuropathy with low-level laser therapy. Clinical Features: An 81-year-old white male presented to the clinic with complaints of numbness in his feet and hands bilaterally which was confirmed with a sensory examination of the areas. The patient was previously diagnosed with diabetic neuropathy by a neurologist. Interventions and Outcomes: A total of 10 sessions of low-level laser therapy were provided to the patient's hands and feel bilaterally over a 3-month period. During that time that patient reported improvement in the sensation in both his hands and feet, he was able to play the guitar again and walk more easily. The re-evaluation examination showed sensory improvement after the 10th session. Additionally, the patient showed improvement on the outcome assessments used. Conclusion: This case suggests that low-level therapy may have positively affected diabetic neuropathy in this patient. Although there are medications offered to patients with this condition, low-level therapy is a viable low-cost, low-risk, conservative intervention that should be considered when managing patients with diabetic neuropathy. (This is a conference presentation abstract and not a full work that has been published.)

### Experiential learning exercise: Lessons learned for curriculum development

*Scott Dunham, Christine Bradaric-Baus, Cirene D'Monte, David Starmer, Dominic Giuliano, Kim Ross, Alex Lee*

Objective: Educational literature supports the efficacy of experiential learning as a strategy to increase student confidence and competence. It is best practice to trial-run innovative educational advances prior to full integration into a curriculum. The purpose of this study is to highlight the development, delivery, and evaluation of a 2-day experiential learning exercise with implications for future development. Methods: A collaborative approach involving directors, chairs and faculty was employed in developing this educational activity. A post-experience quality improvement survey was designed and administered to students including qualitative and quantitative measures. Results: 62% of participants (65) completed the evaluation, with 89% "agreeing" or "strongly agreeing" that it was a valuable addition to the curriculum. Self-reported confidence improved, and anxiety decreased in pre and post activity measures. Satisfaction score means for the 8 individual activities ranged from 4.1–4.8 out of 5. Conclusion: A 2-day experiential learning activity was successfully implemented and evaluated for year I students. Valuable feedback was obtained for refinement and development of future activities. (This is a conference presentation abstract and not a full work that has been published.)

### Communication-based interventions, psychotherapy in chronic musculoskeletal pain: A narrative review

*Sydney Ernst, Jason Napuli, Anna-Marie Ziegler*

Objective: This narrative review describes several communication-based interventions for chronic musculoskeletal pain conditions, emphasizing clinical relevance, patient values, and whole health. Methods: Existing literature was searched for studies pertaining to motivational interviewing (MI), message-framing (MF), cognitive functional therapy (CFT), and cognitive behavioral therapy (CBT). PubMed search terms included, "motivational interviewing AND chronic pain NOT cancer", "message framing AND chronic pain NOT cancer", and "cognitive therapy AND chronic pain NOT cancer." Inclusion criteria consisted of the adult population suffering from chronic, non-cancer, musculoskeletal-related pain. Exclusion criteria included perisurgical pain, interventions focused on comorbidities, or case studies. Results: Search results yielded 2,503 initial articles. Removing duplicates left 2,484 for title review; 41 articles were included for full-text review; 26 met final inclusion criteria. Studies focused on CBT (12) and CFT (10), 3 explored MI, and one addressed using MF. Interventions addressed global joint discomfort, including spinal pain, by utilizing communication approaches resulting in reduced negative functional outcomes and improved affective characteristics. Conclusion: Motivational interviewing, MF, CBT and CFT are promising effective approaches for management of chronic musculoskeletal pain impacting both functional and affective outcomes. Further research is needed to understand the impact of utilizing communication-based interventions in patient-centered, evidence-informed care. (This is a conference presentation abstract and not a full work that has been published.)

### Musculoskeletal rehabilitation professions and the management of spinal manifestations of diffuse idiopathic skeletal hyperostosis: A scoping review

*William Foshee, Michael Fergus, Katie Benson, Jeff Miller, Brenna Gray, Eric Daniel*

Objectives: Research suggests a correlation between diffuse idiopathic skeletal hyperostosis (DISH) and metabolic disorders. The standard of care for DISH pain or dysfunction includes musculoskeletal (MSK) rehabilitation. Public health objectives include arthritis, chronic pain, physical activity, and older adults. Up to 20% of older people are believed to be affected by DISH. This review summarizes the gap in clinically applicable, rehabilitation sciences research around MSK management of DISH. Methods: The authors searched PubMed, ICL, CINAHL Complete, and Gale OneFile: PTSM for keywords: DISH, rehabilitation, physical therapy, and chiropractic. Inclusion criteria for outcomes assessments, spinal involvement, and described intervention were assessed. The review follows the PRISMA-ScR checklist for scoping reviews. Results: The literature search yielded 177 peer-reviewed articles. Nine articles met inclusion criteria with case series/studies (n = 7), one cohort observational study, and one case control study included. Patients in these studies (n=156) presented with DISH in up to 4 spinal regions. The review demonstrates a gap in research for DISH rehabilitation with spinal region specificity. Conclusions: MSK rehabilitation for regional DISH is not well documented for prognosis or intervention dosing. Further research is needed to inform clinicians to improve patient outcomes. (This is a conference presentation abstract and not a full work that has been published.)

### Chiropractic continuing education: A descriptive analysis of cultural competence and special health topics requirements

*William Foshee, Danielle Howard, Maria Buscemi, Nakiesha Pearson*

Objective: The purpose of this study was to investigate the status of chiropractic continuing education (CE) requirements for cultural competence and special health topics for licensure renewal. Methods: A literature search was conducted using ICL, PubMed, CINAHL Plus with Full Text, and AMED for articles related to chiropractic CE as a component of professional regulation. Four authors accessed the websites for chiropractic licensing authorities (n = 116) from September 9 to October 3, 2022, for the jurisdictions noted by the World Federation of Chiropractic as locations where the chiropractic profession is regulated. The US and Canada's provincial/state governments regulate chiropractic. Inclusion in the study was limited to regulators whose requirements were on their websites in English. Results: Authors collected CE data from 74 of 116 jurisdictions and identified 18 distinct requirements for license renewals. New Zealand, Oregon, Maryland, and Washington, D.C. require cultural competence CE. Special topics requirements included trauma-informed practice, human rights, and suicide prevention. Conclusion: Culturally competent health care is associated with the reduction of health disparities and improved patient outcomes. This study found that CE in cultural competency for chiropractors is deficient and highlights the need for further training in this area. (This is a conference presentation abstract and not a full work that has been published.)

### A hidden ganglion cyst: A case report

*Leslie Fuller, Melinda Novak*

Objective: This report presents the case of a 41-year-old female with pathologically confirmed concurrent fibroma and ganglion cyst which developed following trauma to the foot. The clinical presentation, diagnostic imaging, differential diagnosis, and management are discussed. Clinical Features: The patient presented to a chiropractic office one month following a laceration to the lateral hindfoot. Subcutaneous swelling occurred within 1 hour following injury. Initial clinical evaluation revealed a small superficial rubbery and firm mass, non-tender to palpation, and suspected to be a ganglion cyst. Intervention/Outcome: Despite several months of conservative management, symptoms worsened to include tenderness and hypertonicity of the lateral leg with near constant heel pain. Diagnostic ultrasound and MRI of the foot revealed a second soft tissue mass, deep in the ankle joint and larger than the superficial mass. The imaging features of the deeper mass were typical for a ganglion cyst while the superficial mass was less consistent. Surgical excision was performed, and the deeper lesion was pathologically proven to be a ganglion cyst and the superficial mass a fibroma. Conclusion: This case demonstrates the importance of including deep soft tissue masses as differential possibilities, as well as the importance of diagnostic imaging, for chronic post-traumatic lower limb pain. (This is a conference presentation abstract and not a full work that has been published.)

### Twists and turns evolving clinical decision-making for intermittent cervical spine symptoms in the presence of vascular anomalies and other complicating factors: A case report

*Jessy Glaub, Christopher Arick, Eric Kirk*

Objective: This case describes the clinical decision-making process over a 12-year period of intermittent follow-up in a patient with atypical cervical symptoms, vascular anomalies, and other complicating factors to reduce vascular event risks with chiropractic care. Clinical Features: A 59-year-old female, with chronic neck pain, dizziness, left-sided facial pain with paresthesia and complicating factors of hypermobility and chronic multiregional pain syndromes. Her symptoms increase with left cervical rotation and examination revealed a positive George's test. CT-angiograms demonstrated vascular changes suggestive of probable fibromuscular dysplasia, a left internal carotid artery aneurysm, and a tortuous dominant left vertebral artery. MRI findings included multilevel degenerative disc and facet changes with uncinate hypertrophy noted adjacent to the tortuous dominant vertebral artery. Intervention/Outcome: The patient's treatments focused on techniques that limited end-range movement and avoided using a high-velocity thrust to limit risk of potential vascular compromise. These treatments temporarily abate her symptoms and have continued to allow for the completion of daily activities. Conclusion: This case documents the timeline of chiropractic evaluation and management of a patient with atypical cervical spine symptoms, vascular anomalies, and other complicating factors, highlighting the importance of calculated clinical decision-making. (This is a conference presentation abstract and not a full work that has been published.)

### Healthcare overspend insights from a hands-on assessment and chiropractic care for uninterrupted cervicogenic headaches: A case report

*Jessy Glaub, Michael McQueen, Christopher Arick, Eric Kirk*

Objective: Utilizing palpation during physical examination can provide information that may direct care away from costly investigations. This case demonstrates that utility in a patient with uninterrupted cervicogenic headaches. Clinical Features: A 15-year-old female presented with a new onset of uninterrupted headaches over the previous 3 months with associated visual disturbances, nausea, and dizziness. Her symptoms were aggravated by coughing, transitioning from a flexed to an upright posture, and golfing. Prior to receiving a referral to chiropractic care, she received an MRI of the brain and cervical spine, an eye evaluation, and a psychotherapy evaluation. These investigations did not identify any structural abnormalities or relevant psychosocial factors. Intervention/Outcome: An initial assessment identified active trigger points of the suboccipital muscles bilaterally and spinal joint restriction. Treatment consisted of myofascial release of the suboccipital muscles, chiropractic manipulation of the cervical and thoracic spine, and home exercise plan of suboccipital stretching. Two additional treatment sessions occurred at 1-week intervals which resulted in full symptom resolution and discharge from care. Conclusion: This case underscores the cost-savings potential of a physical examination that incorporates palpation by identifying myofascial sources of pain that can be overlooked by more costly alternative assessments. (This is a conference presentation abstract and not a full work that has been published.)

### Results from the ACCRAC 2023 workshop business education for chiropractors part 1: Building a foundation

*Brian J. Gleberzon, Michael Ciolfi, Ayla Azad*

Objectives: Surveys, comparative audits and in-person interviews reveal business education to chiropractic students is inadequate and non-standardized. We convened a facilitated workshop during the 2023 ACC-RAC conference to address these issues. The objective of this study is to report on the results obtained from workshop participants. Methods: Since participation in this workshop was voluntary and responses were anonymized ethics approval was not required. Workshop participants were asked to: (i) identify what is currently taught at chiropractic programs; (ii) identify specific gaps in business education and (iii) develop content to address these gaps. Results: Thirteen conference attendees participated in the workshop. Participants agreed there was a dearth of chiropractic business education and topics covered. Participants suggested: courses be offered prior to entry in the program; chiropractors be invited to share what strategies lead to a successful practice and; elective courses cover all areas of operating a small business, including investment strategies. Results from an exit survey revealed participants perceived this was an important topic to discuss, were very satisfied with the workshop and would attend future ones. Conclusion: The workshop provided valuable information that can help guide curricular decisions. Future workshops can provide more granular guidance. (This is a conference presentation abstract and not a full work that has been published.)

### Development of entrustable professional activities at 2 community-based chiropractic student preceptorship sites

*Jordan A. Gliedt, Kevin S. Mathers, Jeff King, Michael J. Schneider, Michael R. Wiles*

Objective: To describe the development and introduction of entrustable professional activities (EPAs) at 2 community-based chiropractic preceptorship sites. Methods: EPAs were developed and implemented at 2 community-based chiropractic preceptorship sites. This process involved 5 distinct steps: 1) differentiating EPAs from competencies, learning objectives, and knowledge, skills, and attitudes, 2) identifying distinct EPAs, 3) mapping EPAs to competency domains, necessary experience, knowledge, and skills, 4) designing EPA assessment strategies, and 5) implementing EPAs into each preceptorship site. Results: A total of 13 EPAs were developed and mapped to Council on Chiropractic Education meta-competency domains, as well as necessary experiences, knowledge, and skills. Three assessment tools were developed to assess student entrustability. The EPAs and assessment tools were implemented into 2 community-based chiropractic student preceptorship sites. Conclusions: This is the first known description of the development and use of EPAs in the chiropractic field. Research is needed to develop and standardize EPA use and assessment, and to evaluate outcomes associated with EPA use. (This is a conference presentation abstract and not a full work that has been published.)

### Brain neurotransmitter imbalance in central sensitization and chronic pain in vivo using 1H-MRS: A narrative review

*Noah Hass, Janelle Goss, Norman Kettner*

Objective: Central sensitization (CS) underlies the pain amplification and somatosensory sensitivity of chronic pain. Neurotransmitter imbalance and neuronal hyperexcitability likely characterize the development and maintenance of CS. We report the results of a narrative review identifying controlled studies using brain magnetic resonance spectroscopy (1H-MRS) for assessment of glutamate/GABA ratio, their imbalance is frequently associated with CS. Methods: A search was performed in PubMed and Google Scholar to identify controlled studies in which 1H-MRS was used to measure glutamate/GABA ratio in the cerebral cortex of patients with chronic low back pain (cLBP) or fibromyalgia, disorders where CS is prominent. Results: The inclusion/exclusion search criteria identified 1,008 articles, 998 duplicates were removed, 34 full text articles were assessed for eligibility resulting in the inclusion of 8 English language articles addressing 311 subjects. Our data did not support the hypothesis of glutamate/GABA imbalance in fibromyalgia and cLBP compared to healthy controls. Conclusion: This narrative review refuted the hypothesis of neurotransmitter imbalance as the driver of CS. Glutamate/GABA ratio imbalance was not supported as hypothesized. Additional 1H-MRS research is warranted in order to understand and optimize patient outcomes in chronic pain and CS. (This is a conference presentation abstract and not a full work that has been published.)

### Chiropractic care and research priorities for the pediatric population: A cross-sectional survey of Quebec chiropractors

*Rebecca Hayes, Camille Imbeau, Katherine A Pohlman, Marc-André Blanchette, Chantale Doucet*

Objectives: To identify treatment techniques used with pediatric patients by Quebec chiropractors; to explore research priorities of Quebec chiropractors for the pediatric population and to identify Quebec chiropractors' training in the field of pediatric chiropractic. Methods: A web-based cross-sectional survey was conducted amongst all licensed Quebec chiropractors. Descriptive statistics were used. Results: Amongst our 245 respondents, results showed practitioners adapted their treatment techniques based on their patients' age group, thus using softer techniques with younger patients, and gravitating toward techniques used with adults when patients reached the age of 6. In terms of continuing education, chiropractors reported an average of 7.87 hours of training on the subject per year, which mostly came from Quebec's college of chiropractors (OCQ), written articles or seminars and conferences. Both musculoskeletal and viscerosomatic conditions were identified as high research priorities by clinicians. Conclusion: Quebec chiropractors adapt their treatment techniques with pediatric patients. In light of limited sources of continuing education in pediatric chiropractic, practitioners relied on the training provided by their provincial college and scientific publications. According to practitioners, future research priorities for pediatric care should focus on the effectiveness of chiropractic care on MSK and non-MSK conditions. (This is a conference presentation abstract and not a full work that has been published.)

### Content validation of globally scored chiropractic basic and clinical sciences exams: a Delphi study

*Igor Himelfarb, Bruce L. Shotts, Andrew R. Gow*

Objective: This study aims to assess the content validity of globally scored Part I and Part II chiropractic license examinations. These exams are designed to closely align with chiropractic college curricula and the current state of the chiropractic profession. Method: The study employed the Delphi method, a structured communication technique, to engage with chiropractic colleges. These institutions were asked to provide information on the number of hours dedicated to each subject area in their curriculum and the perceived importance of these subjects. Each college appointed a subject matter expert for the domains covered in Parts I and II exams. The first iteration established the content structure and weights within each domain. In the second iteration, the weight of each exam domain was determined. A panel of NBCE's internal subject matter experts reviewed and implemented the recommendations. Results: The study received and analyzed responses from 52 experts in the first round and 13 independent responses in the second round. By the end of the first iteration, a consensus on the importance of the exam content was achieved. Conclusion: This research contributes to the validation of NBCE's exam content, ensuring its alignment with chiropractic college curricula. (This is a conference presentation abstract and not a full work that has been published.)

### Alignment between NBCE exams and CCE meta-competencies: Qualitative and quantitative analyses

*Igor Himelfarb, Nai-En Tang, Bruce Shotts*

Objective: This study aimed to assess the alignment between the National Board of Chiropractic Examiners (NBCE) exams and the Council on Chiropractic Education (CCE) Meta-competencies through a mixed-methods approach, combining qualitative and quantitative analyses. Method: Thematic analysis was initially conducted to explore content alignment between the exams and meta-competencies. This qualitative phase provided in-depth insights into patterns and connections. Following the qualitative analysis, CFA was employed to examine the factorial structure of the exams and their relationship to the meta-competencies. Results: Qualitative Analysis: The qualitative analysis revealed the emergence of a new domain called "Chiropractic Theory" within an existing exam domain, encompassing competencies related to chiropractic philosophy and paradigm. Quantitative Analysis (CFA): The quantitative analysis identified the factorial structures of the exams, confirming their alignment with specific meta-competencies. The exams loaded onto multiple factors, with certain domains aligning more closely with particular competencies. Conclusion: The combined qualitative and quantitative analysis provided a comprehensive understanding of the alignment between NBCE examinations and CCE meta-competencies. Qualitative findings shed light on contextual nuances and thematic patterns, offering deeper insights into content alignment. The quantitative analysis further validated this alignment by identifying factorial structures. (This is a conference presentation abstract and not a full work that has been published.)

### Recalcitrant lower trunk pain responds to yoga combined simultaneously with myofascial release therapy: A case report

*Benjamin Holmes, Brianna Vaa Stelling*

Objective: Movement therapies and manual therapies are both common evidence-based approaches to treating musculoskeletal pain, however the benefits of the simultaneous application of these 2 approaches are sparsely documented and poorly understood. This report explores the clinical effects of simultaneous yoga and myofascial release therapy (termed, "yoga release"). Clinical Features: A 40-year-old female presented to a chiropractic practice within a multispecialty clinic, with chronic right-sided thoracolumbar and posterior ribcage, abdominal wall, and anterior hip pain, despite extensive workup and multifaceted treatment. Interventions/Outcomes: Chiropractic treatment initially entailed exercise and manual therapies, performed separately. Outcomes during the first 2 months of care fluctuated erratically. The subsequent introduction of yoga release yielded lower pain and better psychosocial and physical function. Seven of 8 domains measured on the PROMIS-CAT instrument improved significantly following the introduction of yoga release: Anxiety (46 – 42), Fatigue (57 – 43), Sleep Disturbance (54 – 37), Pain Interference (60 – 47), Pain Rating (5 – 2), Ability to Participate in Social Roles (44 – 65), and Physical Function (32 – 51). The Depression score remained steady at 45 (within normal limits). Conclusion: Lower pain and improved psychosocial and physical function were associated with the introduction of yoga release in this patient. (This is a conference presentation abstract and not a full work that has been published.)

### Faculty perceptions of Dropout Detective as a tool to identify and support at-risk students in a doctor of chiropractic program

*Ramona Houston, Krista Ward, Susie Childs*

Objective: Investigate the usage of Dropout Detective (DD) among faculty at a Doctor of Chiropractic Program (DCP). DD is a learning analytic tool designed to help identify students at risk of failing their courses. Methods: As part of a quality improvement (QI) project, faculty were surveyed about their use of DD in the Spring 2023. Paper surveys were distributed during 2 faculty meetings and an electronic version was sent to all academic faculty (66 total) as part of a weekly update. Results: 23 faculty responded (35% response rate). The majority of respondents (78%) reported using DD to communicate with academic counselors for at least 1 course. 66% reported the DD alert system is beneficial; 57% reported they are able to use the information from DD to identify at-risk students; and 43% reported needing guidance to effectively use DD. When asked what prompted their DD usage, several faculty members mentioned institutional expectations. Barriers to usage included instructor burden and feelings that students are adults and need to be proactive on their own. Conclusion: This QI project identified factors that motivate DD usage among DCP faculty as well as barriers to use and a need for additional training. (This is a conference presentation abstract and not a full work that has been published.)

### Novel video telehealth for chronic low back pain self-management in United States military Veterans during the COVID-19 pandemic: A quality improvement study

*Steven Huybrecht, Bridget Conboy, Karen Seal, Zac Cupler*

Objective: The COVID-19 pandemic severely limited patients' access to in-person health services to manage chronic low back pain (cLBP). We describe a quality improvement project piloting a series of video telehealth classes combining yoga, education, and rehabilitative exercise to improve spine health and empower veterans' self-management of cLBP. Methods: An experienced yoga instructor and chiropractor collaboratively developed a series of 4, 1-hour video telehealth classes tailored to veterans with cLBP. Sessions emphasized spine education and self-care strategies. Open-ended feedback was sought from attendees. Results: Three cohorts (n=17) attended classes between February 2021 and September 2021. The age of participants ranged from 34 to 80 years old (Mean 58.4 years), and a majority were male (3:1 ratio). Ten participants attended 2 or more of the 4 sessions. Veterans reported feeling better equipped to manage their cLBP. The delivery of classes via video telehealth provided access for a geographically diverse population. Conclusion: Challenges in providing in-person management of cLBP were met by offering a novel and practical virtual spine health course led by a staff chiropractor and yoga instructor. Enhanced technical support to close the digital divide gap is needed. (This is a conference presentation abstract and not a full work that has been published.)

### Intimate partner violence among chiropractic patients: A literature review and call to action

*Julie Johnson, Alex Margrave, Kira Baca, Lisa Killinger, Judy Bhatti*

Objective: To describe published literature on interpersonal violence (IPV), emphasizing the role of health professionals to ensure patient comfort and safety, and examine current related academic content in chiropractic programs. We aim to identify gaps in current chiropractic curricula to design evidence-based instructional materials to increase sensitivity to IPV patients and integrate trauma-informed patient care. Methods: An initial literature review was conducted on 50 articles using search terms interpersonal violence, domestic violence, healthcare providers/students related to the prevalence and impact of IPV including implications for healthcare practitioners. Results: IPV refers to behavior within an intimate relationship that causes physical, sexual, or psychological harm, and affects approximately 1 in 3–5 people over a lifetime. Clinical practice recommendations across health professions advise knowledge, awareness, and training to enhance responsiveness and avoid re-traumatization. IPV training is inconsistent or absent in many training programs and warranted to inform trauma-sensitive clinical care. Conclusions: Trauma-informed care for patients with IPV is recommended. Assessment tools to review academic content and perceptions of IPV may positively impact training. Additional research is needed to identify the most effective evidence-based training resources to enhance awareness of IPV and competence in clinical management to provide appropriate care. (This is a conference presentation abstract and not a full work that has been published.)

### Catastrophic seizure syndromes: A case study introducing novel nonpharmaceutical treatment protocols

*Trent Jones, Jake Halverson, Norman Kettner*

Objective: Dravet syndrome is a genetic epileptic encephalopathy resulting in frequent and recalcitrant seizures and developmental delays. This case demonstrates outcomes of novel, conservative co-therapies administered to a young male patient with Dravet syndrome. Clinical features: The child's seizures began before 7 months of age. At age 7, in spite of standard polypharmacy consisting of antibiotics, steroids, and anti-epileptic drugs, he continued suffering from 25–28 daily tonic-clonic seizures; this amounted to over 750 seizures per month. Intervention/outcome: We aimed to restore Endocannabinoid System (ECS) function by integrating very low dose, whole plant extracted, hemp derived phytocannabinoid formulations, and broad environmental and dietary modifications. Within the first week of treatment, the patient had only one to 2 mild seizures per day. Four years later all pharmaceuticals were discontinued, and by age 12, the patient's daily hemp formulation was reduced to PRN status. The patient is now 15 and has an average of 7–10 very mild seizures per month. Unlike the standard polypharmacy approach, the whole plant hemp formulations generated no adverse side effects. Conclusion: The presented case study demonstrates successful co-management of a patient with a catastrophic seizure disorder using novel conservative co-management strategies. (This is a conference presentation abstract and not a full work that has been published.)

### Manipulation under anesthesia for 4-level cervical fusion with dropped head syndrome: A case report

*Kevin Kaldy*

Objective: Describe the results of manipulation under anesthesia (MUA) for a patient with post-cervical fusion flexion deformity and secondary depression. Clinical features: A 63-year-old female with dropped head syndrome was selected for MUA after failed conservative care. She had a 4-level (C3-C7) cervical fusion, 3-years earlier, and was referred for MUA with the diagnoses of vertigo, recurrent hand numbness, and cervical kyphosis. Prior treatment after surgery consisted of 2 cervical epidural injections, physical therapy, acupuncture, and chiropractic without symptomatic improvement. Intervention/outcome: MUA procedure consisted of soft tissue manipulation and spinal manipulative therapy to the cervical and thoracic spine; performed twice over 12 months with 6-weeks post-MUA rehabilitation care. After the initial visit there was a 50% improvement in numerical pain rating scale and active range of motion, and an additional 40% improvement after the second treatment. There was a return to near normal head posture, reduced vertigo and hand numbness symptoms, and improved activities of daily living. Conclusion: Following failure of multiple interventions, MUA to the areas around a 4-level cervical fusion was effective in improving this patient's posture, neurological symptoms, and vertigo. The patient further reported that the improvement in daily functions reduced depression symptoms. (This is a conference presentation abstract and not a full work that has been published.)

### Effects of class IV laser on post-surgical wound healing: A case report

*Mary Kampa, Micayla Batchlor*

Objective: Scarring may present as an undesirable outcome of surgical procedures. Low-level laser therapy (LLLT) has been used to treat wounds and accelerate tissue healing through photo-biomodulation. There are few research investigations studying the impact of class IV lasers on post-surgical wound healing. This single retrospective case study presents the use of a high-power diode laser over an acute postsurgical peroneal tendon repair wound on a 26-year-old female to facilitate healing and minimize visible scarring. Clinical Features: Starting 2 weeks post-surgery, over 34 days a single patient received 24 class LLLT treatments over a surgical wound. Intervention/Outcome: The patient underwent 24 total class IV LLLT treatments using a high-powered solid-state diode laser using blended wavelengths of 810–980 nm at power of 3 W with continuous homogeneous emission from a 10 mm beam head. The applications were performed using a scanning technique of velocity of 1 cm/s. Photographs of the surgical site were obtained after each session. Conclusion: The LLLT application was simple and pain-free. The wound healing suggests positive effects on scar appearance, further research is warranted to establish the clinical significance of class IV laser therapy. (This is a conference presentation abstract and not a full work that has been published.)

### Chiropractic management of a 25-year-old female patient with cervicogenic vertigo: A case report

*Sulakshandan Kathireson*

Objective: Cervicogenic Vertigo (CV) is described as the patient's perception of whirling/rotating also referred to as dizziness with a loss of balance and range of motion related to cervical spine. The etiologies of CV are quite numerous. The main theory that is explored in this study is that of cervical spine subluxations from whiplash-associated disorder (WAD) causing CV due to the disturbances of cervical spinal afferentation in the zygapophyseal joints. Clinical features: Patient presented with a chief concern of vertigo, neck pain, and headaches. Based on the history cervicogenic vertigo and Meniere's Disease were considered. Upon examination, she was diagnosed with cervicogenic vertigo, cervical facet syndrome, and cervicogenic headaches. Intervention: The initial treatment implemented was Toggle Recoil Chiropractic Technique with a frequency of 2 times a week for 8 weeks. Upon re-evaluation, we switched treatments to Blair Chiropractic Technique to address her full cervical spine with a frequency of 2 times a week for 8 weeks with a re-evaluation. Conclusion: The outcome for this patient with CV using Blair Chiropractic Technique reported encouraging results of improved vertigo, balance, as well as a decrease in severity and frequency of overall pain from neck and head. (This is a conference presentation abstract and not a full work that has been published.)

### Reducing barriers to conservative spine care to minimize opioid exposure in indigenous community: a global spine care initiative implementation project in Northern Manitoba, Canada

*Deborah Kopansky-Giles, Steven Passmore, Andre Bussieres, Patricia Tavares, Jennifer Ward*

Objective: Project aimed to determine extent to which spinal disorders impact individuals in an underserved Indigenous community and to measure the perceived value of and intention to adopt the GSCI model of spine care (MoC) by local stakeholders. Methods: Mixed methods using a participatory approach exploring the readiness/feasibility of implementing the MoC in the community, from various stakeholder perspectives. We used a stepwise approach informed by conceptual frameworks and Proctor's taxonomy to assess current spine care, identify factors influencing uptake, and plan implementation solutions. Results: The GSCI MoC, (Phase 1) was used to design the implementation study and to frame spine care services for the underserved community. This readiness study (Phase 2) gathered baseline data (chart review (n=50), community survey (n=150), and qualitative interviews (n=15) to identify implementation strategies and confirm stakeholders' interest in a feasibility study (Phase 3). Phase 3 will estimate the potential for MoC adoption of a spine care clinic, a 15-week community educational/movement program, and their potential impact on clinicians, patients or undertaking the community program. Conclusion: Results will inform the planning/execution of Phase 4 MoC sustainability and scaling-up study aiming to improve care and health outcomes for spine pain patients. (This is a conference presentation abstract and not a full work that has been published.)

### Opioid use reduction in failed back surgery syndrome patients at 3 months utilizing manual spinal decompression manipulation

*Ralph Kruse, Maruti Gudavalli, Casey Rogers*

Objective: Continued pain following spine surgery frequently results in continued or increased use of opioid pain medication. This study proposes to analyze the usage of opioids in patients with continued or recurring pain after spinal surgery treated with Cox Technic Flexion Distraction Decompression manipulation (CTFDD). Methods: Analysis of data collected during a multi-center prospective cohort study of 59 Failed Back Surgery Syndrome (FBSS) patients treated by 21 field Doctors of Chiropractic certified in CTFDD manipulation. This study included patients who had spinal surgery and were treated with chiropractic care in the same regions. Clinical outcomes of manual spinal interventions were documented. Eleven of the 59 patients meeting inclusion criteria indicated they used opioids for their spinal pain. Results of spinal pain and opioid use questionnaires administered at initial visits and following 3 months of care were collected and analyzed. Results: Eight of the 11 patients reported a reduction or discontinuation of opioid use for pain control related to the region of surgery; no change in opioid use was reported by 3 patients. Conclusion: The results of this prospective study revealed a patient-reported reduction or discontinuation of opioid use during their initial 3-month course of care. (This is a conference presentation abstract and not a full work that has been published.)

### Knowledge and willingness to use an automated external defibrillator among chiropractic students at a single United Kingdom institution: A cross-sectional survey

*Wai Ting Lee, Adrian Hunnisett, Christina Cunliffe*

Objective: This study explored the knowledge and willingness to use automated external defibrillator (AED) among chiropractic students at a single UK chiropractic college. Method: Following ethical approval, a previously validated questionnaire was distributed to all students at a single UK chiropractic college. This questionnaire sought information on AED knowledge (assessed via 15 MCQs) and AED willingness. At the time of the survey, there were 130 students in the college and the required sample size was estimated to be 96. Results: The response rate was 75% (n=98) with 40% of respondents (generally clinic interns) having any AED training. The mean knowledge score for untrained students was 7.6/15 (SD 2.3) and for trained students, including clinic interns, was higher at 8.7/15 (SD 2.5); $p<0.001$. Most respondents were willing to apply the AED if needed (76.5%; n=75). Reported barriers for using AED were lack of knowledge or confidence (64%; n=62) and fearing any legal liability (48.9%; n=48). Conclusion: Most chiropractic students, including all clinic interns, surveyed had some training in the use and application of the AED and were willing to undergo further formal training. This study indicated a significant training need and should be repeated across other chiropractic institutions. (This is a conference presentation abstract and not a full work that has been published.)

### Reliability of the biomechanical assessment of the sagittal cervical spine on radiographs used in clinical practice: A systematic review of the literature

*Douglas F. Lightstone, Joe W. Betz, Paul Oakley, Deed E. Harrison, Ibrahim Moustafa*

Objective: The objective of this systematic review is to identify and review the reliability of different methods of biomechanical analysis of the sagittal cervical spine on radiographs that are commonly used in clinical practice. Methods: This review was conducted using the Peer Review of Electronic Search Strategies checklist to organize the search strategy. We will use a combined approach using Medical Search Headings search terms and a SROL search strategy. Our review will follow the recommendations of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Databases to be searched include PubMed, CINAHL, AltHealth Watch, Web of Science, and a grey literature search. Results: Initial search results produced 1147 results. 818 records were screened by 2 independent reviews. 96 full text articles were retrieved. 56 studies were included in the final analysis and were independently assessed by 2 of the authors for methodological quality using the 11-item Quality Appraisal of Diagnostic Reliability tool for reliability studies. Conclusion: Based on the results of this systematic review of the literature the majority of articles investigating the reliability of common methods quantifying sagittal cervical spine alignment on radiographs show good to excellent reliability. (This is a conference presentation abstract and not a full work that has been published.)

### The role of complementary and integrative health schools in serving underserved communities

*Nipher Malika, Margaret Whitley, Patricia Herman, Michele Maiers, Ian Coulter, Margaret Chesney*

Objective: Complementary and integrative health (CIH) schools are uniquely positioned to play a pioneering and proactive role in community outreach and service, making them the prime catalyst for transforming the landscape of CIH utilization among underserved and under-resourced communities. Methods: The RAND Center for Collaborative Research in Complementary and Integrative Health is a collaboration between the RAND Corporation and 13 North American institutions training CIH practitioners. These institutions have longstanding partnerships with local organizations to offer CIH care to marginalized communities. Interviews with these institutions were conducted to gather information on their service history, partners, offered services and community demographics. Results: Results will provide an aggregate summary of the community-based partnerships and services the CIH institutions provide. Key findings include community engagement, targeted initiatives/partnerships, continued collaborations, and the impact on CIH student education. Conclusion: This presentation will underscore the critical role played by CIH schools in increasing access to care for underserved communities. Their commitment to community engagement, culturally competent care, and patient-centered approaches has made strides in reducing disparities and promoting wellness. Continued collaboration between CIH schools and underserved communities is vital for creating a healthier, more inclusive future. (This is a conference presentation abstract and not a full work that has been published.)

### Conservative management of lower extremity radicular pain in a Veteran with solitary intraneural neurofibroma of the lumbosacral plexus: A case report

*Kevin Meyer*

Objective: Neurofibroma is a benign tumor, which may be solitary, or a symptom of a larger syndrome known as neurofibromatosis type 1. These growths derive from Schwann cells and may present with radicular symptoms and/or radiculopathy. Surgical options for large neurofibromas are limited due to the possibility of loss of nerve function. Clinical Features: This case depicts a 33-year-old Asian male U.S. veteran with solitary intraneural neurofibroma of the left lumbosacral plexus and subsequent radicular pain into the left lower extremity. The patient was deemed by oncology and neurosurgery teams to be not a good candidate for surgery due to the extent of the neurofibroma. The patient was instructed to pursue conservative care for symptom management. Intervention/Outcome: The patient underwent a trial of chiropractic care utilizing a gradual progression of forces with treatment to eventual high-velocity, low-amplitude spinal manipulation in combination with a referral for pelvic floor physical therapy. The patient reported short-term symptom improvements following chiropractic care and did not experience adverse events. Conclusion: Chiropractic care may be a beneficial adjunct for symptom management in the setting of non-operable peripheral nerve tumors. Individual presentation, provider preferences and patient tolerance should be taken into consideration. (This is a conference presentation abstract and not a full work that has been published.)

### Thoracic compression and scapular fracture, rare sequela of a seizure event: A case report

*Hang Nguyen, Sherman Rhee*

Objective: Describe a rare case of scapular and thoracic compression fracture following a seizure. Clinical features: 31-year-old male Navy veteran presented to a VA emergency department with severe left shoulder pain following a seizure. The seizure occurred during sleep where the body became extremely rigid with the back arched and the arms extended forward. X-rays revealed a complex mid body scapular fracture. A chest CT confirmed a comminuted fracture of left scapula and incidental findings of 30% compression fracture at T4 and mild compression fractures at T3, T5, T7 and T8. Intervention/Outcome: The patient received physical and occupational therapy for the shoulder with improvement with some remaining residual shoulder and back symptoms. Radiographs of the left scapula 4 months following the injury revealed complete healing of the scapula. Conclusion: Scapular fractures are rare and usually result from high-energy trauma with a high incidence of significant associated injuries to the visceral, vascular, and osseous structures in the chest and the shoulder girdle. Scapular fractures and thoracic compression fractures related to seizure activity are rare but should be considered. Management includes ruling out more serious concomitant injuries and treatment should focus on symptom management and restoring function. (This is a conference presentation abstract and not a full work that has been published.)

### Abolishing a recurrent lateral lumbar shift with associated low back pain via chiropractic care guided by end-range loading: A case report

*Joshua Nisler, Jessy Glaub*

Objective: To describe a case of recurrent left lateral lumbar shift deformity (LLS) and associated low back pain treated with chiropractic care guided by end-range loading. Clinical Features: A 33-year-old male with a left LLS and low back pain that started after a recent road trip. Aggravating factors included prolonged sitting, walking, and attempting to stand erect. Additionally, he reported a history of recurrent low back pain that causes him to be shifted off to the left. Intervention/Outcome: Initial assessment via repetitive movement testing revealed an inability to self-correct the LLS, necessitating a manual shift correction. After abolishing the LLS, an end-range loading program began. On visit 4, chiropractic manipulation was implemented as a force progression. By visit 6, he was symptom-free, enabling the implementation of a function recovery plan to reintroduce flexion tolerance. He was subsequently discharged from care with marked improvements in Numerical Pain Rating Scale (9/10 to 0/10) and Oswestry Disability Index (37% to 2%) and educated on prevention with self-management strategies for future reoccurrence. Conclusion: This case demonstrates the utility of chiropractic care guided by end-range loading in a patient with a history of recurrent LLS and associated low back pain. (This is a conference presentation abstract and not a full work that has been published.)

### Evaluating the tolerance, oxidative stress, and inflammatory biomarker response to a whole-food dietary intervention based on hemp oil, calamari oil, and broccoli

*Chinmayee Panda, Brandon Metzger, Thirumurugan Rathinasabapathy, Slavko Komarnytsky*

Objective: Chronic inflammation, arising from injury, infection, or irritation, contributes to various metabolic and immune disorders. The endocannabinoid system (ECS) and oxidative stress interplay in regulating inflammation. Dietary approaches involving phytocannabinoids and omega-3 fatty acids influence lipid mediators of inflammation, but their precise mechanisms are unclear. Methods: An open-label trial examined the effects of a hemp oil, calamari oil, and broccoli supplement on inflammation and oxidative stress markers in healthy individuals over 10 days. Results: Phytocannabinoid metabolites peaked after 3 days of administration and persisted throughout the supplementation. The intervention was positively associated with reduced serum Hs-CRP, cortisol, and peripheral blood mononuclear cell ROS levels (14% decrease, $p<0.05$). No adverse effects were observed. Conclusion: This study underscores the potential protective role of multicomponent supplementation with phytocannabinoids, omega-3s, and glucosinolates to manage ECS health, ease inflammation, and provide balanced antioxidant support. (This is a conference presentation abstract and not a full work that has been published.)

### Burnout amongst chiropractic practitioners and trainees: A scoping review

*Brittni Partridge, Zachary Scott, Christopher Roecker, Sheryl Walters, Clinton Daniels*

Objective: The purpose of this scoping review was to summarize the literature pertaining to burnout within the chiropractic profession. Methods: We searched PubMed, CINAHL, Index to Chiropractic Literature, and the grey literature by combining the term "chiropractic" and a variety of terms relevant to burnout. A librarian performed the search and 2 authors independently screened articles for inclusion and completed data extraction, while a third author helped resolve disagreements. Results: Our search yielded 108 total articles and 7 met the inclusion criteria. The literature consisted of 2 chiropractic student surveys, 3 licensed chiropractor surveys, one narrative review, and one study protocol. Chiropractic students reported greater burnout than the general population, while licensed chiropractors described lower rates when compared to other healthcare professions. Factors reported to increase burnout risk included high workload, physical demands, and insurance mandates. Whereas longer duration in practice and philosophy-based practices were protective against burnout. Conclusion: Research on burnout within the chiropractic profession is limited and may not be generalizable, however factors contributing to burnout are well-documented. Future research should be conducted to improve understanding of the prevalence and causes of burnout in the chiropractic profession. (This is a conference presentation abstract and not a full work that has been published.)

### A cognitive functional therapy approach to the management of persistent, debilitating lumbar radiculopathy: A case report

*Kevin Percuoco, Casey Buns, Ryan Kelly*

Objective: This case discusses the management of persistent disabling lumbar radiculopathy from a Cognitive Functional Therapy (CFT) approach. Clinical features: A 75-year-old male veteran sought chiropractic care for persistent lumbar radiculopathy which negatively influenced lifestyle and led to withdrawal from activities of daily living (ADL's). Symptoms had remained refractory to physical therapy and medication. A radiographic examination identified no underlying lumbar spine disease. The OSPRO yellow flag (OSPRO-YF) and Low Back Oswestry outcome measures revealed significant disability and concerns with fear avoidance, anxiety, depression, low self-efficacy, and chronic pain acceptance. Intervention and Outcome: Management consisted of spinal manipulative therapy, graded exposure exercises, and reengagement into lifestyle factors. The patient was managed for 12 visits over 2.5 months after which reporting full resolution of symptoms and confidently returning to ADL's. The patient was discharged with 0% disability and no longer reporting yellow flags via OSPRO-YF. Conclusion: This report presents a patient with disabling radicular leg pain that was able to confidently return to his ADL's following a cognitive functional therapy approach. The results suggest a management plan focusing on education, graded exposure to movement, and lifestyle engagement may offer value for those with persistent debilitating symptoms. (This is a conference presentation abstract and not a full work that has been published.)

### Proximal median nerve schwannoma sonographic findings: A case report

*Huxlande Petigny, Jessica Billham, Daniel Haun, Norman Kettner*

Objective: Although rare, Schwannomas represent the most common benign peripheral nerve sheath tumor of the upper extremities. Reliable clinical findings include a subcutaneous mass and a positive Tinel's sign. We describe the unusual case of a patient who presented with cervicalgia and a left proximal mobile subcutaneous mass. We emphasize the sonographic (US) findings. Clinical Features: A 52-year-old male presented with neck pain and a subcutaneous mass on the left upper arm. The mass-produced radiating pain into the hand when percussed. Examination revealed reproduction of neck pain with neck flexion and shoulder abduction. Referral US was performed on the patient's subcutaneous mass. US findings of an eccentrically located, well-encapsulated, fusiform, and hypoechoic mass continuous with the median nerve assisted in its diagnosis of Schwannoma. Intervention/Outcome: Neurosurgical consultation led to oral medications and spinal injections. A nonsurgical approach was opted for the Schwannoma. Follow-up 10 months later, the patient reported improvement of neck pain. However, radiating pain with percussion persisted and a repeat US demonstrated interval growth of the Schwannoma. Conclusion: US is useful for evaluating subcutaneous masses. A neurogenic tumor was suspected, most likely a Schwannoma. (This is a conference presentation abstract and not a full work that has been published.)

### Chiropractic management of tendinopathy: A systematic review

*Mark Pfefer, Stuart McIntosh, Melanie Church, Jacob Holbrooks, Michael Pearl, Devon Van Houten, Travis Turley, Kaylee Grissom*

Objective: Chronic tendon pathology is a soft tissue condition commonly seen in chiropractic practice. Tendonitis, tendinosis, and tendinopathy are terms used to describe this clinical entity. The purpose of this article is to review interventions commonly used by chiropractors when treating tendinopathy and to update a previously published 2009 review. Methods: A systematic search of the medical and chiropractic literature was performed. Inclusion criteria were manual therapies, tendinitis, tendinopathy, tendinosis, cryotherapy, bracing, orthotic, massage, friction massage, electrical stimulation, acupuncture, dry needling, exercise, eccentric exercise, laser, instrument assisted soft tissue mobilization, therapeutic ultrasound, and shockwave therapy. Instruments developed by the Scottish Intercollegiate Guidelines Network were used to evaluate RCTs and systematic reviews. Results: There is evidence that ultrasound therapy provides benefit in treating calcific tendinitis. Limited evidence exists to support the use of eccentric exercise, friction massage, acupuncture, or needling, bracing, orthotics, and cryotherapy. Class 3-B and class 4 laser/photobiomodulation and shockwave therapy are emerging interventions that are promising for treatment of tendon pathology. Conclusion: A number of conservative interventions show promise in treatment of tendon pathology that is commonly encountered in chiropractic offices. (This is a conference presentation abstract and not a full work that has been published.)

### Can chiropractic improve tone production in singers

*Joseph Porter, Christina Cunliffe, Adrian Hunnisett*

Objective: To assess whether tone production in singers improves following a chiropractic adjustment with a jugular foramen distraction. Method: Following ethical approval, an interventional pilot study was undertaken. 15 professional and semi-professional singers sang a note, received the adjustment, and then sang the same note again. Each participant returned for a second measurement and adjustments within 2 weeks. Changes in harmonic content of notes were measured using a spectrum analyzer and compared. Participants also completed a questionnaire about broader vocal parameters before and after adjustment. Results: 73% (n=11) measured an immediate improvement in tone from one or both adjustments and for 45% (n=5) the change was a significant improvement of 10dB or more ($p<0.001$). Tracking autonomic nervous system changes indicated an immediate increase in sympathetic activity compared with a decrease in parasympathetic following the adjustments. Conclusion: This pilot study informs singers of an option available that could immediately improve vocal tone and performance parameters and may prove helpful to avoid overuse voice damage. Chiropractic can help athletes to increase performance and avoid injury—could the same now be applied to singers? Further research using robust RCT design is indicated. (This is a conference presentation abstract and not a full work that has been published.)

### Chiropractic management of alar ligament injury: A case study and review

*Katherine Reckelhoff, Chris Leonardi, Mark Pfefer, Kenneth Reckelhoff, jacquelene neal, Helena Jorgenson, Dacia Mast, Jaci Bayne, Kysn Paepke, Jack Rader*

Objective: The alar ligaments play an important role in maintaining stability and protecting the craniovertebral junction from excessive contralateral rotation and lateral flexion. When a patient has sustained cervical trauma and/or is not improving as expected after trauma, radiographic exams should be reviewed or obtained. The purpose of this paper is to review the functional and radiographic features associated with post-traumatic alar ligament instability and to inform chiropractors of the significance of assessment of the craniovertebral region in patients who have been involved in motor vehicle accidents. Clinical Features: A case is described of a patient evaluated for care in a chiropractic-teaching clinic. The patient was in a recent motor vehicle accident and was not responding to previous care. Subtle signs were missed by prior providers. This project reviews appropriate diagnosis and management of a patient with history of cervical trauma and describes the isolated alar ligament injury associated with trauma, especially if the head is positioned in flexion and rotation. Conclusion: Chiropractors should be aware of the mechanisms associated with alar ligament injury and the need to obtain functional side flexion x-rays of the upper cervical along with flexion-extension stress views when suspected. (This is a conference presentation abstract and not a full work that has been published.)

### Best exercises to treat and prevent low back pain: A narrative review

*Steven Reece, Mark Pfefer, Christopher Scott, Ivon Garcia, Lindsey Wendland, Josephine Kubat, Anthony Keck, Makenzie Curry*

Objective: The objective of this study was to review published research regarding the use of exercise to prevent and treat low back pain. Various types of exercise are commonly recommended as a stand-alone intervention or in combination with other interventions to both prevent and treat low back pain. Methods: A systematic search was conducted of online medical and chiropractic literature. Instruments developed by the Scottish Intercollegiate Guidelines Network were used to evaluate RCTs and systematic review. Results: Seventeen articles were included for this narrative review. There is moderate quality evidence that exercise can help in treating and preventing future low back pain. Various U.S. and European guidelines include exercise as first-line treatment for non-specific and some types of radicular low back pain. Walking, graded lumbar stabilization exercise, Pilates, and yoga exercise show promise although class 1 evidence is lacking. Conclusion: Although there is no clear consensus on the best exercise recommendations, supervised exercise appears to offer some advantages when available. The data are also unclear regarding optimal type, intensity, frequency, and duration of exercise. Future studies with larger sample sizes, longer follow-up, and standardized outcomes would improve the quality of evidence. (This is a conference presentation abstract and not a full work that has been published.)

### Objective human motion assessment using inertial measurement systems: An umbrella literature review

*Steven Reece, Mark Pfefer, Stuart McIntosh, Mitchell Ludwig, Karen Umana, Johnny Fuller, Caleb Ketelsen, Katie Mahoney, Ashley Collins, Hannah Risley*

Objective: Newer motion capture equipment using inertial measurement unit sensors or optical cameras is an emerging technology that can objectively acquire human motion. Current IMU-based systems are becoming more portable and easier to use. These electronic devices can report on acceleration, orientation, angular rates, and other gravitational forces which can be used to assess motion disability that affects activity of daily living and abnormal neural control. The objective of this study was to review IMU utilization for the assessment of patient movement for use in clinical studies. Methods: A search was conducted using PubMed and Sportdiscus. All eligible articles were scored utilizing the methodology for Joanna Briggs Institute (JBI) umbrella reviews. Results: Fifteen articles were considered eligible for review. Several studies have demonstrated high levels of agreement between IMU measurements and gold standard methods such as force platforms or optical motion capture systems when assessing functional movement. Conclusion: Emerging IMU systems demonstrate promise in the assessment of patient movement patterns. Data is lacking in its utilization in a pre and post assessment model relative to various clinical interventions. Further research is planned to use IMU systems in clinical studies involving chiropractic care interventions. (This is a conference presentation abstract and not a full work that has been published.)

### Spinal manipulation for fibromyalgia: A narrative review

*Christopher B. Roecker, Sachien R. Hewawasam*

Objective: The purpose of this review was to describe the available literature regarding spinal manipulative therapy for the treatment of fibromyalgia. Methods: We searched MEDLINE, Index to Chiropractic Literature, PEDro, and Google Scholar with various combinations of the terms "chiropractic," "manipulation," and "fibromyalgia." We also reviewed the references of relevant studies to help identify literature missed by database searches. Results: We identified a variety of relevant literature, including 12 case reports, 7 clinical trials, 5 systematic reviews, and 2 guidelines. The outcomes described in the case reports were universally favorable and involved a wide variety of spinal manipulative techniques. Clinical trials tended to be small and reported mixed results regarding efficacy. Systematic reviews and guidelines outlined how the literature is composed of lower quality studies and state that the effectiveness of spinal manipulation for the treatment of fibromyalgia is either limited, inconclusive, or recommended against due to the lack of established benefit and risk of flare. Conclusion: Literature regarding spinal manipulation for treating fibromyalgia is limited. Large differences exist between the results described in case reports compared to clinical trials, and guidelines outline either inconclusive evidence or recommend against. (This is a conference presentation abstract and not a full work that has been published.)

### An automated computational method of identifying the site of human crepitus with piezoelectric accelerometers

*Gregory R. Roytman, Jocelyn Faydenko, Matthew Budavich, Judith D. Pocius, Gregory D. Cramer*

Objective: Human crepitus signals are difficult and time consuming to analyze. We propose an automated computational method (AM) to identify crepitus more efficiently. Methods: Sixteen participants were recruited. To train AM, 4 were allocated to a test group while 12 were allocated to a validation group. To assess a wide range of subjects 6/12 had low-back pain and the rest did not. Accelerometers were placed at L1-L5 spinous processes and S1 and S2 tubercles (vertebral accelerometers [VLAs]). Four accelerometers were placed 3 cm lateral to midline (side accelerometers [SAs]) between levels of the L1-L2 and L3-L4 VLAs. Lumbar flexion and extension were recorded. Crepitus was defined by 4 of 11 accelerometers having a clean signal and at least 4 accelerometers with amplitudes $>0.075$ mV. Based on these criteria, the AM was developed and compared with 2 trained human observers (HOs) using a weighted kappa statistic (Kw) and time-to-completion. Results: The final Kw was 0.788 indicating a moderate to substantial level of agreement. The AM was 54X faster than HOs in completing analysis (4.13 hours vs. 7.43 minutes). Conclusion: The AM agreed with HOs to a substantial degree with dramatically lower time to completion of analysis. (This is a conference presentation abstract and not a full work that has been published.)

### A scoping review to identify barriers and facilitators of research participation among chiropractic faculty

*Kara Shannon, Brian Anderson, Kira Baca, John Crouse, Amberly Ferguson, Alex Margarve, Meredith Meyers, Kevin Percuoco, Patrik Schneider, Jennifer Smith, Michael VanNatta, Breanne Wells, Lia Nightingale, Stacie A. Salsbury*

Objective: To describe peer-reviewed literature on chiropractic faculty participation in research and identify important barriers and facilitators. Methods: We conducted a scoping review using comprehensive searches through November 2022. English language publications of any design were included. Specific subject headings and free-text terms related to chiropractic, faculty, and research were employed. Covidence software aided article screening and data abstraction, overseen by primary and secondary reviewers responsible for consensus. Data was entered into evidence tables and analyzed descriptively. Results: 330 articles were screened with 14 papers deemed eligible. 8 cross-sectional/correlational studies and 6 narrative reviews/editorials, dated from 1987 to 2017, were included. Facilitators included primary research roles, institutional research support, and allocated research time. Barriers included clinical/teaching duties, lack of incentives and mentorship, and high teaching loads. Qualitative findings identified 5 domains influencing faculty research: demographics/professional role, personal empowerment, research culture, institutional context, and research training. Conclusion: This review highlights a paucity of recent literature on chiropractic faculty research involvement. To enhance research among chiropractic faculty, institutions should promote scholarly activities; provide tangible support such as resources, training, and time; and address identified barriers. Faculty are urged to leverage facilitators, develop strategies, and publish their results. (This is a conference presentation abstract and not a full work that has been published.)

### Management of irritable bowel syndrome with non-invasive vagus nerve stimulation and an integrated chiropractic and medical treatment approach in India: A case study

*Tanmay Shinde, Charles Henderson, Monica Smith*

Objective: Describe the management of irritable bowel syndrome (IBS) utilizing non-invasive vagus nerve stimulation (nVNS) with integrated chiropractic and medical treatment approach in India by an MD, DC practitioner. Clinical features: Middle-aged Indian male, a chronic-smoker for more than 10 years, presented with a 6-year history of abdominal cramps, diarrhea, and insomnia; diarrhea aggravated by spicy foods during an international trip. Prior medical care: IBS diagnosis confirmed by a gastroenterologist, symptoms unresponsive to medications. Intervention and outcome: Initial consultation included review and modification of medications. Integrative care plan: Chiropractic care (Activator, Diversified, and Thompson techniques) and medical care (nVNS and discontinued medications), 3 visits/week for 1st week, 2 visits/week for next 2 weeks, with lifestyle management (smoking cessation). Patient reported complete relief after initial 3 visits and remained asymptomatic for the next 8 visits (current). Conclusion: Results suggest chiropractic care with nVNS may significantly ameliorate IBS symptoms. Allostatic Load theory offers one biologically plausible explanation and putative mechanism for the observed effect with this single clinical case. Further research with a rigorous study design and adequate sample could offer additional evidence to understand the correlation between smoking and IBS and clinical application of the nVNS modality with chiropractic care for this condition. (This is a conference presentation abstract and not a full work that has been published.)

### Correction of pigeon toe or in-toeing in a 2 $^1/_2$ year old female with chiropractic treatments: A case report

*Lisa Stowell, Charles Blum*

Objective: This case report discusses care rendered to a 2 $^1/_2$-year-old female child presenting for chiropractic care with bilateral in-toeing in an interdisciplinary clinic. Clinical Features: Pigeon-toe or in-towing is a relatively common condition in childhood causing the toes to point inward or feet to excessively internally rotate when standing or walking. While this condition usually resolves as the child ages it does appear to affect a child's gait, causing repetitive falls. Sometimes a child's self-esteem may also be adversely affected by this condition. Intervention/Outcome: Treatment was rendered that included "low-force-techniques," Sacro-occipital technique, and cranial techniques to address spinal, lower-extremity, and postural imbalances ~ possibly contributing to the patient's in-toeing. Following the third treatment, the patient was able to walk with one-foot pointing straight ahead and by the fourth office-visit was walking and standing with both feet pointing straight ahead. Further care continues to sustain progress with intervals between treatment extended as the patient's progress is maintained. Conclusion: This case may demonstrate a conservative, effective treatment for a subset of children presenting with in-toeing, particularly when watching and waiting is not preferred and the child's gait, repetitive falls, and self-esteem is being adversely affected by this condition. (This is a conference presentation abstract and not a full work that has been published.)

### Functional recovery following traumatic brain injury in rats is enhanced by oral supplementation with bovine thymus extract

*Natalia Surzenko, Johana Bastidas, Robert W. Reid, Julien Curaba, Wei Zhang, Hamed Bostan, Mickey Wilson, Ashley Dominique, Julia Roberson, Glicerio Ignacio, Slavko Komarnytsky, Alexa Sanders, Kevin Lambirth, Cory R. Brouwer, Bassem F. El-Khodor*

Objectives: Traumatic brain injury (TBI) is one of the leading causes of death worldwide. There are currently no effective treatments for TBI, and trauma survivors suffer from a variety of long-lasting health consequences. With nutritional support recently emerging as a vital step in improving TBI patients' outcomes, we sought to evaluate the potential therapeutic benefits of nutritional supplements derived from bovine thymus gland. Methods and Results: In a rat model of controlled cortical impact (CCI) we determined that animals supplemented with extract of nuclear materials of bovine thymus (thymus nuclear fraction -TNF) display greatly improved performance on beam balance and spatial memory tests following CCI. Using RNA-Seq, we identified an array of signaling pathways that are modulated by TNF supplementation in rat hippocampus, including those involved in the process of autophagy. We further show that bovine thymus-derived extracts contain antigens found in neural tissues and that supplementation of rats with thymus extracts induces production of serum IgG antibodies against neuronal and glial antigens, which may explain the enhanced animal recovery following CCI through possible oral tolerance mechanism. Conclusion: This study demonstrates that nuclear fraction of bovine thymus gland enhances functional recovery from TBI. (This is a conference presentation abstract and not a full work that has been published.)

### Influence of class IV laser on osteolysis of the distal clavicle: A case study and review

*D'sjon Thomas, Chris Leonardi, Mark Pfefer, Phil Gastl, Jacob Steneberger, Edward Kutsar, Zachary Bloenker, Grant Burnett*

Objective: The purpose of this project is to review mechanisms, indications, contraindications, and dosage issues regarding Class IV laser intervention and to describe effects of this intervention in a patient with osteolysis of the distal clavicle. Photobiomodulation using laser therapy has been shown to modulate cellular protein production, stimulate healing, and reduce pain in a dose-dependent manner. Previous studies using laser therapy for musculoskeletal problems have typically used class IIIb or lower power lasers with outputs of less than 0.5 W. Here we provide intervention with an 810 nm class IV laser with a power output of 20 W. Clinical Features: A case is described of a patient presenting for care in a chiropractic-teaching clinic. The patient complained of disabling shoulder pain with a history of repetitive, heavy weightlifting. The patient quickly responded positively to laser Photobiomodulation intervention with decreased pain and disability. Conclusion: Chiropractors should be aware of appropriate use of the emerging Class IV laser therapy device as an intervention for musculoskeletal problems. Well-powered research is needed to evaluate the effects, outcomes, safety, and appropriate dosage of Class IV laser use in patients with various painful, disabling musculoskeletal problems. (This is a conference presentation abstract and not a full work that has been published.)

### Manual therapy management of temporomandibular joint dysfunction: A literature review

*D'sjon Thomas, Mark Pfefer, Eve Cohn, Brian Perez, derek bowman, Holly Pirolim, Maria Tackett, C J McGurk, Nicole Manning*

Objective: Temporomandibular disorders (TMD) are a common condition characterized by jaw pain, joint dysfunction, headaches, and disability. Manual therapy interventions have been proposed as a potential treatment for TMD, but their effectiveness is still under investigation. The purpose of this project was to review manual therapy intervention effects on pain and dysfunction when used to treat TMD. Methods: A systematic search of the medical and chiropractic literature was performed. Instruments developed by the Scottish Intercollegiate Guidelines Network were used to evaluate RCTs and systematic reviews. Results: No class I evidence was found to guide clinical decision-making. Two published articles specifically describing chiropractic care were located. The combination of manual therapy techniques with splint therapy or exercises targeting the cervical spine has been shown to reduce pain intensity and improve TMJ dysfunction. Conclusion: Adequately powered research is needed to confirm these findings and determine optimal treatment protocols. Combination interventions using manual therapy and anterior occlusal splinting demonstrate promise for management of TMD and associated headache. Chiropractic care is promising based upon studies with small sample sizes, which prompts the need for additional investigation. (This is a conference presentation abstract and not a full work that has been published.)

### Applications of eye-tracking technology in chiropractic: Current evidence and example data

*Parth Trivedi, Charles Henderson, Monica Smith*

Objective: Eye-tracking offers potential research and clinical applications in chiropractic. We present current literature and describe a developmental exercise collecting eye-tracking data with research-grade technology. Methods: A search of PubMed, Google Scholar and PEDro, using the keywords eye-tracking, chiropractic, rehabilitation,

diagnosis, and musculoskeletal disorders, yielded less than 20 relevant clinical or human performance studies, or reviews published between 2010 and 2023. We collected data from 3 healthy subjects using a wireless (untethered) BIOPAC/Argus 180 Hz binocular eye- tracking device. Results: Growing scientific evidence suggests eye-tracking is a promising biomarker for assessing neuromuscular coordination and biomechanical imbalances. The metrics Local Area of Interest, Continuous Gaze Pattern, Eye Blink, and Horizontal/Vertical Eye Position show potential for developing evidence-based personalized treatment plans and objective patient progress assessments over time. Our example data and video for 3 healthy subjects demonstrated these metrics and analytic software (Argus/ETVision, BIOPAC/Acqknowledge). Conclusion: Eye-tracking offers an innovative approach providing objective measurements and insights into neuromuscular responses and outcomes. Further research and larger-scale studies may establish the full application scope in clinical and human performance research. Eye-tracking may enhance diagnostic accuracy and treatment efficacy to advance chiropractic healthcare, opening avenues for more precise and patient-centered treatment. (This is a conference presentation abstract and not a full work that has been published.)

### Does core stabilization training prevent injury and improve performance: A literature review

*Shelby Waldman, Brian Perez, Thomas Kopatich, Mark Pfefer, Timothy McHaffie, Keaton Hoeke, Andrew Medico, Emily Winter, Jaimison Peckham*

Objective: It has been proposed that young athletes should train to improve core stability and neuromuscular control combined with appropriate (not too little or not too much) lumbar and thoracic range of motion to improve performance and reduce injuries. The purpose of this project was to review published articles regarding performance and injury prevention associated with these training goals. Methods: A systematic search of the peer-reviewed, medical and sports literature was performed. Instruments developed by the Scottish Intercollegiate Guidelines Network were used to evaluate RCTs and systematic reviews. Results: Ultimately, 19 articles were included and scored for this review. No class I evidence is available to guide interventions. There is evidence that a lack of core stability and neuromuscular control combined with excessive velocity of the trunk can lead to injuries, including injury of the lower extremity. Inappropriate range of motion of the lumbar and thoracic spine, especially combined with impaired neuromuscular control can lead to injury and impair performance. Conclusion: Appropriate movement patterns including attention to strength, range of motion, and neuromuscular control during sports and physical activities are likely important for both athletic performance and injury prevention. (This is a conference presentation abstract and not a full work that has been published.)

### Discomfort during side posture lumbopelvic manipulation in a low back pain population: Effects of a modified flexed lumbopelvic position

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Objective: To investigate the influence of side posture lumbopelvic manipulation (SPLM) positions on self-reported discomfort in individuals with low back pain (LBP). Methods: Volunteer adults (18–60 years old) with LBP experienced 2 procedures in a randomized order: 1. Standard hypothenar-PSIS (Standard) and 2. Modified flexed lumbopelvic hypothenar-PSIS manipulation (Modified). The Modified position had increased hip and lumbopelvic flexion. Self-reported discomfort was recorded (scale: 0–10) before and after each procedure. Comparison of mean discomfort scores were made using paired t-tests. MCID of 2.0 was used. Correlations between discomfort during active range of motion (AROM) and SPLM procedures were analyzed. Results: Forty participants were recruited (mean 25.5 years old; 75% female). There were no differences in discomfort between Standard versus Modified SPLM. No correlations were found between AROM and SPLM procedures. Individual discomfort profiles indicate some participants experienced a within subject difference $> 2$. Lower discomfort was reported by 6 participants during Standard and 8 participants during Modified SPLM. Conclusion: Comparing discomfort during a Modified SPLM to the Standard one revealed no difference in a population with LBP. Future studies should examine other manipulation variations and subgroups of LBP (eg, direction related). (This is a conference presentation abstract and not a full work that has been published.)

### Current literature and resources addressing metabolic syndrome in chiropractic practice

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Objective: Over 1/3 of United States adults have metabolic syndrome (MetS), a group of heart disease and diabetes risk factors. This project's aim is to review current MetS literature, focused on prevention applicable to chiropractic practice. Methods: Data collection began by searching PubMed for meta-analyses published in the past 5 years with free-text availability in English, indexed with Medical Subject Heading "Metabolic Syndrome." The 149 retrieved titles were screened for MetS and prevention relevance. Additional data was collected from the U.S. Preventive Services Task Force (USPSTF) website and by asking faculty teaching MetS related courses in a Doctor of Chiropractic program for materials provided to students. Results: The team of researchers and academic and clinical faculty identified over 30 meta-analyses and 8 clinical practice guidelines/USPSTF recommendation statements for review and data extraction. Current literature supports chiropractors to address MetS with lifestyle behavior interventions, including goal setting to increase aerobic and resistance physical activity and adaptation of dietary patterns emphasizing whole grains, legumes, vegetables, and fruit. Conclusion: This project resulted in acquiring several resources chiropractic students, interns and doctors can use to help address MetS in their patients and promote public health. (This is a conference presentation abstract and not a full work that has been published.)


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