ABSTRACTS

LBORC-NUFA Poster Abstracts 2022: Students

Every year at the American Academy of Osteopathy Convocation, the Louisa Burns Osteopathic Research Committee (LBORC) and the National Undergraduate Fellows Association (NUFA) together host a research poster presentation session for residents and medical students. The 2022 poster abstracts for students are presented here.

CASE STUDY

Katie Ackerman, OMS IV; Kristen Gavin, OMS IV; David Johnson, DO

Picking Apples and Somatic Dysfunctions: A Case Study of Osteopathic Manipulative Treatment in the Farmworker Community

Introduction/Background: The United States Bureau of Labor Statistic consistently ranks the agriculture industry as the highest risk for occupational injuries and fatalities, and farmworkers may delay treatment related to socioeconomic barriers. There is little research regarding osteopathic manipulative treatment (OMT) in farmworkers and this case serves as an introduction to the effectiveness and suitability of OMT in this population.

Case: A.M. is a 57-year-old female who presented with back pain and abdominal complaints. Her electric-type pain radiated anteriorly from the posterior mid-thorax. Pain was 4/10 at baseline and 7/10 while wearing an apple-picking bag. Previous chiropractic treatments and medications slightly decreased discomfort, but she stopped working because of persistent and function-limiting pain. Over the course of two visits, somatic dysfunctions were found in the thoracic spine, ribs, respiratory diaphragm, viscera, and sacrum. Treatment methods included balanced ligamentous tension, counterstrain, facilitated positional release, fascial distortion model, muscle energy, myofascial release, and soft tissue.

Results: OMT was well tolerated, and A.M.'s back pain was markedly decreased at the end of the second visit with lifestyle modifications helping to eliminate abdominal complaints. Two months after the second treatment, A.M. had returned to work and symptoms had resolved. An in-person, three-month follow-up appointment has been scheduled to reassess longer-term impact of treatment.

Discussion: For many farmworkers, cost-effective and long-lasting treatments that enable return to work are especially imperative. A.M.'s case demonstrates that OMT—even within a few visits and without additional medications—may fill this role. A case series would provide more generalizable evidence for the use of OMT in farmworkers beyond this single case.

Jesse Aaron Benzell, OMS III; David Abend, DO; James Bailey, DO, FAAPMR; Danielle Cooley, DO, FACOFP; Millicent King Channell, DO, MA, FAAO, FNAOME

Upper Cross Syndrome and a Guarded Heart: Posture in a Case of Depression

Introduction/Background: Treatment-resistant depression requires innovative interventions. Care for the Body-Mind-Spirit axis can be delivered via osteopathic manipulative medicine (OMM) and may potentiate the healing process.

Case: A 62-year-old male with 30 years of treatment-resistant depression and suicidality sought to discontinue psychiatric medications. A holistic inpatient regimen included medication changes, supplementation, sauna, exercise, and psychological therapy. OMM was employed to reduce biomechanical symptoms of upper cross syndrome and related behavioral restrictions. Direct inhibition was targeted to the coracobrachialis, pectoralis minor, levator scapulae, brachioradialis, and teres minor.

Post-isometric relaxation was performed on the sternocleidomastoid, atlantoaxial junction, and the thoracic spine. Soft tissue techniques included occipitoatlantal release, contralateral cervical traction, trapezius release, and cervical myofascial release.

Results: 20 mental symptoms were measured and linear regressions for inpatient stay and OMM period were plotted. Symptoms of depression, fatigue, resentment, suicidal ideation, pain, frustration, anxiety, insomnia, fear, and anger correlated to a trend of improvement. Worsening trends were seen in symptoms of weakness, disorientation, and confusion. There was no effect on self-harm ideation. Follow up at 470 days post discharge revealed improved mental health and appreciation of treatment.

Discussion: An improvement in posture from "hunched and fearful" to "proud and confident" was apparent after treatment. Osteopathic medicine may have the ability to improve the symptoms of mental illness by improving physiologic movement of the musculoskeletal system with cascading effects in social, cognitive, and environmental interactions. Rigorous trials should be conducted to determine the safety and efficacy of OMM for psychiatric complaints.

Rosalyn Bloch, OMS II; Megan Kempa, OMS II; J'Aimee Lippert, DO

Osteopathic Manipulative Treatment of Individual with Intractable Singultus

Introduction/Background: The etiology and mechanism of singultus, or "hiccups," is largely unknown; it is believed to be related to a reflex arc of the vagus, phrenic, and sympathetic nerves. Intractable singultus describes hiccups persisting longer than one month. Current medical literature lacks universally accepted techniques to treat intractable singultus. Application of OMT to treat singultus is limited to two case reports.

Case: An otherwise healthy 23-year-old female presented with a 5 year history of intractable singultus. The patient kept a hiccup diary before beginning treatment to track hiccups. In addition to reporting a daily average of 59.5 ± 23.9 hiccups, the patient had distressing associated symptoms: burping, dyspepsia, nausea, back and abdominal pain. After physical exams discovered somatic dysfunction, the patient was treated once a week for four weeks using the following OMT techniques: muscle energy treatment, myofascial release, counterstrain, and high velocity low amplitude treatment.

Results: After four treatments of OMT, the patient's average daily hiccups decreased to 33.5 ± 5.4. Additionally, the patient reported decreased associated symptoms which improved quality of life.

Discussion: Addressing intractable singultus with OMT reduced daily hiccups, associated symptoms and improved quality of life. A limitation of the study was interruption of the hiccup diary pretreatment as the patient, a student, transitioned between semesters. Interestingly, our patient's somatic dysfunction corresponded with the anatomical routes of the phrenic and vagus nerve. This case supports current literature; intractable singultus may be related to dysfunction of the physiological mechanism of the vagus-phrenic-sympathetic reflex arc, illustrating the relationship of structure and function. Intractable singultus diminishes wellbeing; absent medical guidelines for clinical treatment warrants further research applying OMT for managing intractable singultus.

Dominique L. Cameron, OMS III; Manda Mainville, OMS III; Jill Wallace-Ross, DO, MS

An Osteopathic Approach to Chronic Pelvic Pain

Introduction/Background: Chronic pelvic pain (CPP) is defined as persistent pain that is perceived to originate from the pelvis and lasting more than six months. In 2021, it was estimated that CPP affects 26% of females worldwide. Osteopathic Manipulative Treatment (OMT) may be useful in cases of CPP as a safer alternative to drug therapy.

Case: 42-year-old female with history of endometriosis, status-post partial hysterectomy, presented to the Osteopathic Treatment Center with seven years of right suprapubic pain. Pain is sharp, non-radiating, and 10/10 in severity. Patient reported urinary frequency at night. Pain is exacerbated by pressure over the area and a full bladder and improved with exercise and reclining with feet elevated. Patient stated she has no pain free days each month and had been previously seen by gynecology, urology, general surgery, and orthopedic surgery without diagnosis or symptom management. Acetaminophen at home was ineffective. OMT was directed towards somatic dysfunctions of the lower extremities and innominates. OMT was used to relax the muscles that attach to the pelvis and the pelvic floor muscles, and to restore pelvic biomechanics.

Results: After a pelvic diaphragm release on visit three, the patient stated that she was pain free for 2 weeks before the pain returned, and pain was more tolerable at that time. Patient believed the improvement in her symptoms was due to OMT.

Discussion: Our case study suggests that the use of OMT can be effective in treating chronic idiopathic pelvic pain. Limitations include the limited number of patient encounters and the inability to confirm history of endometriosis with a pathology report. Future research should address the use of OMT to treat pelvic floor pain and associated somatic dysfunctions.

Nicole Companion, OMS III; Melissa Ventimiglia, DO; Sheldon Yao, DO, FAAO

Effects of Osteopathic Manipulative Treatment (OMT) on Anosmia and Ageusia in Post-COVID-19 Patient: A Case Report

Background: The prevalence of olfactory and gustatory dysfunctions in COVID-19 infection affects approximately 65-70% of patients.[1] The pathogenesis of the anosmia and ageusia is thought to be related to the inflammation of epithelium and the presence of ACE-2 receptors on supporting cells of the olfactory epithelium.[2] Prior studies to treat COVID-19 related anosmia and ageusia have not shown much efficacy, including intranasal steroids or systemic steroids.[3] Osteopathic Manipulative Treatment (OMT) has potential to facilitate recovery of both sense of taste and smell in COVID-19 patients.[4]

Case: A 46-year-old-male presented to the office with diminished sense of smell and taste for 1 week. He had a positive COVID test 2 weeks prior to the visit. He tried nasal corticosteroids and vitamin C and D supplements with no improvement to taste or smell. Other than loss of smell, physical examination and vitals demonstrated no significant abnormalities. Osteopathic exam revealed somatic dysfunctions (SD) of the cranial bones, spine, rib cage, sacrum and pelvis. OMT including balanced ligamentous tension (BLT), myofascial release (MFR), and cranial osteopathic manipulative medicine (COMM) were applied to treat the SD.

Results: Immediately after treatment, the patient self-reported 25% improvement of taste and smell, and 50% improvement on day 2. On day 3, patient reported >75% improvement and on day 4, he reported that taste and smell returned to normal.

Conclusion: This case demonstrated improvement of anosmia and ageusia in post-COVID-19 patients after OMT. Limitations of this study include using subjective measurements of improvement of smell and taste. More research needs to be conducted to observe the effect of OMT on smell and taste and quantitative objective measurement in this patient population.

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Marianne Cortes, OMS III; Nishma Shah, OMS III; Yasmin Qureshi, DO (AUS), Ed.D, DPT

An Uncommon Cause of Common Peroneal Nerve Paresthesia: The Effect of Osteopathic Manipulative Treatment on Ganglion Cyst-Induced Common Peroneal Nerve Paresthesia

Introduction/Background: Ganglion cyst formation can lead to pain due to compression of nerves and stress on soft tissue. In a previous study regarding CTS, OMT demonstrated increased available space within the carpal canal, decreasing pressure on the nerve and symptoms.

Case: A 50-year-old female presented with 2 months of nontraumatic left lateral foot pain. She reported intermittent episodes of tingling and burning radiating to the ankle, rating it 8/10. Physical exam revealed decreased dorsiflexion ROM and decreased sensation on the dorsolateral aspect on the left foot. MRI imaging revealed an intratendinous ganglion cyst in the extensor hallucis longus which was drained, decreasing her pain to 5/10. Osteopathic structural exam revealed a short leg. The most effective OMT modalities were articulatory techniques, MFR, and the novel Butler nerve stretch (common peroneal nerve) as they addressed surrounding fascial tension.

Results: The patient's functionality was evaluated through the Lower Extremity Function Scale (LEFS). Prior to OMT, she scored 28/80. After drainage of the cyst and 3 OMT sessions, she felt relief and increased ROM in the ankle. A few weeks later, the burning sensation returned and worsened, prompting her to seek OMT. After the final treatment she scored 70/80 and her pain diminished to 0/10, allowing her to take daily walks again.

Discussion: This case study demonstrates the effectiveness of OMT in the treatment of ganglion cyst-induced common peroneal nerve paresthesia. This suggests draining of the compressive force on the nerve was not enough to eradicate the patient's pain, demonstrating that OMT can be beneficial to eradicate significant residual pain. Limitations to this study included lack of repeat imaging upon recurrence of pain and administering the final questionnaire after resolution of pain.

Elisabeth L. Frankini, MPH, OMS III; Adena Leder, DO, FAAN; Sheldon C. Yao, DO, FAAO

Relief of Post-COVD-19 Burning Mouth Syndrome (BMS) with OMM- A case study

Background: Burning Mouth Syndrome (BMS) is a rare condition consisting of a burning sensation of the oral mucosa of unknown etiology without physical examination findings. Patients may have other symptoms including difficulty speaking, headache (HA), temporomandibular disorder (TMD), and muscular weakness of the jaw.[1] Treatment methods include benzodiazepines and antidepressants.[2] Although there is no documentation of Osteopathic Manipulative Treatment (OMT) being utilized to treat BMS, OMT has been shown to be effective in treating TMD and HA.[3,4]

Case: 71-year-old male presented with a burning sensation of the left side of his tongue for the past two weeks. Previously, the patient experienced the sensation for over one year after being diagnosed with COVID-19 in March 2020. Patient reported 2/10 pain at time of visit, and 8/10 pain at its worst. He used Mylanta four times/day to alleviate pain. Physical examination and vital signs were within normal limits. Osteopathic structural examination revealed somatic dysfunctions (SD) of the cranium, jaw, spine, ribcage, and pelvis. OMT including cranial osteopathic manipulative medicine, myofascial technique, ganglion release, muscle energy and counterstrain were utilized.

Results: At one week follow up, patient self-reported no burning for 4 days following treatment. He reported an 80% overall decrease in discomfort and ceased use of Mylanta for 4 days. He recently resumed Mylanta and has been using it 1-2 times/day and rates the pain 2/10 at its worst.

Conclusion: This case demonstrated improvement of post-COVID-19 BMS symptoms. Limitations of this study include subjective measurements of improvement and a small sample size. More research needs to be conducted to observe the effect of OMT on BMS and its associated etiology.

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Logan Haley, OMS III; Matthew Clark, OMS III; Randy Litman, DO; Greg Heller, DO

Body-Mind-Spirit Connection as an Approach to Treatment of Spasmodic Torticollis

Introduction/Background: Spasmodic Torticollis (ST), also known as Cervical Dystonia, is a common disorder of the cervical musculature that causes repetitive movements and abnormal posturing. The etiology is often from trauma or neurological disease. ST may cause frequent, unpredictable, often painful contractions and significant functional impairment to a person's activities of daily living.

Case: A 70-year-old male presented to the OMM clinic complaining of severe, "burning, stabbing" neck pain and frequent uncontrollable muscle spasms. These symptoms persisted for the past 20 years, worsening over time. History was notable for past trauma and chronic postural abnormalities at the workplace. Osteopathic structural examination revealed: patient's head grossly sidebent right and rotated left due to right SCM hypertonicity,

with a fine tremor present regardless of positional changes or motion. Right SBS torsion present. Cervical extension was limited due to tenderness.

Results: Osteopathic Manipulative Treatment (OMT) was administered successfully over several months, specifically targeting the patient's body-mind-spirit connection. Treatment outcomes occurred via re-training the affected SCM muscle, restoring head and cervicothoracic motion, and normalizing body position. Effective treatment modalities included: myofascial release, balanced membranous tension, strain-counterstrain, and muscle energy. Patient education, targeted muscle activation/relaxation, at-home exercise regimens, and addressing psychological well-being played major roles in treatment success. Remarkably, the patient reported no abnormal contractions and near-complete pain relief, with approximately no head deviation from upright posture after treatment.

Discussion: Our case study suggests that OMT as part of an integrated body-mind-spirit approach can provide effective first-line treatment for Spasmodic Torticollis. This holistic, osteopathic approach may be necessary for long-term pain relief and functional improvement for chronic ST cases. A limitation to this case is the lack of objective measurement of muscle contractions before treatment.

Stephanie J. Hermann, OMS III; Morgan E. Barnett, OMS V; Kurt P. Heinking, DO, FAAO; Kyle K. Henderson, PhD

Osteopathic Manipulative Treatment may be a Cost-Effective Approach to Reducing Pain Associated with Acute Flare of Interstitial Cystitis

Introduction/Background: Interstitial cystitis (IC) is a chronic disorder of the bladder characterized by urinary frequency, urgency, bladder pressure and pain; affecting 3-7% women. Proposed pathology includes altered urothelium, toxin-induced uro-inflammation, neural upregulation, and hypertonic pelvic floor musculature. Multiple mechanisms contribute to symptomatology which account for the range of treatments and differences in therapeutic effect. Treatments include stress management, education, behavioral/diet modification, pain management, and manual therapies.

Case: A 26 year-old female with history of IC presented with an 8 week "flare" of constant, bladder pain, urinary urgency, and frequency. Pain and pressure were rated a constant 2/10, with sudden daily worsening to 10/10. She was taking Uribel for pain and Elmiron to rebuild the urothelium ($950/month; discontinued 1-month), prior to seeking Osteopathic Manipulative Treatment (OMT). OMT was provided three times. Somatic dysfunction included cranial, innominate/sacral, and thoracolumbar regions. Treatment included cranial; sacral counterstrain, articulation, and myofascial release; soft tissue thoracolumbar region; and muscle energy of innominates. The Bladder Pain Interstitial Cystitis Symptom Score (BPIC-SS) was completed before treatments and one week after last treatment.

Results: OMT improved structural asymmetry and myofascial restrictions. Following treatments the patient experienced short-term reductions in frequency, urgency, and most intense pain (BPIC-SS: 25/38 to 14/38 after final treatment); and reduced frequency of oral analgesics.

Discussion: Reducing myofascial restrictions around the sacrum may address IC pathology by facilitating drainage of toxins associated with peripheral uro-inflammation and neural upregulation of pain. Cranial OMT may reduce stress and catecholamines which are implicated in IC. This study suggests OMT may be a cost-effective approach to IC. It is limited by case/sample size. Future research is needed to investigate effect of OMT on uro-inflammatory biomarkers.

Jacob Honeyman, OMS II; Benjamin Robke, OMS II; Gasinee Reed, OMS II; Lisha Jacob, OMS II; Marissa O'Donnell, OMS II; W. Dan Lynch, DO; Wes Moore, DDS

Effects of Osteopathic Manipulative Therapy on Temporomandibular Joint Disorders

Introduction: Temporomandibular disorder (TMD) causes pain and discomfort at the joint connecting the mandible to the skull. Various nonsurgical interventions have been used for the management of patients with TMD, but the efficacy of these interventions remain unclear. This case study aims to provide insight into how osteopathic manipulative treatment (OMT) can be used to improve the symptoms and function of the temporomandibular joint (TMJ).

Case: A 52-year-old female presented with a 16-year history of TMD starting after orthodontic treatment. She has never received OMT for TMD. Baseline measurements were gathered using the TheraBite scale, Joint Vibration Analysis (JVA), and T-Scan Novus. JVA data was

analyzed using Piper classification, which is an analysis of TMJ disk alignment. These measurements were repeated immediately following a 15-minute OMT treatment session focused on the head and neck regions.

Results: Following OMT, maximum opening increased from 39mm to 44mm. Pre-treatment bite force distribution was 44.6% on the left and 55.4% on the right. Post-treatment bite force was 47.8% on the left and 52.2% on the right. Piper classification improved from 4B to 4A.

Discussion: This case provides a quantitative demonstration of how OMT improves function of the TMJ. OMT may be a more effective option for patients with TMD than current nonsurgical treatments. Treatment provided and measurements obtained are dependent on operator skill. More research is needed to confirm the above findings.

Sarah Lambros, OMS III; David Tuyn, OMS III; Mark Sandhouse, DO; Yasmin Qureshi, DO (AUS), EdD, DPT

Out of Place: An Osteopathic Approach to Recurrent Shoulder Dislocations in an Ehlers Danlos Patient

Introduction/Background: Ehlers Danlos Syndrome Hypermobility Type (EDS-HT) is an inheritable connective tissue disorder characterized by abnormal collagen synthesis resulting in joint hypermobility and frequent joint subluxations/dislocations. This functionally debilitating condition plagues a patient's physical, social and emotional wellbeing.

Case: A 35-year-old female presented to the osteopathic treatment center with bilateral shoulder pain secondary to recurrent dislocations. Her shoulders dislocated 15-20 times a day on average with the left shoulder dislocating more frequently. She noted daily headaches with 5/10 severity. Physical exam revealed a bilateral sulcus sign, postural decompensation with significant elevation of the left shoulder and cyanosis of the hands. OMT was directed towards the somatic dysfunctions of the secondary stabilizers of the shoulder joint. Prolotherapy was administered to her shoulder joints to increase the ligamentous stabilization she was lacking.

Results: After the fourth treatment, the patient noted a reduction in the frequency and severity of her shoulder subluxations, a negative sulcus sign bilaterally, and equal shoulder heights. Remarkably, she reported her shoulders were only dislocating twice a day. She also noticed that the frequency of her headaches was reduced to 2-3 times a month, with 3/10 severity and that her sleep improved.

Discussion: This case suggests that performing OMT to realign the joint and balance the soft tissues prior to prolotherapy is integral for improved treatment outcomes in EDS-HT patients. In relieving the body's secondary compensation to disease and aiding the body's natural ability to heal itself, OMT and prolotherapy may be beneficial in improving the quality of life in EDS-HT patients. A limitation of this study was our lack of a control group to determine the efficacy of OMT versus prolotherapy versus both treatments.

Manda Mainville, OMS III; Dominique Cameron, OMS III; Patrick Barry, DO

Managing Muscle Rigidity: An Osteopathic Approach to the Treatment of Stiff Person Syndrome

Introduction/Background: Stiff person syndrome (SPS) is a rare autoimmune neurologic disorder characterized by muscular rigidity and painful muscle spasms that affect proximal limb and axial muscles, leading to gait difficulties, progressive disability, and impaired activities of daily living. We hypothesize that osteopathic manipulative treatment (OMT) can help control pain, reduce spasm frequency, and improve gait in SPS patients.

Case: A 62-year-old female patient complained of chronic, diffuse stiffness and pain of the low back and neck. She described an aching pain that waxed and waned, lasting for over an hour. Spasmodic episodes occurred four times weekly, triggered by prolonged standing or sitting. Severity was 3/10 at rest and 9/10 at worst. Physical examination revealed profound fatigue, shortness of breath, increased thoracic kyphosis, decreased lumbar lordosis, levoscoliosis, and wide-based gait. Direct MFR, BLT/LAS, and muscle energy were performed every four weeks for six months to treat somatic dysfunctions of the neck, thoracolumbar spine, diaphragm, and extremities.

Results: By the third treatment, pain severity decreased to a 2/10, duration reduced to under an hour, and frequency of weekly spasmodic episodes declined. An ability to sit and stand for a longer period before experiencing fatigue was reported. Improved posture, muscle rigidity, gait, and respiratory diaphragm movement were also noted.

Discussion: Our case report suggests OMT can help control pain, reduce spasm frequency, and improve gait in SPS patients. Symptomatic management may be beneficial in improving their quality of life. Future research should focus on the benefits of OMT as an adjunct to other treatment modalities. One limitation of this study was the lack of collected objective data from other healthcare providers involved in her care.

Claudia Nelson, OMS III; John Henderson, OMS III; Cory Kim, OMS II; Bachtuyet Le, DO; Kara Mintier, DO

Osteopathic Manipulative Treatment of the Deep Fascia for the Treatment of Chronic Trauma-induced Somatic Dysfunction

Introduction/Background: Fascia is a connective tissue that envelops the human body from organs, muscles, and bones, to nerves and blood vessels, enabling the systems of the body to operate as a unit.

Case: A 22-year-old male involved in a motor vehicle collision sustained multiple injuries including: carotid artery dissection, traumatic brain injury with subdural hematomas and subarachnoid hemorrhage, exploratory laparotomy with splenectomy, and clavicle fracture needing open reduction internal fixation. Even after two years he continued to experience recurrent somatic dysfunctions (SD), most notable being rib pain limiting respiration, and thoracic cage, cervical, and shoulder restrictions. He received osteopathic manipulative treatment (OMT) for these SD with Still's, Strain-Counterstrain, and high-velocity low-amplitude techniques, however they would recur within a month. While an osteopathic medical student, he volunteered to serve as an educational demonstration for OMT pre-doctoral teaching fellows.

Results: The student underwent a series of demonstrations focusing on manipulation of the transversus thoracis, diaphragm, mediastinal ligaments, parietal and visceral pleura, and periosteum of the ribs, sternum, and clavicles. Following each demonstration, he felt complete relief of posterior rib pains with improved breathing capacity and increased compliance of the thoracic cage and shoulder girdle. The duration of his relief expanded after each session, progressing from one to several months with no recurrence of SD.

Discussion: This case shows enhanced treatment effects on chronic trauma-induced SD when the deep fascia is addressed compared to superficial anatomy treated with classic techniques, providing evidence that deep fascia could serve as a mechanism for chronic SD. More research is needed to investigate deep fascia manipulation and its role in SD.

Ryan Schultz, OMS III; Younus Baig, OMS V; Kyle K. Henderson, PhD; Kurt P. Heinking, DO, FAAO

An Osteopathic Approach to Childhood Scoliosis and Leg Length Inequality in a Pediatric Patient with Chiari I Malformation

Introduction/Background: Chiari I Malformation is a congenital condition characterized by abnormally-shaped cerebellar tonsils that are downwardly displaced below the level of the foramen magnum. While the pathogenesis behind Chiari Malformation has not been elucidated, one proposed explanation involves an abnormal fixation of the spinal cord, known as Tethered Cord Syndrome. Additional findings associated with a tethered cord include scoliosis, leg length inequality, and leg pain.

Case: A 4-year-old male patient with Chiari I Malformation presented to the clinic with a 2-year history of intermittent nocturnal 10/10 bilateral posterior leg pain. The patient was noted to have a 7 mm short left leg and a scoliotic curve convex left in the lumbar region and convex right in the thoracic. A 3 mm heel lift was initiated during the original visit. Osteopathic Manipulative Treatment (OMT) was used to treat somatic dysfunctions found in the thoracic region, lower extremities, and sacrum. Treatment modalities included soft tissue, muscle energy, and articulation.

Results: Over the course of 3 follow up appointments, the patient had significant improvement in their leg pain, rating it a 3/10, and experienced fewer and shorter painful episodes. Additionally, there was steady improvement in the patient's scoliotic curve along with leveling of the sacral base.

Discussion: Our case study suggests that OMT and heel lift therapy can be effective in treating leg pain and scoliosis in the setting of Chiari Malformation in a pediatric patient. Clinical Relevance: Addressing the leg length inequality and leveling the sacral base may have alleviated tension of a tethered cord, thus improving the scoliosis and posterior leg pain. A limitation is that follow-up scoliotic measurements haven't been performed yet as treatment is still ongoing.

Nishma Shah, OMS III; Marianne Cortes, OMS III; Alessandra Posey, DO

Establishing OMT as a Key Treatment Modality in Injury Rehabilitation: Teres Major Tear

Introduction/Background: Teres major muscle tears are rare injuries with <30 case-studies and 2 case-series in present literature. This case study contributes to the limited existing research and investigates conservative treatment as a validated treatment approach for rehabilitation. Furthermore, current rehabilitation for these injuries have only included Physical Therapy (PT); this is the first case study that incorporates the concomitant use of PT and OMT.

Case: 39-year-old male presented with two-month history of right shoulder weakness and bicep pain. Patient felt a "gum stretching out sensation" during a cross-fit KIP toe-to-bar pull-up exercise. He reported 2-3/10 axillary pain and local swelling. A soft tissue bulge (1.5in diameter) was noted on the inferior lateral right scapula. A wide field-of-view evaluation of the shoulder girdle MRI confirmed injury consistent with a grade 2 muscle tendon junction tear in teres major. A combination of OMT (MET, CS, LAS, transverse friction rub, FPR, HVLA) and PT was recommended to address soft tissue restrictions, altered muscle firing patterns, postural misalignment and weakness, respectively.

Results: After two OMM treatments, patient's bicep pain decreased from a 3/10 to a 0/10. Soft tissue bulge decreased by 0.5in. Increased strength was noted. During third OMM visit, patient noted pain remained a 0/10.

Discussion: This case study adds to the limited existing literature and contributes evidence that concomitant use of OMT and PT in teres major tears can show significant improvement without surgery. This was exemplified by the patient's increase in strength and decrease in pain. One limitation to this study is that the treatment is still in progress. Furthermore, this case study shows how the joint treatment usage of OMT and PT can be applied to other musculoskeletal injuries.

Daniel Trinh, OMS II; John Henderson, OMS III; Edward Goering, DO

Novel Lymphatic Counterstrain (LC) in a Case of Low Ankle Sprain

Introduction/Background: Since the 1930s, Chapman discussed the presence of gangliform contractions related to viscerosomatic reflexes. Recent practice discovered areas for evaluation and treatment leading to a novel lymphatic counterstain (LC) modality. This case study utilized LC for a low ankle sprain.

Case: A 24-year old male presented with an acute, left inversion ankle sprain during a basketball game. The subject stepped awkwardly on another player's foot, leading to immediate pain, edema, and ecchymosis. The subject was treated with a lower-extremity LC protocol four days post-injury, and again four days after initial treatment.

Results: Before treatment, the subject had pitting edema (3+/4) on the affected ankle with reduced dorsiflexion and plantar flexion due to pain (6/10) and swelling. Immediately after treatment, there was a modest reduction in ankle edema (2+/4) and greatly improved active range of motion (AROM) in all planes of motion with reduced pain (3/10). Eight hours after treatment, the patient noted marked reduction in swelling (0/4). In the next three days, edema returned (2+/4). The protocol was repeated four days after the initial treatment, which immediately reduced edema, pain, and nearly restored full AROM. Within two weeks of injury, the subject reported no pain, no swelling, and full AROM.

Discussion: We believe LC reset the body's natural ability to reduce inflammation due the progressive reduction of swelling eight hours after treatment. Through the two weeks of treatment and observation, the subject also performed stability and ROM exercises. Further studies should evaluate the generalizability of LC across diverse patient populations and conditions, as well as measure the effects of adjunctive physical therapy.

David Tuyn, OMS III; Sarah Lambros, OMS III; Mark Sandhouse, DO, MS; Yasmin Qureshi, DO (AUS)

Uncovering Trigger Points Masked by Lumbar Radiculopathy

Background: From 1990 to 2017, low back pain (LBP) has been the leading cause of years lived with disability. In 2017 alone, the global prevalence of people with LBP was estimated to be $577 million.

Case: A 29-year-old female presented to the osteopathic treatment center with 5/10 chronic neck and LBP with pain radiating intermittently down the right lateral thigh to the knee. The patient sustained the injury following a motor vehicle accident in December 2019. Lumbar MRI

in January 2020 revealed right facet joint effusion, disc bulge, and facet joint hypertrophy at L3-L4 and left foraminal disc herniation at L5-S1. Physical exam revealed no neurological deficits in the upper and lower extremities bilaterally. Osteopathic structural exam revealed severe right Quadratus lumborum (QL) trigger point, left QL tenderness, right paraspinal hypertonicity, and right piriformis tenderness. Counterstrain was performed on the right QL with adduction to facilitate its attachment to the twelfth rib, as the typically recommended hip abduction provided no relief.

Results: After the patient's first visit, she experienced near complete relief of her LBP. She would experience flare ups between subsequent visits, each with decreasing severity and no radiation. Prior to each inciting event, she remained virtually pain free.

Discussion: The initial utilization of OMT can be less invasive and costly than complex diagnostic evaluations. Jones prescribed counterstrain in specific ways; however, osteopathic physicians must understand the complex interactions of muscular anatomy to generate novel treatments for unique cases and improved treatment outcomes. Opportunities for research are present in assessing osteopathic structural exam findings and treatment outcomes in patients with LBP. A limitation is present due to lack of EMG data to further rule out spinal neurological involvement.

Duncan Williams, OMS IV; Carlton Richie, DO

"Skateboard to the Head" A Case of Persistent Headaches Following Blunt Eye Trauma

Introduction/Background: The sphenoid is the anchor of the eye. Its architecture maintains the safety and function of the eye by providing protection, access for neurovasculature, and attachment of extraocular muscles. Traumatic manipulation of the sphenoid can disturb these functions. Ocular injuries account for 3% of all emergency room visits in the U.S., with 97% resulting from blunt trauma. This case study supports the evaluation of sphenoid bone motion through osteopathic examination following blunt eye trauma.

Case: J.D. is a 54-year-old female who presented two-weeks status post surgical repair of a right dislocated lens caused when a skateboard struck her eye six weeks prior. She complained of a constant, right-sided, periorbital headache rated as 10/10 with photophobia, neck pain, and decreased visual acuity that had continued since the injury. Osteopathic examination revealed a right cranial torsion and somatic dysfunction of the cervical and thoracic spines. Indirect and direct osteopathic manipulative therapy (OMT) techniques were utilized.

Results: Following the initial OMT, J.D. reported an immediate reduction of her pain. After five visits she reported complete resolution of her periorbital headache with improvement of sleep, vision, and quality of life. Over one year of follow up she continued to receive OMT for chronic neck pain and occasional exertional periorbital pressure but denied recurrence of the constant severe headache described in her initial visit.

Discussion: Addressing derangement of the sphenoid reduced persistent symptoms of blunt eye trauma not addressed by surgical intervention alone. Limitations of this study include not performing pre- and post-treatment imaging. Further research with more objective measures is needed to illustrate the benefits of osteopathic evaluation of the sphenoid in treating complications of blunt eye trauma.

Jeremy Williams, OMS III; John C. Biery, Jr., DO, CAQSM

Restricted Shoulder Range of Motion: A Neglected Component That May Surprise You

Introduction/Background: Myofascial trigger points (MTrPs) are a common finding on osteopathic screening exams (OSE) in patients presenting with restricted shoulder range of motion (ROM). Of the rotator cuff muscles, the subscapularis has been identified on the differential for such pathologies. Many mechanisms for these conditions have been proposed; however, the identification and release of MTrPs as a primary etiology has been far overlooked.

Case: A 24-year-old male presented with a 3-month history of restricted abduction of the left shoulder. He denies an inciting event and now reports an inability to perform any activity overhead. Physical exam demonstrates limited abduction, left shoulder restricted to 90°, painful hypertrophic distal subscapularis, and mild discomfort with Jobes empty can and Neers. On OSE, a myofascial trigger point was noted in the ipsilateral subscapularis. Osteopathic manipulative treatment (OMT) was directed at treating the MTrP with direct inhibition. Additionally, rehabilitation was aimed at scapula stabilization (low trapezius and serratus anterior).

Results: Following OMT, the patient experienced immediate return to full, unrestricted range of motion of the left shoulder. Follow up 4 days later, he had returned to unrestricted activity. He continues to have unrestricted range of motion at a four-month e-mail follow up and attributes this improvement completely to OMT.

Discussion: This case study suggests that treatment of myofascial trigger points using OMT can be a viable treatment modality in patients presenting with limited ROM with a MTrP on exam. Furthermore, the identification of subscapularis MTrPs should not be overlooked in shoulder pathologies involving restricted abduction. A limitation to this study is small sample size (n=1); future research should be aimed at expanding the sample size to increase generalizability.

Khloud Yassin, OMS III; Cody Mutter, OMS III; Holly Waters, DO, MS; Rohit Mehra, DO, MPH, MS

Osteopathic Manipulative Treatment for Refractory Gastroesophageal Reflux Disease (GERD)

Introduction/Background: Gastroesophageal Reflux Disease (GERD) is a common problem that is found in a wide variety of demographics and can significantly affect a person's quality of life. Lifestyle modifications and Proton Pump Inhibitors (PPIs) are standard treatments for these patients.

Case: A 45-year-old female with a past medical history significant for a cerebral vascular attack in June of 2020 presented to her primary care physician for R shoulder pain. She was initially referred to the OMT clinic for this complaint, with review of systems positive for severe heartburn. She admitted to vomiting multiple times a day, requiring her to carry an emesis bag daily. She regularly took 4 tablets of Famotidine per day with minimal relief. Physical exam revealed direct tenderness to her epigastric area. OMT was directed towards the following relevant somatic dysfunctions: celiac ganglion restriction, cervical and suboccipital muscle hypertonicity, a mesenteric restriction, and cranial – R SBR, L torsion, and L lateral strain. A variety of techniques were used but the most effective were myofascial release, OA decompression, cervical soft tissue techniques, and osteopathic cranial manipulative medicine.

Results: Over the course of 8 visits for OMT, the patient experienced significant improvement in her GERD symptoms, citing decreased frequency and severity of heartburn. Her Famotidine intake decreased to PRN, and vomiting became rare. She continues to follow up for regular OMT for this and other complaints.

Discussion: This case report suggests OMT may provide benefit in the treatment of severe or refractory gastroesophageal reflux disease. Additionally, OMT may be beneficial in improving the quality of life in GERD patients. Further research is warranted to explore this potentially beneficial area of treatment.

EDUCATION & PUBLIC HEALTH

Erum Ahmed, OMS IV; Jerry Jose, OMS III; Randy Stout, PhD; Sheldon C. Yao, DO, FAAO

The Effects of a Novel Virtual Reality Osteopathic Manipulative Medicine Program on First Year Practical Exam Scores

Introduction/Background: Virtual reality (VR) is an emerging technology that provides an immersive virtual environment and has been used in medical education curricula.[1,2] Having a virtual patient to observe and practice techniques in VR, osteopathic medical students may have the opportunity to refine osteopathic manipulative medicine (OMM) techniques.

Objective: To determine the effects of a virtual reality OMM program on student practical grades.

Methods: First year osteopathic medical students were recruited via email and in-person announcements to participate in this NYIT-IRB approved BHS-1582 study and were provided with an Oculus 2 VR headset. They completed a 25-minute interactive OMM program focusing on reinforcing key concepts in screening and identifying landmarks on a virtual patient. First practical exam scores of VR participants were analyzed using chi-squared analysis against first year students who did not participate in the VR program to assess for any association between VR program use and the student's first OMM practical exam scores.

Results: The mean practical score for students completing the VR program (n=39) was 93.06 whereas the mean practical score for students who did not participate in the program (n= 287) was 93.32. Chi-squared analysis revealed that exposure to the VR program had no association with practical exam scores (p-value: 0.91).

Discussion/ Conclusion: The OMM VR program did

not have a significant effect on practical exam scores. Limitations include a small number of students participating in the VR program and confounding factors which may limit the use of the OMM practical exam as an effective differentiating measure. Future studies in the use of VR interface with osteopathic education may be a beneficial endeavor.

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Urooj Arshad, OMS II; Benjamin Baum, OMS II; Reagan Carter, OMS I; Sharon Gustowski, DO, MPH

Utilizing Osteopathic Manipulative Techniques to Mitigate Fall Risk Among Hospitalized Elderly Patients: A Literature Review

Introduction/Background: Falls rank as the second highest cause of unintentional death worldwide, with individuals over 60 being the most affected. Consequently, fall risks in hospitalized elderly patients are a concern. Dizziness, vertigo, and postural imbalance can lead to falls, and osteopathic medical students are taught how to use osteopathic manipulative treatment (OMT) to help alleviate these conditions. Therefore, osteopathic medical students can utilize OMT as part of a complete treatment plan during clinical rotations to help mitigate the risk of injury from falling.

Objective: This literature review identified OMT that demonstrated effectiveness at reducing dizziness in elderly patients.

Methods: A review of the medical literature database PubMed was conducted. The search included only articles published since 2010 that used the Dizziness Handicap Inventory (DHI) Scale and Sway Area (SA) to measure the effectiveness of OMT. These articles encompassed randomized controlled trials, nonrandomized controlled trials, and case reports.

Results: Eight research studies met our inclusion criteria. A total of 113 participants were treated for balance disorders with osteopathic techniques. Sixty-six participants were evaluated with the DHI; the remaining 47 were evaluated by SA. Each of the eight studies showed statistically significant improvement following treatment with OMT.

Discussion/Conclusion: OMT can improve both dizziness and sway. Osteopathic medical students and residents can use OMT in hospitalized elderly patients to help mitigate the risk of injury associated with falls.

Bridget Budny, OMS III; Dominic Gigliotti, OMS III; Brenda Diggs, OMS III; Thomas Fotopoulos, DO; Jeffery Johns, DO; John C. Biery, Jr., DO

SOAP Note Review: Evaluating Osteopathic Principles and Practice in Clinical Education

Introduction/Background: Prior osteopathic medical education studies have looked at general student interest in OMT and SOAP note writing but have not evaluated student integration of somatic dysfunction assessment from screening to full segmental diagnosis. The Alabama College of Osteopathic Medicine (ACOM) instituted an OMT SOAP note assignment to assess thought process completeness in osteopathic medicine and noted OMS IIIs diagnose and treat SD based only on Osteopathic Screening Exam (OSE) not the segmental exam. This observation initiated a curriculum revision (Didactics and OMT clinic) which is evaluated in this study.

Objective: Evaluate the effectiveness of the OPP curriculum revision for OMS IIIs in their osteopathic management and documentation, specifically the segmental examination prior to SD diagnosis and OMT.

Methods: Graded OMS III OMT SOAP notes from the current academic year (AY) were reviewed for the rate and type of OSE, segmental exam, SD, and OMT performed. This data is compared to the previous academic year to assess the effect of the curricular revision.

Results: In the current AY, 35 of 75 notes graded demonstrated congruency of OSE guiding segmental exam, diagnosis and treatment of SD compared to 9 of 55 notes in the prior AY. This is an improvement in congruency (16% to 46%, p=0.000309).

Discussion/Conclusion: The data supports our curricular change regarding instruction on the role of the OSE and the segmental exam prior to assigning a SD diagnosis. This study only assessed student performance on a known OMT documentation assignment, thus limiting its generalizability to all patient care encounters. The use

of the SOAP note assessment tool on randomly selected patient encounters would allow us to assess the OMS-III understanding and use of OMT in future daily practice.

Phuong Daniels, DPT, OMS III; Jayanth Rajan, OMS II; Madiha Huq, DO; Marija Rowane, OMS IV; Shan Shan Wu, DO; Devi Jhaveri, DO; Robert Hostoffer, DO

Development of a home-based osteopathic manipulative module

Introduction/Background: Rhinitis is an inflammation of the nasal passage resulting in common symptoms of sneezing, rhinorrhea, nasal congestion, and nasal pruritus. Pharmacological approaches have been the cornerstone for management of rhinitis. By applying the five osteopathic approaches to patient care, Wu et al described a module of osteopathic manipulative management (OMM) techniques aiming to treat symptoms of rhinitis.

Objective: In the current climate of the COVID-19 pandemic, patients are encouraged to limit the amount of office visits. We developed a self-treatment OMM module to provide our patients a tool to manage rhinitis symptoms between office visits.

Methods: We adapted Wu et al's OMM module into self-treatment techniques as demonstrated in a patient information handout.

Results: During the OMM treatment session, patients are taught the self-treatment techniques and are assessed for competency. These techniques included: suboccipital release, cervical muscles stretching, frontal and maxillary effleurage, supraorbital and infraorbital nerve release, mandibular drainage with gall breath, and periauricular drainage.

Discussion/Conclusion: We believe that the home-based treatment for rhinitis offers patients an additional modality to manage symptoms at home in conjunction with the current pharmaceutical approach while maintaining the recommended social-distancing guidelines during the COVID-19 pandemic. Furthermore, this OMM patient information handout is designed to be the first of many future applicable self-treatment protocols to further enhance the application of osteopathic principles to patient care beyond the scope of OMM office visits. The implementation of OMM self-treatment protocols has the potential to not only decrease the time and financial burden on patients but also serve to ease the impact of the physician shortage crisis.

Jan Andrea Garo, OMS IV; Yuriy Dasar, OMS IV; Morgan Nichols, OMS III; Edward Goering, DO; Janice Blumer, DO

Blended Learning: Evaluating the effectiveness of various instructional methods

Introduction: Blended learning is a combination of face-to-face and computer-mediated instruction. In recent literature, attributes of blended learning include a significant improvement in post-test scores compared to pre-test scores on a topic, which suggests this to be an effective method of permanent learning. Osteopathic medical education requires students to spend additional hours learning Osteopathic Principles and Practices (OPP), in which information is delivered in lecture and hands-on settings. COMP-Northwest in Oregon is a branch campus of COMP located in California. During Fall 2019, COMP-Northwest piloted a mandatory digital learning platform using the same OPP curriculum, while the use of digital materials was optional at COMP.

Objective: To determine the effects of delivering the OPP curriculum with blended learning materials on test outcomes.

Methods: Using a linear regression model, compare the written and practical exam scores between first-year osteopathic medical students of COMP-Northwest (DONW 2023) and COMP (DO 2023). Measure students' perception of materials using a universal assessment tool.

Results: OPP written scores for COMP-NW and COMP were 77.1 ± 13.0 and 77.8 ± 11.9 (p=0.645) with overall written scores being 80.3 ± 6.9 and 81.3 ± 6.6, respectively. OPP practical scores for COMP-NW and COMP were 92.4 ± 5.4 and 93.2 ± 5.6 (p=0.233), respectively.

Discussion: The results were inconclusive to the effects of blended learning. Exam scores were not statistically significant between DONW 2023 and DO 2023 in Fall 2019. However, student satisfaction was high with blended learning. In the setting of curricular confounding factors and limited sample size, a larger study over time is indicated.

Ashton Gatewood, MPH, OMS II; Rachel Terry, BS, OMS II; Natasha Bray, DO; Micah Hartwell, PhD

Native American Student Perspectives on Culturally Integrated Education at a Tribal College of Osteopathic Medicine

Background: Students' sense of belonging is linked to positive academic outcomes, increased engagement, self-confidence, and acceptance. The osteopathic tenets of mind, body, spirit connection align closely with Native American (NA) beliefs. Yet, no research has been conducted regarding NA students' sense of belonging in osteopathic medical school.

Objective: To evaluate NA students' perspectives on self-identity, culture, and tribal affiliation as the inaugural class at Oklahoma State University College of Osteopathic Medicine at Cherokee Nation, the first tribally-affiliated college of medicine in the United States.

Methods: A social constructivist approach using mixed methods provided qualitative evaluation. Data included Sense of Belonging surveys and semi-structured interviews. Participants were recruited from inaugural class members identifying as tribally enrolled or tribal descendancy. Sense of belonging surveys were collected and interviews were recorded for transcription with Rev. Thematic analysis was conducted using Braun and Clarke's six-phase framework. MAXQDA software was used for data management.

Results: Seven participants completed the study. Semi-structured interview data were coded into four main themes with subthemes: Psychosocial and Personal Identity, Native Culture and Heritage, Community Perception, and Tribal Affiliation. Sense of belonging survey data was averaged categorically, scoring 4-5/5 in all categories.

Conclusion: Our findings suggest that completing medical education under the Indian Health Service's mission to raise the physical, mental, social, and spiritual health of NAs alongside the nearly identical osteopathic principles and practice of treating the body as a unit of body, mind, and spirit promotes NA students' sense of belonging. Limitations include overall sample size and potential for self-selection bias. Future research could establish impact on osteopathic medicine academic milestones, such as board exam pass rates, graduation, and residency match rates.

Calley Gober, OMS V; Emily Daly, OMS III; Kurt Heinking, DO, FAAO

A Guide for Transitioning Osteopathic Research from Medical School to Residency to Increase Research Productivity across Medical Training

Introduction: Research involvement is emphasized in medical education for matching into residency and fulfilling its requirements. Osteopathic schools have increased resources for prioritizing osteopathic research, yet many students find difficulty participating due to lack of time and mentors. Literature shows that structured research activities and student guides aid in research project completion. Current guides are directed to medical students and residents in how to organize their projects, however there is currently a gap in resources that address continuing ongoing research into residency. Therefore guidance in transitioning established projects will prevent research waste, promote productivity, and add to the osteopathic body of knowledge.

Objective: To review literature on student research guides and curriculum in order to formulate a novel guide that addresses how to transition projects. The goal of this guide is to offer recommendations to students that wish to continue their research projects into residency.

Methods: We conducted a literature review (PubMed database, Midwestern University Library Search Database, *Journal of the American Osteopathic Association*) on research curricula in medical education, research productivity amongst medical students and residents, and current student research guidelines. Of the 32 articles that provided structured research guidelines, none addressed how to transition research into residency. Our guide was organized in a stepwise format that focused on identifying researchable problems, followed by exploring those observations through studies designed to address solutions.

Results: A novel guide was created based on successful student research programs and experiences.

Conclusion: Literature shows a gap in guidelines for transitioning established research projects from medical school to residency, which results in less research productivity. This guide assists students to overcome these barriers and create multiple, manageable projects to extend into residency.

Zuolin Ouyang, OMS II; Robert Murphy, MS; Kurt P. Heinking, DO, FAAO; Kyle K. Henderson, PhD

The Soft Tissue Clinic Experience (SCTE): A sustainable way for early medical students to develop patient interaction and manipulative treatment skills

Introduction/Background: In 2017 the Soft Tissue Clinic Experience (STCE) was created to increase medical students' exposure to history taking, musculoskeletal assessment, and practice of Osteopathic Manipulative Treatment (OMT). Hypothesis: Volunteering at the STCE will be correlated with increased student confidence working with patients and use of OMT during their 3rd and 4th year. Clinical Significance: Fostering a free, on-campus, student-run clinic, supervised by faculty may promote use of OMT in residency and clinical practice.

Objective: To assess the relationships between students' participation in the STCE, their use of OMT, comfort with performing OMT, taking a history, and making physical contact with patients.

Methods: IRB approval was obtained (MWU-21068) to deploy a voluntary online survey to 3rd and 4th year students in the winter quarter of 2021 to assess prior clinical experience, and confidence in taking patient histories, touching patients, and OMM diagnosis/treatment. Data was collected on a secure website (REDCap) and processed with SPSS software with statistical significance at $p<0.05$. Students not participating in the STCE served as the control group.

Results: 141 students responded to the survey with 24% participating in the STCE. Participation in the STCE was correlated to significantly greater use of OMT when allowed ($U=2737.5$; $p<0.001$), comfort with performing OMM diagnosis ($U=2649.0$; $p<0.001$), performing OMT ($U=2906.5$; $p<0.001$), comfort touching patients when rotations first started ($U=2191.5$, $p=0.03$) and at the time of the survey ($U=2214.5$, $p=0.04$).

Conclusion: Students who volunteered with the STCE are more comfortable working with patients and using OMT during clinic rotations. Limitation: Survey was voluntary (35% of population), and data is correlational. Future research: The survey is longitudinal with a five-year goal to account for changes in the STCE associated with the pandemic.

Marichelle Renee Pita, OMS III; Jayme Mancini, DO, PhD

Medical Students Learn Physical Exam and Health Through Research: Prevalence of Sacroiliac and Pubic Symphysis Joint Shears in Single Leg Balance

Introduction/Background: Osteopathic medicine students (OMS) learn how to integrate osteopathic manipulative treatment into patient care for pain and function. The prevalence of chronic low back pain (LBP), low back somatic dysfunctions, and impaired single leg balance (SLB) in OMS is unclear.

Objective: To investigate the impact of participating in a prevalence study on OMS' understanding of exam findings pertinent to assessment and plan for chronic LBP.

Methods: During a diagnosis and treatment LBP laboratory session, second year OMS performed history and physical, including a 30-second SLB test. Online worksheets were completed by students while examining their laboratory partners. Frequencies were calculated. Innominate diagnoses were classified as correct or incorrect. In correctly diagnosed innominates, the prevalence of sacroiliac. and pubic shears among those who failed SLB was calculated.

Results: When asked if this study improved their understanding of chronic LBP exam findings, assessment, and plan, self-completed responses from 99 students were 50.5% "Yes, definitely," 40.4% "Somewhat," and 3% "Not at all." Chronic LBP was documented in 23.2%. Innominates were correctly diagnosed in 80.8% of students as 80% rotations and 20% shears, with 15% reporting failed SLB. In those who failed SLB, there were 75% rotations, 25% shears, and 83.3% symmetrical pubic tubercles.

Discussion/Conclusion: The results suggest that OMS believed their understanding of exam findings pertinent to assessment and plan for chronic LBP improved through this study. In failed SLB, innominate rotations were more prevalent than shears. Though no identifiers were collected and responses were not graded, social desirability bias may limit this study. Possible limitations include inaccurately identifying anatomical landmarks and innominate diagnoses. Future studies could determine which other joint dysfunctions affect SLB and include OMS from several schools.

ORIGINAL RESEARCH

Brianna Ahn, OMS III; Eric Martinez, BS; Hana Hadiprodjo, OMS III; Caitlin Jackson, OMS; Myra Gutierrez, OMS; Paula Crone, DO; Brian Loveless, DO; Sebastien Fuchs, MD, PhD; Hendrik Szurmant, PhD; Jesus Sanchez, DO

Augmentation of Immune Response to COVID-19 mRNA Vaccination Through Osteopathic Manipulative Treatment

Introduction/Background: Multiple studies have shown benefit to treating patients with osteopathic manipulative treatment (OMT) in conjunction with receiving their immunizations. Our group decided to replicate these studies on a larger scale with the COVID-19 vaccines.

Objective: We hypothesize that the use of OMT will increase antibody (IgG) responses as quantified by SARS-CoV-2 antibody (IgG) against spike protein levels and the duration of antibody titers after mRNA COVID-19 vaccination. We are also tracking medication usage and side effects of vaccines and breakthrough cases.

Methods: 91 subjects were randomized into either control groups with vaccine only or intervention group with the vaccines in conjunction with two sessions of OMT after the vaccine was administered and the following day. Participants had blood drawn on: day 0 (1st vaccine), day 7, day 21 (2nd vaccine), and days 28, 35, 90, 182, and 365. Blood samples were processed and bio-banked for future antibody testing.

Results: We have successfully recruited and retained 91 participants, of which there is a diverse representation. Our retention rate is 87.5% over the course of 7 months. Reported symptoms and medication usage after each of the vaccines has been very similar between the two groups, yet of those 12 subjects who have experienced breakthrough cases, self-reported symptom severity, length of symptoms, and days of medication usage have been higher in the control group than in intervention group.

Discussion/Conclusion: We have successfully recruited and retained 91 participants and continue this ongoing study. OMT has shown promise in dampening the effects of the breakthrough cases to date. The first set of serum samples is soon to be processed for levels of SARS-CoV-2 antibody (IgG) against spike protein and results are forthcoming.

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Trauma-Informed Care Program Implementation for Osteopathic Medical Students

Introduction/Background: Trauma-informed care (TIC) is gaining momentum as studies examine the ill-health effects of experiencing trauma: however, this skill has yet to be included widely in medical school curriculum. The authors examined the change in knowledge, skills, and attitude of medical students after completing two or more TIC training sessions.

Objective: The primary program goal aimed to increase student knowledge, skills, and confidence in implementing TIC in their future profession, and the secondary program goal was to determine whether TIC curriculum could be effectively delivered in the medical school curriculum.

Methods: The program included an extra-curricular series on TIC for medical students. The program included an introduction to trauma-sensitive care and three in-depth topics on vulnerable populations: victims of sexual assault; lesbian, gay, bisexual, transgender, and queer or questioning (LGBTQ+) communities; and adverse childhood experiences (ACEs). The program utilized an anonymous, electronic questionnaire for optional pre- and post-program surveys and individual pre- and post-session surveys on a 5-point Likert scale, administered immediately after each session and again at two years. Survey response data were analyzed as categorical data with contingency tables using the Exact test.

Results: The program had a statistically significant change to "agree" or "strongly agree" with statements on TIC approach and practice. The LGBTQ+ and ACEs sessions had statistically significant changes in all statements. The sexual assault session had several statistically significant changes. Results of the two-year follow-up are under review.

Discussion/Conclusion: The program was effective at bolstering student confidence and increasing knowledge of TIC. As an extracurricular program, this demonstrated the interest and effectiveness of TIC integration in medical education.

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Impact of Osteopathic Manipulative Treatment on Chronic Persistent Gait Dysfunction Following Total Knee Arthroplasty

Introduction/Background: Musculoskeletal compensations before/after Total Knee Arthroplasty (TKA) may contribute to knee pain, reduced range of motion, and altered gait mechanics. Gait analysis provides a quantitative and functional outcome measure for the efficacy of Osteopathic Manipulative Treatment (OMT) on TKA rehabilitation.

Objective: Provide accurate and quantitative temporal and spatial assessment for the efficacy of OMT on gait dysfunction. Hypothesis: OMT will improve symmetry of spatiotemporal kinetics, and kinematic parameters of gait between operative and non-operative limbs.

Methods: IRB approval was obtained (MWU#21053) and subjects with unilateral TKA were recruited. Subjects were assessed for quadriceps strength, leg length, knee range of motion, and knee pain/functional limitations (KOS-ADL). An 8-camera motion-capture system and force plates acquired kinetic and kinematic data of walking gait. Somatic dysfunction was assessed and treated by an Osteopathic physician (30min); and gait analysis repeated. Data were tabulated with SPSS software with significance equal $p<0.05$.

Results: (N=2) Improvements in KOS-ADL and quadriceps strength in the operative limb (+4.7lbs and +26.4lbs, respectively) were observed following OMT. Walking speed and cadence increased in both subjects. Notably, OMT increased anterior pelvic tilt with a corresponding increase in internal hip rotation and peak knee extension in the stance phase (3.7° to 0.1° of knee flexion, Subject 1); and increased pelvic obliquity during the stance phase (–1.8 to –3.9°, Subject 2).

Conclusion/Discussion: A single session of OMT led to improved kinematic changes in gait and functional outcome measures. The utility of gait analysis is linking somatic dysfunction to specific spatiotemporal, kinetic and kinematic parameters that are improved with OMT. Study limitation: small sample size. Future studies will assess whether chronic gait dysfunction can be improved with weekly OMT.

Xin Lin, OMS II; Lesley Santos, OMS II; Sandy Than, OMS II; Michael Terzella, DO; Min-Kyung Jung, PhD

Effect of Medical School Experiences on Perceived Likelihood of Performing Osteopathic Manipulative Treatment (OMT) in Future Practice

Introduction/Background: Increased clinical exposure to osteopathic manipulative treatment (OMT) is associated with increased confidence in performing OMT amongst clinical-year osteopathic medical students. Research demonstrating preclinical experience's impact on comfortability performing OMT is limited.

Objective: We aimed to investigate how varying medical student experiences at New York Institute of Technology College of Osteopathic Medicine (NYITCOM) affect students' perceived ability to perform OMT and likelihood of using OMT as physicians. We hypothesized that those who performed or received OMT outside of class would be more likely to anticipate performing OMT in the future.

Methods: A RedCap survey was distributed to 2nd- through 4th-year NYITCOM students at the Old Westbury (OW) and Jonesboro (JB) campuses. Students reported their campus, class year, prior experience receiving OMT, and perceived likelihood of using OMT as physicians. Comfortability was considered a ≥5 score on a Likert scale from 0 to 10. IBM SPSS software was used to perform chi-square tests on the 219 responses collected. Significance was set at $p<0.05$.

Results: Across various OMT techniques, 2nd-years and JB students more frequently reported high performance comfortability (chi-square test: $p<0.05$). Neither prior experience of receiving OMT nor performing OMT outside of learning in school significantly impacted performance comfortability. Students with increased performance comfortability were more likely to report that they would perform the technique in the future (chi-square test: $p<0.05$).

Discussion/Conclusion: Preclinical students, JB students, and students who reported higher performance comfortability were generally more likely to perform OMT in future practice. Our findings may guide medical school curricula to improve the likelihood of students

performing OMT as physicians. Some surveys were not fully completed, variably limiting sample sizes across the techniques.

Michael E. Stenta, OMS IV; Clare Bacon, OMS IV; Zelalem T. Haile, PhD; Stevan A. Walkowski, DO

Osteopathic Manipulative Therapy[1] Effects on Prolonged Post-COVID Olfactory Dysfunction

Introduction: In 2019, the emergence of SARS-CoV2 created countless unique threats to public health. One of the cardinal symptoms is the loss of smell. Most people regain their sense of smell; however, some maintain decreased, absent, or abnormal olfaction long after the infection has resolved, leading to increased safety concerns and decreased quality of life.

Objective: This 2021 study represents a single-blinded pilot trial to examine the effects of a single Osteopathic Manipulative Therapy (OMT)[1] treatment on individuals with self-identified prolonged post-COVID anosmia, hyposmia or parosmia (n=20).It was hypothesized that the OMT group would have a greater improvement in olfactory function when compared to the placebo group.

Methods: Participants were randomly assigned to the OMT group or a placebo/light touch/sham group and subsequently underwent pre-intervention smell testing of four items (orange, red onion, bourbon, and perfume). Next, each group underwent assigned intervention followed by post-intervention smell testing to determine change in olfactory function.

Results: A Mann-Whitney test indicated that the post and pre-intervention differences in the correct smell intensity scores of red onions were significantly higher for participants who received OMT treatment (Mdn = 2.00) compared to participants in the placebo group (Mdn=1.00), U=20, p=0.19, r=5. There was a correlation of an increase in smell intensity in 2 out of the 3 remaining smell items, and the mean difference between pre-smell treatment and post-smell treatment in the OMT group was higher than the placebo group.

Conclusion: While the sample size was small and the method of smell assessment could be improved, this OMT protocol, and potentially others, should be investigated further as a promising potential treatment for prolonged post-COVID olfactory dysfunction.

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Effect of Physique on Medical Students' Perceived Physical Ability to Perform Osteopathic Manipulative Treatment (OMT)

Introduction: Musculoskeletal pain from occupational injuries have been linked to physical discomfort and awkward postures across healthcare professions. Physician comfort when performing osteopathic manipulative treatment (OMT) may prevent injuries.

Objective: We hypothesized there will be differences in students' perceived physical ability to perform various OMT techniques based on their physique.

Methods: A RedCap survey was distributed to New York Institute of Technology College of Osteopathic Medicine 2nd-4th year students. Student physique was assessed using the parameters of gender, age, height, and weight. Across all parameters, comfortability performing a technique was considered to be a reported score of ≥5 on a Likert scale from 0 to 10. IBM SPSS software was used to perform chi-square tests on the 219 responses collected. Significance was set at $p<0.05$.

Results: Physician physique had the greatest influence on comfortability performing Thoracic HVLA, particularly on significantly heavier and/or taller patients. Male students, taller students, and heavier students generally demonstrated higher perceived comfortability (chi-square test: $p<0.05$ for all). Students reported feeling the least comfortable performing Thoracic and Lumbar HVLA, whereas student age had no significant impact.

Conclusion: Several aspects of student physique impact perceived comfortability when performing Thoracic HVLA. Whenever significance was found across relative patient physiques, those who most often reported high performance comfortability were males, taller, and heavier. Revising techniques to accommodate various physiques may help to prevent occupational-related injuries. One limitation of our study is that not all of the students who started the survey completed it. Thus, sample sizes across the techniques varied.

[1]Editor note: According to the Glossary of Osteopathic Terminology, the abbreviation OMT is Osteopathic Manipulative Treatment, and OMTh is Therapy.

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The Effect of Osteopathic Manipulative Treatment in Pregnancy on Labor Duration: A Meta-Analysis

Introduction/Background: Musculoskeletal pain from occupational injuries have been linked to physical discomfort and awkward postures across healthcare professions. Physician comfort when performing osteopathic manipulative treatment (OMT) may prevent injuries.

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Discussion/Conclusion: Several aspects of student physique impact perceived comfortability when performing Thoracic HVLA. Whenever significance was found across relative patient physiques, those who most often reported high performance comfortability were males, taller, and heavier. Revising techniques to accommodate various physiques may help to prevent occupational related injuries. One limitation of our study is that not all of the students who started the survey completed it. Thus, sample sizes across the techniques varied. ■