12-5-2021

Osteopathic Treatments for Soft Tissue, Joint, and Head-Related Pain

Emerson K. Linsley
Grand Valley State University

Osteopathic Treatments for Soft Tissue, Joint, and Head-Related Pain

Emerson Linsley

HNR 499: Senior Project

November 2021

Advisor: Dr. Stephen Glass

Introduction

In today's world, osteopathic medicine is becoming a more widely accepted and understood form of medicine. Although it is not considered a plausible replacement for allopathic medicine, osteopathic medicine is used as a therapeutic system that manipulates the body in a way where it can facilitate the healing of itself (Lesho, 1999). This type of treatment focuses on the neuromuscular system, since it connects the autonomic nervous system to the rest of the body (Lesho, 1999). Therefore, any aberration in the musculoskeletal system can not only be used to diagnose disease in the musculoskeletal system as allopathic medicine does, but it also goes further to be a site of intervention to treat visceral disease (Lesho, 1999).

Osteopathic medicine utilizes manipulations to cause mechanical, neurophysiological, and psychological effects to heal the body. These manipulations act to restore the neuromuscular system to its normal position in relation to vertebrae, as well as restore vertebrae to their normal alignment (Lesho, 1999). In doing so, osteopathic treatment is effective in benefitting a wide range of physiological functions including stimulating mechanoreceptor endings, reducing nociceptive activity, increasing the pain threshold, reducing compression, and lubricating the surfaces of joints (Lesho, 1999). Therefore, osteopathic medicine can be used to reduce the pain of all types of injuries. However, patients with low back and neck pain are most likely to be treated with osteopathic manipulative treatment (Licciardone, Schultz, and Amen, 2020).

There are more than 100 different types of manipulations, but they are grouped into one of six major classes: high-velocity-low-amplitude/thrust/mobilization with impulse, muscle energy, counterstrain, myofascial release, craniosacral, and lymphatic pump (Lesho, 1999). In high-velocity-low-amplitude/thrust/mobilization with impulse manipulations, the patient is positioned in a manner that allows the physician to target specific spinal segments (Lesho, 1999).

It involves very little force to move articulating surfaces short distances in order to restore joint interaction and maintain a desirable gap in the joint socket to allow normal movement (Lesho, 1999). Muscle energy techniques involves the physician exerting an equal and opposite force to the patient's active force in order to complete successive isometric contractions that passively increases the range of motion after each contraction (Lesho, 1999). This method is used to increase joint mobilization and lengthen contracted muscles (Lesho, 1999). Counterstrain is the least uncomfortable technique (Lesho, 1999). The manipulator positions the patient in a position that is least uncomfortable for them, usually where the muscle is at the shortest length, and holds it for 90 seconds until being slowly and passively returned to normal position (Lesho, 1999). During this time period, the gamma motor neurons reset so that they are not trying to maintain their muscle tone by excessively firing (Lesho, 1999). Furthermore, myofascial release technique is a deep tissue massage that aims to stretch muscles and fascia to reduce tension or to promote venous and lymphatic drainage (Lesho, 1999). Lymphatic pump techniques, however, attempts to enhance the lymphatic return to the lower extremities (Lesho, 1999). In order to do so, the technique uses pectoral traction, postural drainage, effleurage, thoracic expansion, and rhythmic passive dorsiflexion of the feet (Lesho, 1999). Finally, craniosacral therapy are oscillatory movements of the cranial and sacral bones that are barely noticeable (Lesho, 1999). The movements are mediated through tension of various dural membranes and are applied gently to specific areas in the two regions (Lesho, 1999). The amplitude and rate of the oscillations are thought to be indicative of a person's health and influences the parasympathetic tone of the body (Lesho, 1999).

Of course, the alternative to osteopathic treatment is allopathic treatment. Allopathic practitioners only use manipulations to address problems in the musculoskeletal system alone

(Lesho, 1999). Therefore, more often than not, pharmacological intervention is needed to treat the pain of some individuals. However, pharmacological intervention can be quite expensive, and addiction can occur to certain medications (Turk, 2002). Furthermore, although osteopathic manipulative treatment (OMT) is considered safe, its efficacy in treating pain is uncertain due to a limited amount of evidence (Licciardone, Schultz, and Amen, 2020). As a result, this paper aims to explore the best form of treatment for pain: solely osteopathic, solely pharmacological, or some combination of both.

Osteopathic medicine for the treatment of soft tissue pain

Injury of the soft tissue pertains to any injury other than those to the nervous system or bony structures (Petty, 1970). Therefore, injury to the skin, subcutaneous tissue, muscle, and organs all fall under the category of soft tissue injury (Petty, 1970). Furthermore, among individuals who reported having chronic pain, 90% of them located the pain in their musculoskeletal system (Andersson, 1999). Pain medication reduces pain but does not alleviate pain at the source. Research on osteopathic treatments examines treatments that may reduce pain by addressing the root problems causing the pain. Gert Roncada (2020) examined the long-term effect of osteopathic treatment (OT) on the management of chronic thoracic pain in post-surgical patients who received coronary artery bypass graft (CABG) surgery. During this procedure, the sternum is cut longitudinally, and the entire chest is opened using retractors. The left side of the chest is further retracted in order to access the internal thoracic artery so that it can be harvested as a bypass vessel. This places a significant amount of stress on the thorax. Additionally, the lungs are collapsed during CABG surgery, since the patients are connected to a heart-lung machine for perfusion of oxygen. Therefore, this procedure causes patients to experience

decreased pulmonary function, and diminished thoracic mobility. The controlled study consisted of 102 patients who were randomly assigned in a 1:1 ratio to groups who both received a standard exercise-based cardiac rehabilitation regimen (SC group) and one group that received four additional osteopathic treatments (OT group). These patients were eligible to participate in this study by being admitted to the hospital for elective CABG surgery with median sternotomy for treatment of the heart. OT that consisted of standardized treatment of the dysfunctions of the thoracic cavity found during examination was performed at four, five, nine, and twelve weeks post-operation by five registered osteopaths with a minimum experience of five years. These treatments consisted of stretching of the abdominal diaphragm, myofascial release of the thorax, and suboccipital inhibition in order increase mobility and release tension and restriction within the connective tissue, increase lymphatic and venous circulation and drainage, and improve pulmonary and parasympathetic function. Both groups had similar post-operative decreases in pulmonary function after being discharged from the hospital and there were no significant changes in the slow vital capacity (SVC) between the two groups (SC= 3.83 ± 0.79 L to 2.38 ± 0.6l L; OT= 3.83 ± 0.79 L to 2.38 ± 0.6l L). There was also no significant difference in the thoracic stiffness between the two groups at twelve (SC= 1.6 ± 1.7 cm on visual analogue scale (VAS); OT= 1.1 ± 1.4 cm on VAS) and 52 weeks (SC= 1.1 ± 1.2 cm on VAS; OT= 0.8 ± 1.7 cm on VAS) post-surgery. There was, however, significantly lower pain intensity in the OT group at both twelve weeks (SC= 1.1 ± 1.6 cm on VAS; OT= 0.8 ± 1.2 cm on VAS) and one year post-surgery compared to the SC group (SC= 1.2 ± 1.7 cm on VAS; OT= 0.6 ± 1.4 cm on VAS). Roncada et al. concluded that the addition of OT to exercise-based cardiac rehabilitation leads to significantly greater reductions in thoracic pain intensity in the first year post CABG surgery

when compared to not receiving it. OT treatments may not address specific functional impairments post-surgery, but it does seem to reduce the impact of some pain contributors.

Pain is not limited to surgical procedures, and identifying the root cause of pain can sometimes be challenging. For example, non-specific lower back pain accounts for about 75% of the cases of back pain physicians are consulted on, and yet, it rarely requires surgical intervention (Tozzi et al., 2012). Localizing the pain can be difficult, since it may be related to muscle, bone, organ, or facia. Tozzi et al. (2012) conducted a study to assess how changes in kidney mobility using Osteopathic Fascial Manipulation (OFM) related to non-specific lower back pain. One hundred individuals between the ages of 18 and 60 with non-specific lumbar pain lasting 3 to 12 weeks were assigned to experimental and control groups. All participants were evaluated by an experienced Osteopath to assess the mobility of the kidney, including an additional 101 asymptomatic people. The experimental group, however, was also evaluated by an osteopath in order to determine the specific areas of major fascial and bony dysfunction. The experimental group received OFM to the lumbar region with not more than two minutes of Still Technique (ST) and more than 90 seconds of Fascial Unwinding (FU) in order to improve lumbar spine mobility and indirectly effect kidney mobility. ST involves manipulating tissues to increase malposition and then forcing them back to the normal positions, while FU requires an unwinding of the surrounding fascia until a release is felt in order to restore tissue mobility and function. The control group received treatment from someone who did not have any experience in manual therapy or any knowledge of the anatomy of the lower back. This person rested his hands on the control patients' lumbar region. The study showed a significant difference in the Kidney Mobility Scores (KMS) between asymptomatic people (1.92 ± 1.14 mm) and people with lower back pain (1.52 ± 1.14 mm). Also, pain was evaluated using the Short-Form McGill Pain

Assessment Questionnaire (SF-MPQ) on the day of recruitment and three days after treatment. There was a significant reduction in pain between the experimental group (pre-treatment: 16.10 ± 5.99 mm; post-treatment: 9.30 ± 5.55 mm) compared to the control group (pre-treatment: 14.03 ± 4.90 mm; post-treatment: 15.41 ± 5.24 mm). Mobility of the kidney is significantly greater in asymptomatic individuals than in people with non-specific lower back pain. Furthermore, OFM treatment of non-specific lower back pain reduced the amount of pain by 42% over a short period of time due to the reduction in myofascial stiffness and improvement of renal mobility. These are promising results for myofascial manipulation and pain reduction.

Non-specific low back pain can be caused by a wide variety of reasons. For example, primary dysmenorrhea (PD) is a common gynecological disorder that appears in women with the onset of menarche (Molins-Cubero et al., 2014). The most common symptom of PD is lower abdominal pain that extends to both thighs and/or the lumbar-sacral region, making treatment challenging (Molins-Cubero et al., 2014). Molins-Cubero et al. (2014) conducted a study to assess the immediate effects of global pelvic manipulation (GMP) in patients with PD. Measures were taken on patients' perceptions of low back pelvic pain and nociceptive biomarkers. A randomized, double-blind controlled trial was conducted in which 40 subjects were distributed into an experimental group (EG) and a control group (CG). Both groups were asked to use the visual analog scale (VAS) to measure self-reported pain. The minimal amount of pressure needed to evoke discomfort or pain, the pressure pain threshold (PPT), was also measured using a digital dynamometer in the sacroiliac joints. Both groups' blood was also taken in order to measure catecholamines and serotonin levels. GMP was defined as a semi-direct, high-velocity low-amplitude thrust that was designed to open the sacroiliac joints and the facet joint of the fifth lumbar vertebra. The EG received GMP in which tension was applied with a thrust, while the CG

received GMP without any tension or thrust. Results showed that the EG had significant decreases in self-perceived low back pelvic pain as well as an increase in the pain threshold of the sacroiliac joints on both sides when compared to the CG postintervention (low back pelvic pain: EG: -11.39 ± 12.03; CG: -.15 ± 5.47; PPT in right sacroiliac joints: EG: .33 ± .33 kg/cm^3; CG: -.02 ± .08 kg/cm^3; PPT in left sacroiliac joints: EG: .16 ± .18 kg/cm^3; CG: -.08 ± .16 kg/cm^3). Serotonin levels in the blood also increased in the EG (preintervention: 60.04 ± 34.76 ng/mL; postintervention: 65.02 ± 37.64 ng/mL), showcasing the endogenous response of the patient to pain and further highlighting the effects of GMP for the group. As a result, GPM seemed to help with low back pelvic pain in women with PD, at least in the short-term.

Regardless of the location or source, data showed that osteopathic treatments can be effective in treating pain in a variety of soft tissue areas. However, longitudinal studies must be conducted to examine the long-term effects of the OMT on the reduction of pain. Even still, it is clear that pain reduction is more likely for patients with soft-tissue injury or disease when they receive OMT from a licensed and experienced practitioner as opposed to not receiving effective treatment or no treatment at all.

Osteopathic medicine for the treatment of joint pain

As we age, joint pain becomes more common (Adamson, 2006). Therefore, it is important to know the risk factors that contribute to developing joint pain. However, most studies that attempt to explain the relationship between risk factors and developing joint pain identify osteoarthritis (OA) as the outcome (Adamson, 2006). Altınbilek et al. (2018) conducted a study to assess the effectiveness of osteopathic manipulative treatment (OMT) with exercise in treating pain caused by OA of the knee. OA in the knee is chronic and progressive, subsequently

reducing knee mobility along with stiffness and pain. The study recruited 100 patients with knee pain that lasted more than six months. Upon physical examination, patients were evaluated for pain, stiffness, and physical functioning of the joint using the Western Ontario MacMaster Questionnaire (WOMAC) before treatments, after treatments, and four weeks after treatment. The patients were then divided into two groups. Group 1 received exercise and OMT while only exercise was used in Group 2. Exercise consisted of three sets of 10 repetitions in order to strengthen and stretch the legs. The exercises were shown twice a week for two weeks in the clinic and were applied twice a day at home. OMT consisted of three minutes of mobilization and three minutes of compression given in one minute intervals to the bilateral patellofemoral and tibiofemoral joint. Then, two minute bilateral lower extremity pumping technique was performed. Patients were again taught to apply these techniques twice a day at home. There were no significant differences between the groups before treatment, but there were after. Group 1 (exercise and OMT) decreased their knee stiffness and had more pain relief than Group 2 (exercise only) after treatment (Group 1: WOMAC pre-treatment stiffness: 4.4 ± 1.7 , post-treatment: 3.5 ±1.7; WOMAC pre-treatment pain: 13.7 ± 3.4 post-treatment: 9.7 ± 3.2; Group 2: WOMAC pre-treatment stiffness: 4.6 ± 1.8 ,post-treatment: 3.8 ± 1.8; WOMAC pre-treatment pain: 14.3 ± 4.2, post-treatment pain: 11/7 ± 4.5). This study showed that OMT and exercise in combination were more effective in treating OA than exercise alone. The combination of treatments both impact pain management as well as physical function, and therefore may reduce or delay the need for additional pharmacological or surgical interventions.

Osteoarthritis, however, is not the only cause of joint pain (Adamson, 2006). For instance, shoulder pain is localized to the deltoid muscle, the superior part of the trapezius muscle, the clavicle, and the acromioclavicular joint (Schwerla et al., 2020). Schwerla et al.

(2020) performed a study to determine the effectiveness of osteopathic treatment pertaining to pain intensity and pain frequency in patients with shoulder pain. In this study, 70 participants were randomized into an osteopathic (n=36) and control group (n=34). Both groups received treatment; however, the control group had to wait until the study was over before receiving any treatment. A standard visual analogue scale (VAS) was used to measure worst pain and average pain at the beginning of each visit. The Likert Scale was used to assess the frequency of the shoulder pain and was dichotomized by responses of never, rarely, and sometimes (low frequency), often and always (high frequency). Osteopathic manipulative treatment (OMT) was defined as possibly including articulatory treatments, balanced ligamentous tension, cranial treatments, counterstain treatments, direct treatments, facilitated positional release treatments, high-velocity low-amplitude treatments, indirect treatments, integrated neuromusculoskeletal release, ligamentous articular strain, muscle energy treatments, myofascial release treatments, soft tissue treatments, and visceral manipulative treatments. OMT was provided to the osteopathic groups every two weeks for 40-60 minutes, resulting in five sessions total. Average pain intensity and worst pain was lower post-treatment for the osteopathic group (average pain: VAS pre-treatment: 57.3 ± 15.5, VAS post-treatment: 19.2 ± 11.4; worst pain: VAS pre-treatment: 73.6 ± 13.5, VAS post-treatment: 28.2 ± 14.6) but remained the same for the control group (average pain: VAS pre-treatment: 59.7 ± 9.8, VAS post-treatment: 62.0 ± 13.3; worst pain: VAS pre-treatment: 73.1 ± 12.3, VAS post-treatment: 69.2 ± 14.5). The Likert Scale dichotomization showed significant differences to support osteopathic treatment efficacy. These differences show a trend toward a lower frequency rating of pain, highlighting the subjective effectiveness of the treatment. Therefore, the study concludes that osteopathic treatment may be beneficial to people that are suffering with shoulder pain. While not eliminating pain, the

treatment may diminish the frequency of the worst pain and could augment other therapeutics used to manage shoulder pain.

As with many incidences of pain, identifying the source of pain and treating it can be a challenge. This is especially true in the jaw, since the mandibular joint may be a source of injury due to trauma, chronic grinding, muscle spasms, or other joint stresses. Cuccia et. al (2010) conducted a study to determine the effects of OMT in 50 adults with temporomandibular disorders (TMD), which is non-specific pain associated with the masticatory muscles and related joint structures. Subjects were randomly assigned to the OMT group and the conventional conservative treatments group (CTT group). The OMT group received osteopathic manipulation involving myofascial release, balanced membranous tension, muscle energy, joint articulation, and cranial-sacral therapy for 15 to 25 minutes. Treatment was focused on the cervical and temporomandibular joint region in order to decrease dysfunction of the temporomandibular joint ligaments and to retrain the control of posture and balance. The CTT group was treated with oral appliances, physical therapy, hot and cold compresses, and transcutaneous nerve stimulation. Both groups could take non-steroidal medication and/or muscle relaxants when prescribed. Assessment of the groups included the intensity of jaw pain using the visual analogue scale (VAS), maximal mouth opening (MOV) using a calibrated caliper, and cervical range of motion (ROM) of the cervical spine on the transverse plain. MOV was measured by the patient opening their mouth as wide as they could until the point of pain. Data were taken at the first visit (T0), after six months of receiving treatment (T1), and two months after the end of treatment (T2). There were no significant differences between the findings of the OMT and CTT groups. However, there was a reduction of pain and improved ROM for both groups between T0 and T2 (OMT at T0: VAS: 6.9 ± .9, ROM: 62.4 ± 10.7 degrees; OMT at T2: VAS: 6.9 ± .9, ROM: 62.4

± 10.7 degrees; CTT at T0: VAS: 6.4 ± 1.4, ROM: 64.5 ± 9.6 degrees; CTT at T2: VAS: 4.4 ± 1.8, ROM: 72.6 ± 3.0 degrees). Therefore, OMT had a positive effect on the physical symptoms of TMD and is a viable treatment option for these types of disorders.

Research on OMT use with joint pain shows that pain reduction is indeed possible, and is seen across a range of joints and pain conditions. While pain is not eliminated, adjunct pharmacotherapy can help control pain and OMT can assist with resorting movement. In all, OMT is more effective in relieving pain when used in conjunction with other forms of therapy and/or on its own in comparison to not receiving it.

Osteopathic medicine for the treatment of head, neck, and spine pain

Generally speaking, the prevalence of neck pain in various populations is quite high (Guez, Hildingsson, Nilsson & Toolanen, 2002). Humans use their neck to perform a wide variety of functions, so therefore, neck pain impairs a person's quality of life (Guez, Hildingsson, Nilsson & Toolanen, 2002). Since axial rotation is one of the most common neck movements, Dugailly et al. (2018) conducted research in order to compare cervical spine stiffness in axial rotation between chronic neck pain patients and asymptomatic patients. Furthermore, the researchers wanted to determine if non-manipulative osteopathic treatment would alter stiffness in any way. In this study, the non-manipulative osteopathic treatment was defined as osteopathic management (OM) and was based on musculoskeletal examination of the cervical spine and scapular regions. The degree of cervical dysfunction was determined by stabilizing the subject's head with solid plastic stanchions covered in foam, which were placed anteriorly and posteriorly on both the left and right sides. The head was then rotated mechanically by a machine's lever arm that allowed for passive displacement. This device, therefore, measured the degree of

stiffness of the neck when it was rotated. Each non-manipulative osteopathic treatment session consisted of three repetitive motion cycles that lasted eight seconds each and consisted of five repeated measures. This treatment was performed on eighteen asymptomatic volunteers and seventeen patients with chronic neck pain. The asymptomatic patients (AS) had no history of cervical spine pain or injury, while the neck pain patients (NP) complained of cervical spine pain for at least three months. Assessments of maximal passive axial rotation amplitude (PROM), neutral zone (NZ), elastic zone (EZ), and stiffness of left and right motion directions of the subjects happened before and within five minutes of the treatment session by having the subject indicate the motion range where they began to feel discomfort when their head was turned to both the left and right . Results showed no significant difference between pain alteration, stiffness, NZ, or EZ changes, but the NZ and EZ values increased between the before and after results of the NP group (NP pre-treatment right: NZ: 35 ± 12 degrees, EZ: .44 ± .12 %; NP pre-treatment left: NZ: 42 ± 17 degrees, EZ: .41 ± .16 %; NP post-treatment right: NZ: 44 ± 14 degrees, EZ: .33 ± .12 %; NP post-treatment left: NZ: 47 ± 15 degrees, EZ: .36 ± .16 %). No significant changes were found for the AS group. In comparison to one another, the NP groups had lower stiffness values post treatment (NP post-treatment right stiffness: .08 ± .03 Nm/degrees; NP post-treatment left stiffness: .07 ± .04 Nm/degrees) than the AS group (AS post-treatment right stiffness: .08 ± .03 Nm/degrees; AS post-treatment left stiffness: .09 ± .03 Nm/degrees), which also made the NP group have lower NZ values post-treatment (AS post-treatment NZ: 98 ± 24 degrees; NP post-treatment NZ: 91 ± 26 degrees). Also, the values between the NP and AS groups were not significantly different for each direction of motion. Furthermore, the severity of neck pain in NP was estimated by using a 100 mm visual analogue scale before and after treatment (before OM: 39.5 ± 23.5 mm, after OM: 15.1 ± 10.3 mm) and

identified significant reductions in neck pain. As a result, this study showed that the cervical stiffness features in axial rotation are significantly different between the neck pain and asymptomatic patient groups. It also shows that osteopathic management does help patients with neck pain.

Patients with cervical or upper thoracic lesions in the spine often experience spinal cord injury (SCI) orthostatic/postural hypotension, and conversely, patients with SCI also have a higher prevalence of neck pain (Cariga, Ahmed, and Mathias, 2002). The pain these people experience is often attributed to spine instability, surgical procedures, inflammatory processes, and neurovascular compression (Cariga, Ahmed, and Mathias, 2002). Arienti et al. (2011) conducted a study to determine the efficiency treating chronic pain in SCI patients by combining osteopathic manipulative treatment (OMT) and pharmacological therapies. SCI pain was identified as being either nociceptive or neuropathic by an expert clinician by examining SCI-related pain, pain perception, and pain interference. Twenty-six patients with stable traumatic SCI for at least six months were recruited into three groups: a pharmacological group (Ph), pharmacological-osteopathic group (PhO), and osteopathic group (Os). The Ph group received pharmacological treatment only. Those with neuropathic pain received 600 mg of pregabalin per day, and those with nociceptive pain received 204 g per day of a non-steroidal anti-inflammatory drug. Pregabalin is a drug that decreases neuropathic pain in this case. The Os group received osteopathic treatment only and was designed for each patient based on their somatic dysfunctions. Treatment included myofascial release, strain-counterstain, muscle energy, and soft tissue and cranial sacral approach. Treatment sessions occurred every week during the first month, biweekly during the second month, and once in the third month, each lasting 45 minutes by an osteopathic physician. The PhO group received pharmacological treatment until they

improved stabilization and then received OMT with the drugs. All groups were evaluated one (T1), three (T2), eight (T3), twelve (T4), 13 (T5), 16 (T6), 20 (T7), and 24 (T8) weeks after the start of the study. Twenty one patients with pure neuropathic pain were also recruited and evaluated at one (T1), three (T2), and eight (T3) weeks after receiving treatment. The verbal numeric scale (VNS) was used to assess treatment outcomes. The Ph and OPs groups had similar improvement rates across all time intervals (Ph: T0: 8.70 ± .67 VNS score, T1: 6.85 ± .82 VNS score, T8: 5.65 ± 1.30 VNS score; Os: T0: 8.92 ± .92 VNS score, T1: 8.17 ± 1.17 VNS score, T8: 6.01 ± .90 VNS score), but the PhO group had significantly improved pain relief once OMT started in combination with the drugs at T4 (PhO: T0: 8.60 ± .84 VNS score, T1: 7.10 ± .88 VNS score, T4: 5.70 ± .82 VNS score, T5: 5.65 ± .75 VNS score, T6: 4.90 ± 1.07 VNS score, T7: 3.80 ± 1.14 VNS score, T8: 3.70 ± 1.06 VNS score). Similar results were shown in the patients with neuropathic pain (neuropathic Ph: T0: 6.35 ± .90 VNS score, T3: 3.92 ± .67 VNS score; neuropathic Os: T0: 6.75 ± 1.04 VNS score, T3: 4.62 ± .74 VNS score; neuropathic PhO: T0: 6.50 ± 1.08 VNS score, T3: 2.92 ± .67 VNS score). Improved VNS scores showed improvement in back and shoulder mobility. The study showed that OMT could be a plausible treatment method for pain management in patients who cannot take the drugs used to treat pain. However, taking pain medication while also receiving OMT may be a better option since the PhO group had significant improvements above the other two groups.

A more specific example of people living with back pain is a disease called ankylosing spondylitis. Ankylosing spondylitis (AS) is a chronic inflammatory disease that usually presents itself with spinal back pain, joint stiffness, and loss of spinal mobility (Seiler, 2020). Although new imaging techniques and therapies developments in the past decade have changed how this disease is managed, treatment with non-steroidal anti-inflammatory agents and physiotherapy

still remains crucial in the long-term treatment of AS (Braun and Sieper, 2007). Seiler et al. (2020) conducted a study to investigate the effects of non-manipulative osteopathic treatment in addition to a physical therapy and rehabilitation program (OSTEO) versus physical therapy and rehabilitation on its own (PTR) when treating people with AS. Differences between treatments on measures of functional features, including quality of life and pain were assessed. In this study, eighteen participants were randomly assigned to two groups, PTR (n=9) and OSTEO (n=9), who received two sessions per week of their assigned treatment for eighteen weeks. The PTR group only received physical therapy and rehabilitation treatment, while the OSTEO group also received a non-manipulative osteopathic management. The physical therapy and rehabilitation sessions lasted 150 minutes and consisted of twenty minutes of physical therapy, thirty minutes of trunk exercises, and a ninety minute workout session. Osteopathic management was also given to the OSTEO group once a week for four weeks, then every fifteen days for six weeks, and then at least once a month for eight weeks. It consisted of various approaches on the spine and limbs as determined by the practitioner. First, general osteopathic approach was used in which the cervical and thoracic spine, the scapular and pelvic girdles, and the lower limbs receive gentle repetitive joint mobilizations and soft tissue techniques. The harmonic approach followed, in which oscillations were used to increase joint flexibility and soft tissue relaxation in the spine. Finally, muscle energy technique (MET) consists of force is applied against resistance by the practitioner. This was done in three series of five isometric contractions to the spine and sacroiliac joints which was followed by stretching. Spinal flexibility and posture were measured using the Bath Ankylosing Spondylitis Metrology Index (BASMI) and activity index of disease, functional index, and quality of life were measures using self-assessment questionnaires. Pain intensity was measured using a visual analogue scale. The results of the study concluded that

there was a significant difference between pre and post-intervention spinal flexibility and posture for the OSTEO group (BASMI pre-intervention: 4.2 ± 1.3 BASMI points; BASMI post-intervention: 2.3 ± 1.2 BASMI points) but not the PTR group (BASMI pre-intervention: 3.0 ± 2.2 BASMI points; BASMI post-intervention: 3.1 ± 2.1 BASMI points). They also showed that the activity index of disease and quality of life after intervention improved significantly more for the OSTEO group (activity index of the disease post-intervention: 3.5 ± 2.2 BASDAI points; quality of life post-intervention: .6 ± .5 HAQ points) than the PTR group (activity index of the disease post-intervention: 6.7 ± 1.6 BASDAI points; quality of life post-intervention: 1.6 ± .5 HAQ points). The study concluded that there are larger improvements in AS when non-manipulative osteopathic treatment is combined with physical therapy and rehabilitation, so it may be beneficial to use both types of treatment when treating AS.

Head, neck, and spine pain may be debilitating since the nervous system is needed to carry out all life functions. Therefore, treatment of this type of pain is especially crucial. Although pain management through OMT seems to be effective on its own, research shows that using OMT to supplement another form of therapy is a promising treatment plan to manage head, neck, and spine pain.

Conclusion

Pain is a common ailment for patients of all ages, and quite common with older populations. Managing pain can mean the difference between normal activities of daily living and a reduced quality of living and lack of mobility. Pharmacologic treatment may only mask pain while having little to no effect on the source of pain. The research presented in this paper provides evidence for the claim that all forms osteopathic manipulative treatment (OMT) can be

used to effectively treat pain that manifests in the body. The effectiveness of OMT appears to be magnified when combined with allopathic, pharmacologic treatments.

The studies show unanimously that receiving some sort of osteopathic treatment, whether on its own or as a supplement, is a plausible form of medicine to reduce pain in individuals with a wide variety of ailments, injuries, and diseases. While it is uncertain if OMT can cure chronic pain, there is evidence for the management of pain while continuously receiving osteopathic manipulations. For instance, in soft tissue injury, it seems that osteopathic treatments allow for a reduction in pain as well as an increase in the mobility of the soft tissue areas associated with pain. Similarly, pain associated with joints seems to decrease in frequency when osteopathic intervention takes place. OMT also seems to reduce the need for surgical intervention in these cases. Patients with head, neck, and spine injuries and diseases who receive OMT also show a significant increase in their mobility of the area. It seems that in order to treat pain, OMT is most effective when used alongside another form of therapy.

The evidence provided gives hope to those with pain who have been failed by allopathic medicine. OMT adds a layer to the treatment of a patient that allopathic medicine simply cannot: it connects the nervous system to the physical body (Lesho, 1999). Therefore, OMT takes allopathic medicine a step further by bridging the gap between pain and the physical cause of it. OMT provides an advantage in that it is non-pharmacological, and it directly treats the site of injury. While efficacy in healing was not the scope of the paper, reductions in pain are certainly progress towards an improvement in the condition.

References

Adamson, J., Ebrahim, S., Dieppe, P., & Hunt, K. (2006). Prevalence and risk factors for joint pain among men and women in the West of Scotland Twenty-07 study. *Annals of the rheumatic diseases*, *65*(4), 520–524.

Andersson, I., Ejlertsson, G., Leden, I., & Scherstén, B. (1999). Musculoskeletal chronic pain in general practice: Studies of health care utilization in comparison with pain prevalence. *Scandinavian Journal of Primary Health Care*, *17*(2), 87-92.

Altınbilek, T., Murat, S., Yumuşakhuylu, Y., & İçağasıoğlu, A. (2018). Osteopathic manipulative treatment improves function and relieves pain in knee osteoarthritis: A single-blind, randomized-controlled trial. *Turkish Journal of Physical Medicine & Rehabilitation (2587-0823)*, *64*(2), 114–120.

Arienti, C., Daccò, S., Piccolo, I., & Redaelli, T. (2011). Osteopathic manipulative treatment is effective on pain control associated to spinal cord injury. *Spinal Cord*, *49*(4), 515–519.

Braun, J. & Sieper, J. (2007). Ankylosing spondylitis. *The Lancet*, *369*(9570), 1379-1390.

Cariga, P., Ahmed, S., Mathias, C. J., & Gardner, B. P. (2002). The prevalence and association of neck (coat-hanger) pain and orthostatic (postural) hypotension in human spinal cord injury. *Spinal Cord*, *40*(2), 77.

Cuccia, A., Caradonna, C., Annunziata, V., & Caradonna, D. (2010). Osteopathic manual therapy versus conventional conservative therapy in the treatment of temporomandibular disorders: a randomized controlled trial. *Journal of bodywork and movement therapies*, *14*(2), 179-184.

Dugailly, P.-M., Coucke, A., Salem, W., & Feipel, V. (2018). Assessment of cervical stiffness in axial rotation among chronic neck pain patients: A trial in the framework of a non-manipulative osteopathic management. *Clinical Biomechanics*, *53*, 65–71.

Guez, M., Hildingsson, C., Nilsson, M., & Toolanen, G. (2002). The prevalence of neck pain. *Acta Orthopaedica Scandinavica*, *73*(4), 455.

Molins-Cubero, S., Rodríguez-Blanco, C., Oliva-Pascual-Vaca, Á., Heredia-Rizo, A., Boscá-Gandía, J., & Ricard, F. (2014). Changes in Pain Perception after Pelvis Manipulation in Women with Primary Dysmenorrhea: A Randomized Controlled Trial. *Pain Medicine*, *15*(9), 1455–1463.

Lesho, E. (1999). An Overview of Osteopathic Medicine. *Arch Fam Med.*, *8*, 477-484.

Licciardone, J., Schultz, M., & Amen, B. (2020). Osteopathic Manipulation in the Management of Chronic Pain: Current Perspectives. *Journal of pain research*, *13*, 1839–1847.

Petty, C. (1970). Soft Tissue Injuries. *The Journal of Trauma: Injury, Infection, and Critical Care, 10*(3), 201-219.

Roncada, G. (2020). Osteopathic treatment leads to significantly greater reductions in chronic thoracic pain after CABG surgery: A randomized controlled trial. *Journal of Bodywork & Movement Therapies, 24*(3), 202.

Schwerla, F., Hinse, T., Klosterkamp, M., Schmitt, T., Rütz, M., & Resch, K.-L. (2020). Osteopathic treatment of patients with shoulder pain. A pragmatic randomized controlled trial. *Journal of Bodywork & Movement Therapies, 24*(3), 21.

Seiler, M., Vermeylen, B., Poortmans, B., Feipel, V., & Dugailly, P.-M. (2020). Effects of non-manipulative osteopathic management in addition to physical therapy and rehabilitation on clinical outcomes of ankylosing spondylitis patients: A preliminary randomized clinical trial. *Journal of Bodywork & Movement Therapies, 24*(4), 51.

Tozzi, P., Bongiorno, D., & Vitturini, C. (2012). Low back pain and kidney mobility: local osteopathic fascial manipulation decreases pain perception and improves renal mobility. *Journal of Bodywork & Movement Therapies, 16*(3), 381.

Turk, D. (2022). Clinical Effectiveness and Cost-Effectiveness of Treatments for Patients With Chronic Pain. *The Clinical Journal of Pain, 18*(6), 355-365.