Osteopathic Manipulative Treatment for Pain Management
- Implications for the Native American Population

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ABSTRACT

Osteopathic Medicine was founded by Dr. Andrew Taylor Still in the late 1800s (8). The basis of the founding of Osteopathic Medicine was to find a way to better available medical practices which were unadvanced during this time period (8). Osteopathic manipulative therapy (OMT) came about by the correlation between disease and musculoskeletal abnormality that was discovered by Dr. A.T. Still (8). From this discovery, a disease treatment method that utilized pressure techniques and the musculoskeletal system was created and is now known as OMT (8).

Two widely utilized forms of pain management are over-the-counter (OTC) and prescription pain medications (1,6). OTC medications work by inhibiting the production of prostaglandins (3). Prescription opioid medications initiate their activity by binding to an opiate receptor (6). Opioid medications have many downfalls when considering chronic pain management (6), which include poor effectiveness rates, addiction and misuse (15).

In comparison to other ethnic groups in the United States, Native American communities have higher drug overdose and mortality rates associated with overdose (16). One report indicated that up to 30 % of the population in one reservation used oxycontin for a non-medical use (17). Fifty-nine percent of the individuals using oxycontin in this reservation who were not prescribed this drug by a physician claimed they took it for pain relief (17).

The purpose of this review is to identify the potential effectiveness of Osteopathic Manipulative Therapy as a chronic pain management technique. To do so, the PubMed database was searched for articles related to the terms, osteopathic manipulative therapy, OMT, pain, and chronic pain. This review is based on the articles found from this search.

The articles presented in this thesis provide evidence that OMT reduced or relieved pain associated with chronic low back and neck pain, in pregnant and postpartum women and in patients with: cancer; cystic fibrosis; chronic migraine; spinal cord injuries; shoulder problems; and traumatic knee arthritis. Additional research work pertaining to the effects of OMT on multiple sclerosis management, wound healing, diaphragm motion, pulmonary function, and cerebral perfusion, are also included in this thesis.

The impact of OMT being utilized as a pain management technique is not completely understood. However, if OMT could be utilized for pain management, then opioids use could be curtailed. A reduction in opioid use could help reduce the complications with these drugs such as dependence, addiction, and drug tolerance. In addition, clinics and medical centers could then be established for the purpose of using OMT for pain alleviation.

Currently, some Native American tribes are promoting the use of OMT through their tribal nation's healthcare system. For instance, the Choctaw Nation of Oklahoma offers OMT services at two locations (26). If further in depth research supported OMT for pain relief, clinics offering OMT could be established in all Native American tribal nations and reservations and be promoted as a pain management resource. If this occurred, then OMT could be used to combat the opioid and prescription drug problems in the American Indian populations.

INTRODUCTION

The history behind osteopathic manipulative therapy:

In the late 1800s, while medicine was still primitive, Dr. Andrew Taylor Still (A.T. Still) founded Osteopathic Medicine (8). The establishment of Osteopathic Medicine came about from an intense desire to improve a system plagued by physician ignorance, abuse of medicines, overzealous surgery, and unsanitary practices (8). Dr. A.T. Still's father was both a physician and a Methodist minister (8). Dr. A.T. Still entered medical apprenticeship under his father and eventually trained to become an allopathic physician (8). Following this training, he went on to attend the College of Physicians and Surgeons in Kansas City (8). Throughout his early life, Dr. Still held within him a deep desire to acquire medical knowledge and increase his understanding of human disease (8). While he was a practicing physician, Dr. A.T. Still lost three of his children to a meningitis epidemic in 1874, and this event intensified his desire to discover medicine further (8).

Hippocrates who is known for being "the Father of Medicine", believed that the focus of a physician should be on the patient rather than the disease (8). To embark on discovery with emphasis to the patient, Dr. Still utilized both living and deceased human bodies (8). He studied anatomy intensely and through recurrent observation, determined a correlation existed between disease and improper blood and nerve supply associated with a musculoskeletal abnormality (8).

From this correlation, Dr. Still came to the conclusion that to treat disease, a physician should use the musculoskeletal system (8). The musculoskeletal system can be defined as "the body's bony frame in combination with its attached muscles, tendons, joints, and tissues" (8). Dr. Still's advanced anatomy knowledge allowed him to be able to feel where a musculoskeletal abnormality was present (8). He then could apply pressure in order to manipulate an abnormal form into the correct position of function (8). This musculoskeletal manipulation is the basis for Osteopathic Manipulative Therapy. (8) The two main differences between an osteopathic physician and an allopathic physician is the DO's knowledge and ability to practice OMT and the holistic approach in which an osteopathic physician "emphasizes a concern for the whole person" as opposed to just the disease (8).

A modern definition of osteopathic manipulative treatment:

As defined by the American Osteopathic Association, Osteopathic Manipulative Treatment (OMT) "is a set of hands-on techniques used by osteopathic physicians (DOs) to diagnose, treat, and prevent illness or injury. Using OMT, a DO moves a patient's muscles and joints using techniques that include stretching, gentle pressure and resistance" (9) Originally, the purpose of OMT was to treat disease (8), but now it is also used in preventative medicine (8). Diseases that OMT can help treat include sinus disorders, migraines, carpal tunnel syndrome, menstrual pain, and asthma (9). It has also been clinically proven that OMT is an effective treatment for lower back pain (9).

The book "*The Difference a D.O. Makes",* portrays the OMT experience of Edward A. Crowell, D.O. and gives insight into the effects that OMT can have on patients.

"When I went into the practice of internal medicine, most internists were in the cardiac field, which takes about 70 to 80 percent of an internist's attention. Once my practice was established, I was greatly surprised to find that a high percentage of my referrals were coming to me from M.D. internists. Their patients would be suffering from all the signs and symptoms of coronary heart disease, acute coronary attacks, or angina, attacks, but electrocardiography and all other tests had disproved it was coronary.

Yet the patients were still suffering from chest pains. Sometimes it was persistent; sometimes it was intermittent; sometimes with exertion, or without. They were referred to me because they were termed cardiac cripples. They were afraid psychologically."

"One man suffered an attack of chest pains and was too frightened to go to work. He was afraid to mow his lawn or do anything that required physical exertion. Even though he'd been assured by the M.D.'s that he had no evidence of coronary heart disease, he was convinced psychologically that he did have."

"With him, as with all the others, I automatically did a spinal examination. In nearly all cases, I found multiple upper dorsal and rib lesions-what D.O.'s call somatic dysfunctions. Very quickly and easily I gave them osteopathic treatment. Their pain left and they no longer suffered from this syndrome." (8)

The science behind prescription pain medication:

Most individuals are familiar with over-the-counter pain remedies such as ibuprofen, acetaminophen, and aspirin, which are a common "go-to" solution for minor pains. Over-the-counter pain medications are within two classes, acetaminophen and nonsteroidal anti-inflammatory drugs (NSAIDs) (1). Other pain remedies used to treat more severe pain levels include prescription opioid medications such as morphine, fentanyl, hydromorphone, and oxycodone.

NSAIDs inhibit the cyclooxygenase (COX) enzyme (3), which converts fatty acids to prostaglandins (3). Prostaglandins are responsible for producing fever, inflammation and pain (3). Therefore, when a NSAID inhibits COX, it also prevents the feeling of pain. The exact mechanism behind acetaminophen is unknown, however researchers believe it is similar to NSAIDs (4).

Opioids work by binding to and stimulating one of the opiate receptors located in the brain (6). These receptors are in the G protein-coupled receptors (GPCRs) protein family (7). When stimulated, the receptors reduce pain and induce respiratory depression, euphoria, sleepiness, and a decrease in gut function (5). When taken intravenously, by intramuscular injection, or by mouth, the peak effect of opioids appears in 10, 35-40, and 90 minutes respectively (5).

It was recently unveiled that opiate receptors can be activated at the surface of and inside the cell (7). This prompted a study to determine where an opioid binds depending on its origin, prescription or endogenous (7). To determine where the binding occured, a "nanobody" sent a green signal whenever the opioid receptor was activated (7). An endogenous opioid entered the endosome and remained active for several minutes, while a prescription opioid caused nanobody activation in the Golgi apparatus and the Golgi outposts (7). This study demonstrated that opioids produced by the brain activate opioid receptors differently than prescription opioids (7).

Opioid complications with chronic pain management:

When opioids are used for management of chronic pain, (lasting longer than 3 months), pain is only reduced by 30 % (6). In long-term use (over 6 months), opioids have resulted in no improvement in the "36-Item Short Form Health Survey" (6). This survey evaluates quality of life related to wellness by measuring both physical and mental health (35). Risks of using opioids for chronic pain management include reduced testosterone, cardiac abnormalities, bone fractures, and immunosuppression (6). A 2015 study found that the misuse rates in the United States were 21.7-29.3 % and the addiction rates were 7.8-11.7 % when opioids were prescribed for chronic pain (6). The number of overdose deaths in the U.S. related to opioids was 42,000 in 2016 (7). In patients who are privately insured, the rate of opioid dependence increased by 3,203% between 2007 and 2014 (18). From 2006 to 2010 there were 259,093 emergency room visits related to poisoning from prescription opioids (18). Over half of these visits resulted in hospitalization, leading to a cost of more than $4 billion (18).

Continual usage of opioids can build up a drug tolerance (15). When this occurs, a higher dosage of an opioid will be needed to produce the same effect it had previously (15). Extended opioid usage could result in the establishment of dependence (15), where symptoms of withdraw (both physical and psychological), will occur when the opioid is no longer taken (15). Addiction can also be experienced with long-term usage of opioids (15). The complications and downfalls of opioid use for chronic pain opens doors to other options for chronic pain management.

The Native American population and prescription pain management:

A larger increase in drug overdose mortality rates has been found in American Indian and Alaskan Natives in comparison to other ethnic and racial groups in the United States (16). In Washington for instance, between 2013 to 2015, the mortality rates involving drug and opioid-involved overdoses were 2.7 times higher than those of whites (16). Oxycontin (classified as an opioid) usage on an American Indian reservation located in the rural Midwest was determined by a self-report questionnaire completed by 400 tribal members aged over 18 (17). Of these participants, 30 % reported during their lives, they had participated in a nonmedical use of Oxycontin (17). The reasons for this nonmedical use included "pain relief (59.3%), getting high (52.2%), decreasing anxiety (18.7%), experimentation (15.9%), addiction (15.0%), and help with sleep (8.0%)" (17). It is clear that in Native American communities a non-prescription form of pain management could have substantial impacts on future rates of opioid abuse and overdose.

RESEARCH PURPOSE

The aim of this thesis is to determine the validity of utilizing OMT as a pain management technique by utilizing the outcomes of peer-reviewed research. A comparison of current pharmaceutical pain management techniques and OMT pain management will be addressed. The potential implications of these findings will be stated with emphasis on the Native American population.

RESEARCH FINDINGS

Chronic low back pain:

A meta-analysis reviewed 15 research studies to evaluate using OMT as a pain management technique for low back pain (20). Of the studies reviewed, 3 tested postpartum women, 2 tested pregnant women, and 10 tested nonspecific low back pain (20). The review found that OMT showed clinically relevant effects in improving function and reducing low back pain in all three groups (20).

In a randomized trial with 66 participants between the ages of 18 and 60 years old, the ability of OMT to manage low back pain was examined (19). All participants had a diagnosis of chronic nonspecific low back pain having lasted at least 3 months (19). The study duration was four weeks and the participants were split into two groups (19). Data collection occurred prior to treatment, at week 4, and at week 12. One group was treated with OMT protocol including specific diaphragm techniques (19). The other group was treated with a sham diaphragm technique (19). The techniques were administered to their respective groups five times a week (19). Results showed OMT including specific diaphragm techniques improved pain, disability, "fear-avoidance beliefs, level of anxiety and depression, and pain catastrophization" at both weeks 4 and 12 (19).

One study compared OMT, physical therapy, and pharmacological treatment as pain and discomfort management techniques for patients with coccydynia, which is a disorder associated with pain/discomfort at the base of the spine (21). A total of 50 patients were included in the study and three data points were taken (21). The first before the treatment began, the second after pharmacological treatment, and the third after OMT (21). The pharmacological treatment lasted 3 months, followed by 3 sessions of OMT within a 5-week time-frame (21). After receiving only pharmacological treatment, the patients were in a stable condition with a reduction in disability (21). However, after OMT, a reduction in pain and greater disability reduction occurred (21). The mean disability ratings, which were measured using the "Oswestry Low Back Pain Disability Questionnaire" were reduced from 14.5 to 2.5 (21). Mean pain ratings, which were measured using the "visual analogue scale" were reduced from 6.5 to 1.2 (21).

Chronic neck pain:

This study identified how utilizing osteopathic visceral manipulation (OVM) would affect patients presenting with nonspecific neck pain and functional dyspepsia (i.e. indigestion) (12). A total of 28 patients were recruited for the study, all meeting the required criteria of a pain rating between 3 and 8 on the Numeric Pain Rating Scale (NPRS), neck pain lasting for at least three months, a rating between 10 and 24 on the Neck Disability Index (NDI) and functional dyspepsia symptoms (12). These patients were then randomly divided into two groups of 14 (12). One group received OVM and the other group received a placebo visceral manipulation (12). This study is based on the concept that "visceral disturbances can lead to increased muscle tension and decreased pain threshold in structures innervated at the corresponding spinal level through viscerosomatic reflexes" (12). The OVM treatment included manipulation to the stomach and the liver which lasted approximately 5 minutes, while the placebo treatment included a placebo visceral mobilization technique (12). Both groups only received their specified treatment one time (12). The outcome of these techniques was assessed by NRPS pain

scores and cervical range of motion (ROM), along with the upper trapezius muscle surface electromyographic (sEMG) activity (12). These areas were accessed a total of three times (12). The first measurement occurred before treatment, the second measurement took place immediately after treatment, and a third measurement occurred seven days following treatment (12). The results of the study included a decrease in the NRPS pain score at both immediately after treatment and at the seven-day mark for those treated with OVM (12). The placebo group also reported a decrease in pain immediately after treatment (12). The EMG signal was also increased in the group that received OVM at both immediately after treatment and seven days following (12). There were no conclusive findings for the range of motion tests (12).

Oncology patients:

A clinical trial on 23 cancer patients aged above 65 was performed to determine the effect of OMT on quality of life and pain relief (10). Research participants were divided into two groups, one group only receiving physiotherapy and the other group receiving both physiotherapy and OMT (10). Once a week, for four weeks, the participants were measured with a Numeric Rating Scale (NRS) (10). This scale measures pain felt by the patient with 10 representing the worst pain and 0 representing no pain (10). OMT was completed one time per week, lasting 45 minutes per treatment (10). The physiotherapy occurred daily for four weeks with each session lasting 30 minutes (10). The group that received both OMT and physiotherapy resulted in lower NRS scores at week two and four (10). The physiotherapy group also revealed a decreased NRS score, however this was only apparent in week four (10). This study showed demonstrated that OMT can be used to decrease pain in cancer patients (10).

Cystic fibrosis:

The main organs affected by cystic fibrosis include the digestive system and the lungs, resulting in chronic constipation, distal intestinal obstructive syndrome (DIOS) and other complications (34). OMT was used in a small study of five cystic fibrosis patients to “improve bowel symptoms and prevent DIOS” along with optimization of the autonomic and lymphatic systems and an improved range of motion (34). The OMT used in this study was described as “manipulation of the viscera, spine and other somatic components” that was intended to release “myofascial restrictions found in the abdomen and somatic structures” (34). While statistically inconclusive, the investigators reported a decrease in pain in four participants and a reduction in the need for laxatives for three participants (34). In addition, an “overall increase in satisfaction with their bowel movements” was found with four participants who received OMT.

Pregnancy:

One study that aimed to identify the effects of OMT on issues associated with pregnancy, without sham controls, was published with data that was gathered from personal interviews (13). The findings included physical and mental health benefits, such as low back and pelvic pain relief, and a reduction in childbirth related anxieties (13). The suggestion of a reduction in childbirth related anxieties was attributed to the perception that OMT was preparing their bodies for childbirth (13).

Another meta-analysis looked to determine the statistical significance between OMT and low back pain relief for pregnant and postpartum women (33). A total of 3 studies for postpartum low back pain and OMT, and 5 studies for low back pain during pregnancy and OMT were analyzed (33). This analysis revealed that for pregnant and postpartum women there was a decrease in back pain that was attributed to OMT (33).

The correlation between OMT and labor duration was the focus of another study (14). This study included 100 participants divided into groups of 50 (14). One group received standard labor management only and the other group received standard labor management in addition to OMT (14). The standard labor management group received care from allopathic physicians while the standard labor management plus OMT group received care from osteopathic physicians (14). The OMT procedure consisted of once-daily administration of suboccipital decompression, thoracic inlet release, rib raising, paraspinal inhibition, and sacral inhibition (14). Results showed that the group receiving standard labor management in addition to OMT had a significant decrease in labor time (14). The mean labor time for patients receiving only standard labor management was 16.57 hours compared to those who received OMT at 11.34 hours (14).

Chronic migraine:

The effects of OMT administration on chronic migraine sufferers was also investigated (22). Initially, participants were divided into three groups (22). The first group included OMT and medication, the second included a sham and medication, and the third group received medication only (22). The results were determined using the Headache Impact Test-6 (HIT-6) questionnaire which was administered prior to and at the end of treatment (22). The HIT-6 questionnaire, measures pain, social functioning, role functioning, vitality, cognitive functioning, and psychological distress (23). The possible results of the score range from 36 to 78, with a higher score correlating with a headache having a larger impact on daily living (23). Results showed that the HIT-6 questionnaire score had been significantly reduced by a mean of -8.74 for the group receiving OMT and medication therapy (22).

Chronic pain management in spinal cord injury:

Forty-seven patients with a spinal cord injury participated in a study that investigated the differences between OMT and conventional pharmacological treatment for chronic pain (24). Of these 47 patients, 33 had a spinal cord lesion that was complete and 14 had an incomplete lesion (24). In an incomplete lesion, sensory and motor function remain intact below the point of injury; whereas in a complete lesion these functions are lost (36). The patients were divided into three groups; one received pharmacological treatment only, a second received pharmacological and OMT, and a third only received OMT (24). The scale used to identify pain was the verbal numeric scale (VNS) (24). At a three-week time period, the pharmacological treatment group achieved a 24% improvement in the VNS, and the OMT group achieved a 16% improvement in the VNS (24). However, after this time point, further improvements were not produced with either the pharmacological treatment only or the OMT only groups (24). The group which received both pharmacological treatment and OMT resulted in pain relief that was greater than that of each treatment alone (24).

Shoulder pain:

In elderly patients with shoulder problems, OMT was administered in an attempt to improve shoulder range of motion, pain, and independent patient functioning (25) Functioning refers to the patient's ability to independently complete daily living activities such as walking, feeding, and dressing, among others (25).This study included 29 participants, who complained about a poor range of motion (63%), pain (33%), and poor range of motion and pain combined (4%) (25). These participants were then randomly separated into two groups where one group received OMT for 14 weeks and the other participants were placed in a placebo group (25). The OMT Spencer technique was performed in the OMT group (25). The Spencer technique places emphasis on glenohumeral and scapulothoracic joint mobilization (25).The placebo group was treated with only Spencer technique positions, without applying correctional force (25). These treatments were performed twice a week during weeks 2, 4, and 6 and lasted about 30 minutes (25). Data was taken prior to any treatment, one week after a treatment and at week 19 (25). Active and passive range of motion was measured using a goniometer (25). The functional ability of the shoulder was measured using a scale that questioned assistance needed to perform various functions (25). Pain was measured using the Subjective Units of Discomfort Scale which measures pain from 0 (no pain) to 10 (pain that is no longer tolerable) (25). At the end of the study, the range of motion for the OMT group revealed a statistical increase in range of motion (25). Pain levels for both groups decreased during treatment and began to rise again after treatment (25).

Traumatic knee arthritis:

The ability of OMT and exercise acupuncture to assist in traumatic knee arthritis treatment was analyzed (29). Fifty-one research participants were separated into three test groups, an OMT group, an exercise acupuncture group, and a routine group (29). All three groups received routine rehabilitation in addition to their assigned therapy (29). The outcomes were measured based on the results of baseline and end of treatment range of motion (ROM) and Western Ontario and McMaster Universities Arthritis Index (WOMAC) scores (29). The WOMAC test is a questionnaire used for the evaluation of hip and knee osteoarthritis (30). This test measures three areas, pain, stiffness, and physical function (30). This study found that OMT positively contributed to rehabilitation (29). However, the improvement of pain was greatest in the exercise acupuncture group (29). Overall it was stated that "exercise needling and osteopathy have positive significance for the improvement of joint pain and dysfunction of joint movement in patients with traumatic knee arthritis" (29).

ADDITIONAL FINDINGS NON-RELATED TO PAIN

Multiple sclerosis:

One study with 20 Multiple Sclerosis (MS) patients set out to determine what effect OMT has on disease management (11). For 60 minutes a day, five times a week, one group received conventional rehabilitation training (CRT) (11). A second group received the same CRT three times a week and a 60-minute OMT session two times a week (11). The group that included OMT showed an overall reduction in a Fatigue Severity Scale and improvement in both the Hamilton Anxiety Rating Scale and 10-meter walk test (11, 37).

Wound healing with lower-extremity ulcers:

The participants of this study included eight patients who had edema and lower-extremity wounds (32). The purpose of this research was to identify if OMT added to standard therapy would improve wound healing time (32). The wound surface area and leg volume edema were measured prior to and after treatment (32). The three phases of the study included using only standard therapy, followed by a second phase of standard therapy and OMT, and a final phase which included only standard therapy (32). OMT was performed twice a week for 10 minutes with the goal of improving lymphatic flow (32). The OMT techniques performed "included myofascial thoracic outlet release, doming of the diaphragm, pelvic diaphragm release, popliteal release, and pedal pump (2-3 minutes of continuous pump) performed in sequence" (32). A questionnaire was also administered to assess the patients' satisfaction with their treatment (32). The results of the study included an increase in the wound surface area during the first standard therapy only phase (32). This increase had a "mean of 10 cm2/wk" (32). During the phase that included standard therapy and OMT, the wound surface area was found to decrease "by a mean of 4.9 cm 2/wk" (32). During the OMT and standard therapy phase, the leg volume edema also showed a decrease (32). The questionnaire confirmed that six of eight participants ranked their treatment experience as "very satisfied" (32).

Healthy individuals - Diaphragm:

Sixty-seven healthy participants whom had a median age of 40.4 years old, participated in a study to determine how a single session of OMT would affect diaphragm thickness and motion (27). The participants were divided into three different groups, one group receiving OMT, a second receiving a sham, and a third control group (27). To assess diaphragm thickness and motion, an ultrasound was performed before and after the OMT session (27). During the treatment sessions, the control group did not receive treatment and were observed while they were lying down (27). The treatment for the sham group included "a gently pressure over the chest and subcostal area, alternate with deep inspirations, without any therapeutic purpose" (27). The OMT group received treatment of domes and pillars of the diaphragm (27). The findings show a mobility increase from 68 mm to 82.5 mm that was statistically significant in the group that received OMT (27). No significant change was noted for diaphragm thickness (27). An additional discovery included that individuals who were smoking at the time of study or had a profession regarded as sedentary did not respond as well to OMT as other participants (27).

Healthy individuals – Pulmonary function:

Another study with 53 healthy participants set out to determine how OMT could impact pulmonary rehabilitation (28). These participants were separated into two groups, one group received the standard pulmonary rehabilitation (SPR) while the second group received OMT for the first four weeks (28). The OMT group techniques included rib raising, doming of the diaphragm, thoracic lymphatic pump, and thoracic high velocity, low amplitude (28). The treatments administered by the SPR group were tapotement, pursed lip breathing, saline nebulizer, and rest (28). Based on the results of the forced vital capacity (FVC) and the forced expiratory volume in the first second of expiration (FEV1) tests, the treatments were ranked (28). This resulted in the groups being administered the two highest ranked treatments for their category in the fifth week of the study (28). In the sixth week of the study, both groups were administered the same treatment consisting of the highest ranked OMT and SPR treatments (28). The FVC and FEV1 tests were performed before and after each individual treatment session (28). This study found the most effective treatment in the OMT group to be rib raising and the second most effective to be lymphatic pump (28). Pursed lip breathing was found to be the best treatment in the SRP group while it was found that tapotement was second best (28). The FVC and FEV1 tests were lower for those who only received SPR compared to those who received OMT or OMT and SPR together (28).

Healthy individuals - Cerebral perfusion:

This research trial was conducted with the aim of better understanding the neurophysiological mechanisms and blood perfusion effects of OMT (31). This trial consisted of 30 participants between the ages of 18 and 40 without any pharmacological treatment four weeks or any pain six months prior to enrollment (31). The participants were separated into two randomized groups, one of these groups was administered a placebo of passive touches in a protocoled order (31) and the other group was administered OMT (31). To measure the effectiveness of each treatment, an MRI was taken before treatment, immediately after, and three days following (31). The results demonstrated that OMT treatment decreased blood perfusion in the left posterior cingulate cortex (PCC) and superior parietal lobule, and blood perfusion was increased in the contralateral PCC immediately following OMT (31). In addition, according to a questionnaire administered after treatment, greater than 60% of participants believed they had received OMT (31).

DISCUSSION

The research presented in this thesis, documents several occasions where OMT has been found useful in the treatment of pain. Current research provides evidence of OMT having relieved pain in the event of chronic low back and neck pain, in cancer and cystic fibrosis patients, pregnant and postpartum women, chronic migraine, spinal cord injuries, shoulder problems, and traumatic knee arthritis. This evidence of OMT successfully relieving pain in the research setting provides evidence that could support the utilization of OMT as a pain management technique. With a great deal more research, it may be possible to utilize active OMT management in order to reduce patient's pain, and patient and physician reliance on opioids.

If opioids were prescribed for shorter timeframes, then the complications associated with their long-term utilization such as dependence, addiction, and drug tolerance, could potentially be curtailed. Applying extensively researched and proven OMT techniques that reduce pain could have an impact on members of Native American communities by reducing opioid use and prescription. Aside from the need for extensive double blind research projects on this matter, there is also a shortage of osteopathic practitioners who specialize in OMT and insurance companies not covering OMT treatment. The ability of insurance companies to consider OMT as legitimate pain therapy could potentially change after extensive research projects and associated publications are produced that support OMT for alleviation of pain.

Currently, some Native American tribes are promoting the use of OMT through their tribal nation's healthcare system. For instance, the Choctaw Nation of Oklahoma offers OMT services at two locations (26). If further research concludes OMT can be used as a pain management technique, clinics offering OMT could established in all Native American tribal nations and reservations. It is possible that this implementation could assist in reducing opioid and prescription drug problems in the Native American population.

Credible research supporting the meta-analysis in this thesis proved to be challenging to find. Using search terms related to osteopathic manipulative therapy, OMT, pain and chronic pain, within the PubMed database, a substantial amount of research regarding OMT and pain relief was not revealed. Overall, the effects of OMT on pain relief has not been thoroughly investigated. This lack of knowledge could be cleared by improving the quantity and quality of research projects being conducted.

CONCLUSION

OMT has been utilized since Dr. Andrew Taylor Still founded Osteopathic Medicine in the late 1800s (8). In the time since its founding, OMT has been used by osteopathic physicians for the benefits of diagnosing, treating and preventing illness or injury (9). It has not been until recently that researchers have begun to investigate the pain-relieving properties associated with OMT. Research suggests that OMT can reduce or relieve pain in patients: suffering from low back, shoulder ,and neck pain; cancer; cystic fibrosis; who are pregnant or postpartum; migraine; spinal cord injuries; and knee arthritis.

Currently, pain management techniques include OTC pain medications or prescription medications such as opioids (1,6). Taking opioids long-term for chronic pain can lead to undesirable complications (15), which supports the need to thoroughly investigate alternative forms of therapy for the treatment of pain. If thorough clinical studies provide evidence of OMT providing pain relief, medical centers can be envisioned that offer OMT for non-medicated pain relief in order to help reduce opioid use. Additional research could include investigations on the mechanisms that results in OMT reducing pain.

ABOUT THE AUTHOR

At the time of writing, I, Tegan Maxson am a Biochemistry and Molecular Biology major through the College of Agricultural Sciences and Natural Resources at Oklahoma State University (OSU) in Stillwater, Oklahoma. I have been a member of the Honors College while at OSU and lived in the honors dorm, Stout Hall, during my freshman year. While at OSU, I have enjoyed being the Executive Secretary of the Biochemistry Club “Delta Nu Alpha” and the Native American Student Association. I have also been employed at the Center for Sovereign Nations on OSU’s campus. In the spring of 2018, I was granted admission to Oklahoma State University’s College of Osteopathic Medicine in Tulsa, Oklahoma through the “3+1 Early Admission” program. OMT has been a great interest of mine and I am excited to learn its techniques as I embark on my journey through medical school. Thank you for your interest in OMT and for your interest in my Honors Thesis.

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