Integration of Osteopathic Manipulative Treatment for Patients with Chronic Pain

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The Five Models of Osteopathic Medicine offers guidance on creating a treatment plan that includes OMT for patients with chronic pain. Using OMT on one body region or system has numerous downstream effects and can influence multiple models. This paper describes this therapeutic modality.

Abstract

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Introduction

During 2021, “an estimated 20.9% of US adults (51.6 million persons) experienced chronic pain, and 6.9% (17.1 million persons) experienced high-impact chronic pain”¹ which by extrapolating from 2023 census figures,²,³ translates into over 958,000 Missourians living with chronic pain. The implications of chronic pain reach far beyond the individual and estimated costs in 2010, were “$560 billion to $635 billion per year, composed of direct health care costs ($261 billion to $300 billion), days of work missed ($11.6 billion to $12.7 billion), hours of work missed ($95.2 billion to $96.5 billion), and lower wages ($190.6 billion to $226.3 billion)”⁴. The treatment of patients with chronic pain presents significant challenges for the modern-day medical practitioner. The chronic pain state occurs when physiologic process shifts away from an acute healing phase and the sympathetic nervous system, endocrine, immune, and central nervous system regions are activated.⁵ Because so many systems are involved in the generation of a chronic pain state, including emotional and psychological systems, identifying one therapy that is curative is challenging. Research continues to emerge that demonstrates the efficacy of multidisciplinary team approach to chronic pain management. Typically, these programs consist of physicians, psychologists, counselors, physical therapists, case managers, occupational therapists, and other health professionals, e.g. psychiatrists, nursing staff, etc.⁶ A treatment plan also requires individualization that must take into account access to care, patient resources, community resources, and patient buy-in. Osteopathic manipulative treatment (OMT) offers a first line or adjunct treatment modality that can be incorporated into the management patients with various presentations and etiologies of chronic pain.
Integrating OMT into Chronic Pain Management

When indicated, OMT can be used as a primary treatment or adjunct treatment in a multidisciplinary approach to the chronic pain patient. OMT is manual treatment for somatic dysfunction, which is: “the impaired or altered function of related components of the body framework system: skeletal, arthrodial, and myofascial structures, and their related vascular, lymphatic, and neural elements”.7 As a primary treatment, OMT will sometimes resolve the patient’s pain and is most often effective in cases of minor acute injuries that cause somatic dysfunction, such as strains or low-grade sprains. As an adjunct treatment, OMT may not fully resolve the patient’s pain directly, but may enhance healing by improving musculoskeletal range of motion, decreasing pain, and lowering allostatic load. A meta-analysis by Franke et al. indicated that OMT was effective in patients with low back pain, including those who were pregnant, postpartum, or had non-specific acute and chronic pain. Bagagiolo, et al. found that OMT is possibly effective in patients with conditions such as chronic neck pain, chronic low back pain and chronic non-cancer pain.9 There are a wide variety of OMT techniques that can be used and detailed knowledge of which technique is applicable for which conditions and/or patients is part of the educational process for osteopathic medical students.

There is sufficient literature pointing to efficacy, safety, cost effectiveness, as well as guidelines which indicate that various manual therapies including OMT, are appropriate to use in clinical practice in a variety of musculoskeletal conditions.10 OMT is generally safe to perform on patients of any age and any condition, including performing around stable artificial joints and internally fixated hardware.12

Five Models of Osteopathic Medicine

A tool called the Five Models of Osteopathic Medicine is a framework for creating a holistic treatment plan for patients with chronic pain, which may or may not include osteopathic manipulative treatment (OMT). The Five Models of Osteopathic medicine are five different components from which to approach health and disease: Biomechanical, Respiratory-Circulatory, Neurologic, Metabolic-Energy and Behavioral. The models are described below and include various chronic pain conditions where OMT can be integrated.

Biomechanical Model & Context

The biomechanical model is a framework for looking at how body structures, including joints, fascia, and musculature, are affected by a condition. Optimal body structural integrity allows for optimal function. Prioritizing body function for ambulation and activities of daily living can improve quality of life not only through decreased pain but also through greater autonomy to care for oneself.

Example: Patients with Chronic, Non-Specific Neck Pain & OMT Integration

OMT is a comparatively safe and efficient approach for patients with chronic neck pain, as reported in a meta-analysis and systematic review of moderate quality.13 A study by Cholewicki et al. indicated that OMT can lessen pain and disability while improving sleep, fatigue, and depression in individuals with chronic neck pain.14 Some osteopathic techniques can also improve neck muscle strength.15 A randomized clinical trial of OMT for patients with chronic neck pain after whiplash injury demonstrated a positive effect on quality of life.16 For patients with chronic neck pain, a reasonable biomechanical approach is to examine and perform OMT to the occipito-atlantal joint, cervical vertebrae, trapezius and suboccipital musculature, the thoracic outlet and first ribs. Gentle OMT techniques such as counterstrain, muscle energy, and myofascial release are all appropriate to use. While not contraindicated, using direct joint mobilization techniques such as high-velocity low amplitude should be used cautiously. OMT combined with other therapies for patients with chronic neck pain have demonstrated effectiveness, such as using OMT with dry needling17 and exercises.18

Respiratory/Circulatory Model & Context

The respiratory/circulatory model recognizes the interconnection between breathing (respiration) and circulation of fluids within arterial, venous, capillary,
and lymph vessels. Efficient gas exchange and circulation of fluids ensures delivery of oxygen, nutrients, and medications, as well as the removal of inflammatory waste products and inflammatory mediators. Studies have been performed that assess the effects of OMT on circulating cytokines and their influences on the immune system. Many positive effects were noted, namely a decrease in levels, suggesting that OMT can directly decrease inflammation.

**Examples: Post-Mastectomy Lymphedema, Chronic Lymphedema Due to Venous Insufficiency, Post-Operative Cardiac Surgery Patients & OMT Integration**

One study demonstrated that osteopathic lymphatic pump techniques significantly increase thoracic and intestinal duct lymph flow, as well as increases the lymphatic flux of cytokines, chemokines, as enzymes involved in defense of oxidative stress, in both the thoracic duct and intestinal duct. The osteopathic pedal pump technique also showed statistically significant change in lower limb volumes of healthy individuals. While these effects are transient, they can be incorporated into a treatment plan coupled with exercises, breathing techniques, and stretches to augment their treatment effect. Improvements in pain management, respiratory capacity and hospital length of stay have also been demonstrated in the post-operative cardiac surgical patient. To address the lymphatic system, perform OMT on the thoracic outlet and other areas prone to lymphatic congestion, such as the thoracoabdominal and pelvic diaphragms, as well as the thoracic spine and ribcage to help restore respiratory mechanics.

**Neurologic Model & Context**

The neurologic model focuses attention on the nervous system, including peripheral and central structures as well as the motor, sensory, and autonomic innervations. Attention to the area generating nociceptive input is important, however, it is also important to identify any areas of possible somatic dysfunction along the nerve pathway from peripheral to the spinal cord that could be affecting nerve function.

**Example: Patients with Chronic, Non-Specific Low Back Pain, Radicular, and Non-Radicular & OMT Integration**

National guidelines support the use of OMT as effective in decreasing low back pain and increasing function, for up to a year. In addition, there is evidence that OMT improves low back pain functioning in pregnant patients. Interestingly, OMT performed to the internal organs via fascial connections, called visceral manipulation, is showing promising results for patients with low back pain. OMT can be performed safely on patients with radicular pain with potential for positive outcomes, including less sciatic nerve symptoms. Utilizing OMT in patient with chronic low back pain includes examining the os coxae (innominates), sacrum, sacroiliac joint, lumbar vertebrae, and numerous muscles, including the piriformis, iliopsoas, pelvic floor, and quadratus lumborum for somatic dysfunction.

Assessment of postural alignment including foot position and spinal curvatures, particularly for patients who are ambulatory, is also warranted.

**Metabolic-Energy & Context**

Optimal cellular metabolic needs are different for individuals with chronic pain who must accommodate for physical impairments such as lack of movement and inflammation. Restoring optimal body function can decrease pro-inflammatory mediators, pain and decrease the work or energetic needs required for movement.

**Example: Myofascial Pain Syndrome & OMT Integration**

There is an inflammatory component to myofascial pain syndrome, mediated by various interleukins, cytokines, and neuropeptides. Some of these biomarkers, namely IL-6, substance P and beta-endorphin, and TNF-alpha have been shown to be decreased with the use of various osteopathic techniques, including myofascial release, counterstrain, as well as stretching. In one study of OMT in patients with chronic low back pain, circulatory pain biomarkers including beta-endorphin (a neuropeptide with morphine like effects) and palmitoylethanolamide (reduces
swelling and inflammation) were increased immediately posttreatment, as well as 24 hours post-treatment, with the effects being greater in the chronic subjects compared to the control group. The techniques resulted in a physiologic response of the target tissues with a positive anti-inflammatory and analgesic effect. Any OMT can be used on any region in patients with myofascial pain syndrome, but gentle ones such as myofascial release, indirect, balanced ligamentous tension and lymphatic techniques are recommended.

**Behavioral Model & Context**

Behavioral health interventions provide coping mechanisms, emotional support opportunities and sometimes significantly alleviate or even resolve chronic pain. Over time, psychosocial factors become increasingly important in the maintenance of chronic pain. The negative impact on multiple life areas frequently leads to a perception of a lack of control or self-efficacy in managing pain.

When resolution of the chronic pain state is not feasible, treatment goals must therefore be one of adaptation and functional optimization, building off the patient-doctor relationship, coupled with OMT and other disciplines when warranted to empower the patient to be an active participant in realizing their health and wellness. Setting expectations with regular follow-up to hold the patient accountable for buy-in further builds on the strength of the relationship established with the patient.

**Example: Any Patient with Chronic Pain & OMT Integration**

Preliminary studies indicate that OMT could have a direct effect on anxiety and depression. For example, in a pilot study, Abraham et al. investigated the use of OMT as an intervention to reduce stress, anxiety, and depression in first responders. The OMT treatment group showed a short-term downward trend of serum biomarkers associated with stress, anxiety, and depression when compared to the sham OMT group.

While this study did not measure symptom improvement, it suggests the possibility of such correlation between serum biomarkers and stress symptoms. Additionally, research has shown that OMT intervention can lessen the physiological response to stress situations, reducing cortisol levels as well as promoting a “faster recovery of heart rate and sympathovagal balance after an acute mental stressor by substantially dampening parasympathetic withdrawal and sympathetic prevalence.” Treatment of structural somatic dysfunctions to improve optimal physiological functioning in whatever state of health the patient may present allows the patient to achieve better balance between mental and physical health in the face of the psychosocial stressors that chronic illness or pain presents.

**Conclusion**

The management of chronic pain patients is complex, and an individualized plan is usually warranted. The Five Models of Osteopathic Medicine offers guidance on creating a treatment plan that includes OMT for patients with chronic pain. Using OMT on one body region or system has numerous downstream effects and can influence multiple models. For example, OMT to the iliopsoas musculature reduces tension and improves hip and low back motion which decreases pain. OMT can also affect diaphragmatic function and therefore oxygenation and lymph flow. When OMT is not available, other manual and conservative therapies such as exercises, physical therapy, chiropractic, and myofascial trigger point therapy, can be substituted and/or used in conjunction with other interventions including pharmaceuticals and surgery.

**References**

6. Oslund, Sarah, et al. “Long-term effectiveness of a comprehensive...

Disclosure

None reported. Artificial intelligence was not used in the study, research, preparation, or writing of this manuscript.

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