Tourette Syndrome and Musculoskeletal Tic Pain: A Case for Osteopathic Intervention

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Abstract

Motor tics in Tourette Syndrome (TS) frequently lead to significant musculoskeletal pain, driven by the repetitive strain placed on joints and muscles. Conventional treatments, including pharmacologic and behavioral approaches, often fail to provide sufficient pain relief or come with adverse side effects. This case report explores the application of osteopathic manipulative treatment (OMT) as a targeted solution for tic-induced pain. Through the use of OMT, an 18-year-old female with refractory TS-associated tic pain achieved notable symptom relief, with techniques addressing both localized muscle dysfunction and systemic autonomic regulation. This case demonstrates the possible therapeutic utility of OMT in this patient population and also highlights the importance of fostering innovation within osteopathic education and practice. Further research should explore OMT's efficacy in treating TS-associated motor tic pain as well as enhance osteopathic training to foster curiosity and adaptable applications of OMT across diverse disease pathologies.

KEYWORDS: Tourette Syndrome, Osteopathic Medicine, Tic, Neuromuscular

1 Introduction

Tourette's Syndrome (TS) is a neurological disorder defined by repetitive, involuntary movements and vocalizations known as tics. Typically this disease starts in childhood between the ages of 5 and 10 and has been shown to affects approximately 1% of the global population [1]. A diagnosis of TS requires that tics must persist for over a year, and the symptoms often can intensify with time and stress. These tics are unique, varying widely in form, frequency, and severity; these unique tics can become disruptive and greatly interfere with a patient's school, work, and social functions. Because of the often-distracting nature of these tics, the physical consequences of these repetitive motions often go underrecognized.

Musculoskeletal (MSK) pain is an often overlooked but prevalent feature of TS. Studies estimate that as many as 60–80% of individuals with TS report pain directly related to their tics [2, 3]. Reports dating back to the late 1980s recognized and described this burden, and attempted to develop a classification system for this tic-associated MSK pain [4]. More recent large-scale studies have confirmed these early observations; a recent review demonstrated how TS patients are at a higher risk of MSK complaints, cervical spine disorders, and even vertebral fractures compared to their peers without TS [5]. As the daily physical toll of these tics compounds, TS patients have an increased risk of developing chronic pain syndromes [6] and painful postural abnormalities [7]. The recognition of pain as a symptom of TS underscores the need for effective treatment options to alleviate the discomfort.

While pharmacologic interventions remain a mainstay of TS management, they are generally reserved for more severe cases given their long-term side effect profiles. Current guidelines recommend starting with behavioral approaches; techniques such as habit reversal therapy or exposure and response prevention have shown comparable efficacy to pharmacotherapy [8]. When medication is required, several options exist, but alpha-2 agonists are generally preferred as first-line for their safety profile [9]. Newer modalities, such as transcranial magnetic stimulation [10] and vagus nerve stimulation, are under investigation but remain experimental. While much of the literature emphasizes these strategies aimed at tic suppression, less attention has been given to treating the MSK consequences of these tics.

Conventional management of tic-related MSK pain is limited and may include analgesics, physical therapy, or symptomatic self-care[11]. Osteopathic manipulative treatment (OMT) offers a hands-on, noninvasive approach that has been shown to be affective at treating MSK pain [12]. Despite its clinical relevance, the use of OMT for tic-related MSK pain in TS has not been described in the existing literature; this represents a potential palliative gap in current treatment approaches for this type of pain.

2 Case Description

Our case concerns an 18-year-old female patient with a history of ADHD, autism spectrum disorder, and TS who presented seeking care for MSK pain associated with motor tics. Over her 10 years of TS, she had previously tried various medications, including clonidine, SSRIs, topiramate, antipsychotics, and baclofen, without relief. Additionally, TMS and holistic lifestyle and dietary changes proved unsuccessful. At presentation, she had significant pain, ranked 7/10, and located in her right anterior neck, right bicep, and right pectoralis. The patient and her mother, having heard about the benefits of OMT, were hopeful that it could provide relief from her MSK symptoms.

The physical exam was positive for two prominent motor tics. The first involves a repetitive head-swinging motion to the right. This motion engaged the sternocleidomastoid (SCM) muscles, causing a forceful lateral flexion and rotation of the head and neck that occurred every 5-10 seconds. An osteopathic exam of the SCM demonstrated increased tenderness and hypertrophy, with palpable differences between the spastic and normal sides. She also had limited ROM against the movement of the tic, all of which suggests SCM somatic dysfunction. The second tic involved a repetitive, forceful swinging motion of the right upper extremity toward the chest, which the patient informally described as resembling a 'Tarzan-like' movement. This occurred every 20 seconds during the appointment. An osteopathic exam of this region revealed findings similar to those of the previous tic but located in the pectoralis, bicep, and deltoid of the right arm. While other smaller tics were noticed during the physical exam, they didn't contribute to any pain and therefore were not treated or discussed in this case report.

After clinical evaluation and receiving patient consent, OMT was initiated to address her MSK pain. With no established OMT protocol for TS-associated pain, the physician, who was an Osteopathic Neuromuscular Medicine (ONMM) specialist, used his clinical judgment and osteopathic training to guide treatment. Treatment began with soft tissue techniques, including kneading and stretching of the SCM, scalene muscles, upper trapezius, and cervical–thoracic paraspinals. In combination, myofascial release was applied to the anterior chest wall and thoracic inlet to reduce hypertonicity and restore mobility. Counterstrain was applied to identified tender points in the SCM and chest wall to relieve localized hypertonicity contributing to her pain. Inhibitory pressure was then directed to trigger points in the SCM and pectoral muscles to reduce focal tenderness. Rib raising was performed bilaterally to improve thoracic cage mobility and support overall relaxation.

By the conclusion of the 40-minute visit, the patient reported a reduction in pain from 7/10 to 2/10 and described decreased frequency and intensity of her primary tics. The patient was scheduled for a follow-up appointment but did not attend. When contacted, she shared out-of-state travel was a barrier at the time and planned to contact the clinic when able. A month later, two additional calls were placed to offer rescheduling, but no further contact was made.

3 Discussion & Conclusion

This case report highlights OMT as a novel approach to alleviating MSK pain associated with TS tics. To our knowledge, no clinical trials or case reports indexed in PubMed have explored OMT for TS-associated tic management, positioning this report as a unique exploration into a largely uncharted therapeutic avenue. Given the potential adverse effects and limitations of traditional treatments for tics, OMT emerges as a compelling minimally invasive alternative. Clinicians treating patients with TS, especially those with significant MSK symptoms, may find it beneficial to incorporate OMT into their management strategies. Even brief, intermittent applications could provide episodic relief, allowing clinicians to better tailor interventions based on symptom flares. We acknowledge that this report has limitations. The lack of follow-up due to logistical and geographic barriers, along with the absence of standardized outcome measures, limits the long-term, objective assessment of treatment efficacy. Additionally, the OMT regimen was applied based on the provider's clinical judgment and understanding of the proposed mechanisms of action for each OMT technique utilized (see Table **??**). The proposed mechanisms of action are described in Foundations of Osteopathic Medicine [13]. While there are studies that have begun to elucidate the physiological effects of OMT [14, 15], having more primary evidence remains an area of continued research and investigation.

While promising, this case raises two practical concerns worth considering when applying OMT to TS and other understudied pathologies where MSK pain plays a role. In medicine, it is generally understood that management of chronic conditions requires consistent treatment and regular follow-up. However, access to qualified osteopathic providers can be limited, creating a practical obstacle for many patients [16]. For individuals with TS and other conditions that lack established OMT protocols, logistical and geographic barriers may further complicate care, despite the evident symptom improvements observed in this case. Secondly, this case underscores the need

Table 1. Osteopathic Manipulative Techniques Utilized and Their Relevance to Tourette Syndrome–Related Musculoskeletal Pain

OMT Technique	Proposed Mechanism	Application to TS-related MSK Pain
Soft Tissue / Kneading & Stretching	Gentle pressure and stretching of muscles, fascia, and connective tissue; promotes local circulation, reduces hypertonicity, and normalizes muscle spindle activity.	Reduces chronic muscle tension from repetitive tics, alleviates soreness, and improves local range of motion.
Myofascial Release (MFR)	Sustained pressure or stretch applied to fascia to release restrictions and improve tissue mobility; affects fibroblasts and connective tissue remodeling.	Relieves fascial tightness caused by repetitive motor tics, decreasing pain and improving joint and soft tissue mobility.
Counterstrain	Passive positioning of tender points to shorten the muscle and fascia, temporarily reducing abnormal proprioceptive input.	Interrupts reflexive muscle spasms triggered by tics, decreasing focal pain and muscle hypertonicity.
Muscle Energy Technique (MET)	Patient actively contracts muscles against resistance provided by the physician; uses reciprocal inhibition or post-isometric relaxation.	Lengthens shortened muscles from repetitive tic movements, reduces muscle overactivity, and improves functional motion.
Inhibition Treatment	Sustained pressure is thought to deactivate myofascial trigger points, decreasing nociceptive input and referred pain.	Targets overused muscles burdened by repetitive tic activity, providing both local and referred pain relief.
Rib Raising	Hypothesized to decrease sympathetic nervous system tone by mobilizing costovertebral articulations.	Promotes autonomic balance and reduces secondary muscle hyperactivity that can exacerbate tic-related strain.

This chart outlines the mechanism of action for each of the techniques utilized in this case. The proposed, outlined in *Foundations of Osteopathic Medicine* [13], continue to be an area of ongoing study, highlighting the need for further research into how these established approaches can reduce the MSK burden of TS.

to foster curiosity and critical thinking within osteopathic education and practice. In this particular case, the provider did not have a standardized regimen for TS patients; however, by drawing on his ONMM training, he was able to adaptively approach the problem and provide meaningful relief to the patient. While research is being done to improve curiosity in OMT training [17-19], further emphasis on advancing "osteopathic curiosity" in education and ongoing clinical practice will equip osteopaths at all levels with the skills and the confidence to explore safe, innovative uses of OMT. By cultivating this mindset, osteopathic students and providers can be empowered to responsibly expand the therapeutic boundaries of OMT, broadening the spectrum of safe, individualized treatment options available to patients with challenging or underexplored conditions.

The observations of this case also call for deeper clinical investigation. Prospective studies, including randomized controlled trials, are needed to solidify OMT's role in long-term TS pain management and establish optimal treatment protocols. Additionally, exploring the specific neurophysiological mechanisms by which OMT might mitigate tic expression could reveal valuable insights into TS management. If validated by larger studies, OMT could become an essential, minimally invasive addition to the therapeutic options for this unique population, expanding the clinician's toolkit for delivering effective, patient-centered care.

Declarations

Ethics Approval and Consent to Participate

Not applicable.

Consent for Publication

Verbal consent was obtained from the patient and her legal guardian for publication of this case report and any accompanying details. Identifying information has been withheld to ensure patient confidentiality.

Data Availability

Not applicable.

Conflicts of Interest

The authors declare that they have no competing interests.

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Author Contributions

All authors contributed to the collection and presentation of this case report.

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