An Osteopathic Approach to Temporomandibular Joint Disorder in an Ehlers-Danlos Patient

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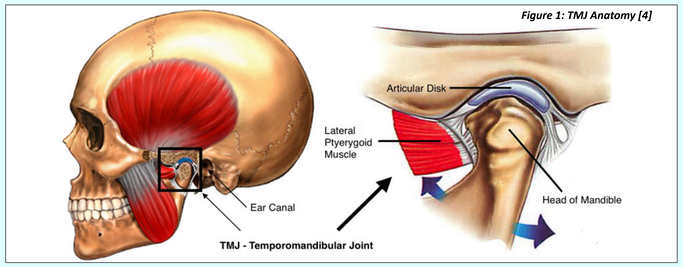
Introduction

- **Ehlers-Danlos syndrome (EDS)** is a collection of rare connective tissue disorders affecting the development of collagen. EDS patients suffer from joint hypermobility, tissue fragility, and skin hyperextensibility. [1]
- **Temporomandibular joint disorder (TMD)** is a common complication of EDS due to hypermobility of the temporomandibular joint (TMJ). Symptoms manifests as crepitus, myalgias, arthralgias, and headaches. Prevalence of TMD clinical signs and symptoms in the general population has been reported as high as 44% [2]. In the EDS population limited research has demonstrated a prevalence as high as 100% [3].
- The **Temporomandibular joint** is a complex synovial hinge joint that is divided into two synovial joint cavities separated by an articular disk. The four muscles of mastication that provide movement to the TMJ are the temporalis, masseter, and medial and lateral pterygoid.

Figure 1: TMJ Anatomy [4]



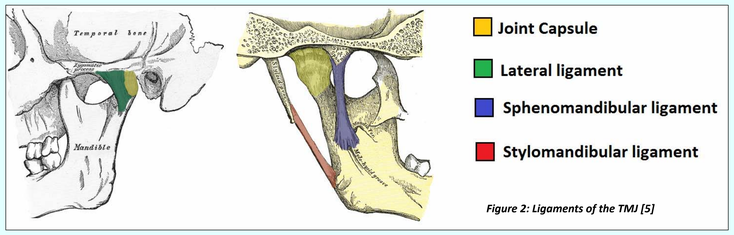


Figure 2: Ligaments of the TMJ [5]

Initial Case Presentation

HPI: A 34-year-old female presented with a four-year history of intermittent bilateral headaches and jaw "clicking" secondary to TMD. The patient stated that the headaches and jaw discomfort began four years ago after a car accident. The headaches were described as throbbing, occipitotemporal pain, with an 8/10 severity. The headaches lasted 6-8 hours and occurred at a frequency of four per month. The patient denies pain with chewing but states her jaw is chronically displaced with movement of the jaw.

ROS: Positive for nighttime teeth clenching. Negative for nausea, vomiting, vertigo, dizziness, blurry or decreased vision, depression, anxiety, tinnitus, and aura at onset of headache.
PMHx: Hypermobile Ehlers-Danlos Syndrome, Gravida 3 Para 3
PSHx: Patellar realignment and lateral release in the right knee (2005). Patellar realignment and lateral release in the left knee (2015).
Social History: Denies alcohol, tobacco, and recreational drug use.
Medications: Ibuprofen, 200-800 mg PO as needed for pain
Allergies: None

Hypothesis

Routine Osteopathic Manipulative Treatment (OMT) to address muscular imbalances, TMJ alignment, and cranial somatic dysfunctions will decrease the frequency of TMJ crepitus and headaches.

Osteopathic Exam and Treatment

Somatic Dysfunction		OMT Performed	
Head			
1.	Occipitoatlantal joint compressed B/L	1.	Myofascial Release (MFR)
2.	OA ER_RS_L	2.	Muscle Energy
3.	Temporalis hypertonicity (R>L)	3.	Temporalis direct inhibition
Cervical			
1.	Hypertonic paraspinals	1.	Soft tissue, stretching, muscle energy
2.	C2 ER_RS_R, C4 ER_RS_R	2.	Still technique
Jaw			
1.	Mandible deviated right	1.	Muscle Energy
2.	Medial and lateral pterygoid hypertonicity (L>R)	2.	Pterygoid direct inhibition
3.	Right Masseter hypertonic	3.	Masseter direct inhibition
Cranial			
1.	Right temporal bone internally rotated	1.	Temporal rocking
2.	Sphenoid compressed	2.	Sphenoid lift
3.	Right occipito-mastoid (OM) suture restriction	3.	V-spread

*The patient was also instructed to perform Rocabado exercises at home

Results

- Over the course of 17 weeks the patient was seen for a total of 12 visits and instructed to keep a headache diary. There was an average of 10 days between each OMT visit. The patient reported a decreased frequency of headaches and TMJ crepitus.
- Initially the patient complained of ≥4 headaches per month. **With routine OMT the onset of headaches was reduced to less than 1 headache per month, a 75% decrease in headache frequency.**
- The patient also noted a decrease in the frequency of patellar subluxations.

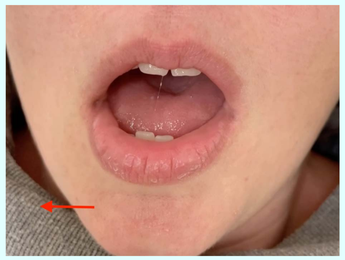


Figure 2: Before Treatment

Figure 3: After Treatment

Discussion

The treatment protocol was centered around the osteopathic tenet, "**Structure and function are reciprocally interrelated**". Therefore, the protocol addressed the muscular, skeletal, cranial, and autonomic facets of TMD. The TMJ consists of articulations between the condylar head of the mandible and the glenoid fossa of the temporal bone [6]. The TMJ is further divided into two synovial joint cavities that are separated by an articular disk. The superior belly of the lateral pterygoid passes through the joint capsule and attaches directly to the articular disc [6]. This important anatomical relationship led to the pterygoids becoming a focus of treatment. The TMJ is further supported by the sphenomandibular, stylomandibular, and the lateral ligaments of the jaw [6]. The patients underlying connective tissue disorder and subsequent bilateral joint subluxations likely resulted in articular disc displacements, ligamentous injuries, and muscular spasms. Intraoral manipulation and jaw techniques have been demonstrated to reduce pain in TMD, but little research can be found on the effectiveness in the EDS population [7]. With primary treatment of TMD focused on prevention and education, there is robust opportunity for OMT to enhance the treatment outcomes.

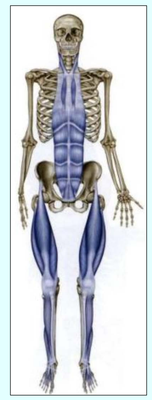


Figure 5: Superficial Front Line [8]

Figure 6: Deep Front Line [8]

Furthermore, the patient had a decreased frequency of patellar subluxations over the course of treatment. This outcome suggests the concepts of **Regional Interdependence** and **Myofascial Meridians** may have played a role in the improvement in patellar subluxations [8]. Specifically, dysfunctions in the Superficial Front Line and Deep Front Line myofascial meridians could explain the relationship between the jaw dysfunctions and patellar subluxations. Further research is required to establish a connection between significant somatic dysfunction of the jaw and fascial distortion of the knee.

Conclusion

This case study provides evidence suggesting OMT can alleviate the associated symptoms of TMD in the EDS population. Further research is needed to expand on TMD treatment and the concept of Regional Interdependence EDS patients. Additionally, introducing objective measurements to assess jaw alignment before and after treatment would improve reliability of the treatment results.

References

[1] Malfait F, Wenstrup RJ, De Paepe A. Clinical and genetic aspects of Ehlers-Danlos syndrome, classic type. Genet Med. 2010;12(10):597-605. doi:10.1097/GIM.0b013e3181eed412
[2] Ballegaard V, Thede-Schmidt-Hansen P, Svensson P, Jensen R. Are Headache and Temporomandibular Disorders Related? A Blinded Study. Cephalalgia. 2008;28(8):832-841. doi:10.1111/j.1468-2982.2008.01597.x
[3] Castori M, Morlino S, Ghibellini G, Celletti C, Camerota F, Grammatico P. Connective tissue, Ehlers-Danlos syndrome(s), and head and cervical pain. American Journal of Medical Genetics Part C: Seminars in Medical Genetics. 2015;169(1):84-96. doi:10.1002/ajmg.c.31426
[4]Wolford LM. Total temporomandibular joint (TMJ) replacement. Drlarrywolford.com. Published December 22, 2014. Accessed January 5, 2021. http://www.drlarrywolford.com/tmj-temporomandibular-joint-disorders/total-temporomandibular-joint-tmj-replacement-2/
[5] Jones O. The Muscles of Mastication - Attachments - Actions - Innervation - TeachMeAnatomy. Teachmeanatomy.info. Published 2014. Accessed February 28, 2021. https://teachmeanatomy.info/head/muscles/mastication/
[6] Alomar X, Medrano J, Cabratosa J, et al. Anatomy of the temporomandibular joint. Semin Ultrasound CT MR. 2007;28(3):170-183. doi:10.1053/j.sult.2007.02.002
[7]Kalamir A, Bonello R, Graham P, Vitiello AL, Pollard H. Intraoral Myofascial Therapy for Chronic Myogenous Temporomandibular Disorder: A Randomized Controlled Trial. Journal of Manipulative and Physiological Therapeutics. 2012;35(1):26-37. doi:10.1016/j.jmpt.2011.09.004
[8] Myers TW. ANATOMY TRAINS : Myofascial Meridians for Manual and Movement Therapists. Elsevier Health Sciences; 2020.