



Review Article

Orofacial manual therapy with oromotor exercises improves cervical movement impairment associated with headache and features of temporomandibular dysfunction: A review article

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ABSTRACT

Temporomandibular joint (TMJ) disorders are a group of conditions that can cause headaches and cervical dysfunction. Cervical dysfunction is manifested by limitations in any part of the kinetic sequence, an important component of which is the temporomandibular joint. The areas of concern in the musculoskeletal system, including the temporomandibular joint and the masseter muscles, are collectively known as temporomandibular disorders (TMJ) and cervical spine disorders. There is also evidence that headaches can cause symptoms that affect the TMJ. Physiotherapy can be used for management of temporomandibular dysfunction and its secondary cervical symptoms. This present article highlights the role of physical therapy in the treatment of TMDs along with cervical spine consideration.

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1. Introduction

The temporomandibular joint (TMJ), also known as the ginglymoarthrodial joint, is a synovial joint made up of the articular surface of the temporal bone and the head of the jaw, enclosed in a fibrous capsule. Temporomandibular disorder (TMJ) is a very common problem. It affects 33% of people during their lifetime. This is a violation of the repetitive movements of the masticatory structures, which has much in common with disorders of the musculoskeletal system of other parts of the body. Patients with concomitant TMJ and neck pain have complex symptoms that are more complex than individual TMJ symptoms. Temporomandibular joint (TMJ) disorders negatively affect jaw function, so patients may experience limited mouth opening or difficulty chewing due to pain and blockage of the TMJ.^{1,2}

The cervical spine, muscles and soft tissues of the head, neck and temporomandibular joints are components of the kinematic sequence. The cervical spine is the most difficult part of the spine, as are the muscles in this area. These muscles are more than just movement and stability, but are strongly involved in the regulatory mechanism of posture. Dysfunction patterns in the cervical spine often involve the postural muscles, resulting in displacement of the body.³ This mechanical dysfunction can manifest itself in the form of limitations in any part of the kinetic chain, an important component of which is the temporomandibular joint.

The relationship between the TMJ and the cervical spine defined by the neuroanatomical convergence of nociceptive neurons that receive trigeminal and neck sensory inputs. In primates, that is as a result of the topographic association of the trigeminal caudate nucleus that permits information change between the spinal and trigeminal nerves. Therefore, stimulation of structures innervated through the trigeminal nerve may produce neck ache and vice-versa.⁴

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TMD is a common disorder most usually found in people among the ages of 20 and 40. Approximately 33% of the population has at the least one TMD symptom and 3.6% to 7% of the population has TMD with enough severity to reason them to are trying to find treatment. TMD etiology is multifactorial. Various theories, consisting of mechanical displacement, trauma, biomedical, osteoarthritis, muscle theory, neuromuscular, psychophysiological, psychosocial theory, had been proposed to reason TMD.⁵

Pain from the TMJ and muscle mass of mastication is a common symptom. It may be a consistent or periodic dull pain over the joint, ear, and the temporal fossa. It is greater located in the course of the mandibular motion or through palpation of the affected regions. The restrictions in motion of the mandible are observable either in all or in part of opening, closure, protrusion, and lateral motion and additionally cervical movement limit because of kinetic chain involvement. Patients perceive the ache and tenderness of masticatory muscle mass alongside the temporal region as headaches. Additionally, it can correlate with different headaches, consisting of migraine ache. Clicking is a sound of the short event discovered in the course of the mandibular motion as a result of the uncoordinated motion of the consular head and the articular disc.⁶

Though, in the randomized control trail, the study has been made on effects of manual therapy in temporomandibular dysfunction but not on other form of interventions effectiveness has been mentioned in it. Hence the purpose of the study is to add up many physical therapy intervention such as exercise and electrotherapeutic modalities as an adjunct to manual therapy in temporomandibular disorder associated with cervical dysfunction.⁷

2. Materials and Methods

A search of the literature is based on a randomized control trial orofacial manual therapy improves cervical motion impairment related to headache and features of temporomandibular disorder. The study design turned into a randomized managed trial conducted in accordance with the Helsinki guidelines and permitted by the Ethics Committee of the Rehabilitation Centre 'Het Roessingh' in Enschede, The Netherlands.^{8,9}

2.1. Intervention

Type of physiotherapy intervention for temporomandibular disorder.

2.2. Tongue exercise

Many malocclusions such as tongue thrusting, mouth respiration develop due to abnormal tongue function. One of the most effective and normally used physical activities

is the 4S workout. This consists of figuring out the spot by the tongue, salivating, squeezing the spot, and swallowing. The 4 steps are as follows:

1. Spotting exercise (1S) Spot must be the relaxation role of the tongue
2. Salivation exercise (2S) The tongue is located at the spot, which leads to salivation
3. Squeezing exercise (3S) The tongue is squeezed vigorously with the tooth closed towards the spot accompanied by relaxing
4. Swallowing exercise (4S) –After squeezing, the following step is to swallow the spot. This new swallowing pattern must be practiced at the least forty times a day.^{10,11}

2.3. Goldfish exercise

It helps to rehabilitate or prevent TMJ. Goldfish exercises can simply perform in any place and focus on strengthening your joints. There are 2 variations of Goldfish Exercise you can do, partial opening or complete opening of the mouth.

2.4. Goldfish' exercise 1 (partial opening)

1. Keep tongue at the roof of your mouth.
2. Place one index finger at the TMJ.
3. Place your other index finder in your chin.
4. Allow the lower jaw to partially drop down and back with assist from the index finger.
5. Monitor this partial jaw commencing in a reflect to make certain the outlet is straight (tongue remains up).

2.5. 'Goldfish' exercise 3 (complete opening)

1. Keep tongue at the roof of your mouth
2. Place one index finger at the TMJ
3. Place your other index finder to your chin
4. Allow the lower jaw to absolutely drop down and lower back with assist from the index finger.
5. Monitor this complete jaw commencing in a reflect to make certain the outlet is straight (tongue remains up).

2.6. Lip exercise

Incompetent lip seal is one of the capabilities of mouth respiration. If there's a affected person with hypotonic short upper lip, the affected person is requested to stretch the higher lip over the lower lip without opening the mouth. The protecting time is 30 s with a frequency of 15–20 instances a day. This will enhance the tonicity of the upper lip. Another workout is asking the affected person to stretch the higher lip in a posterior inferior path in the direction of the chin by overlapping the decrease lip, which moreover facilitates in retaining the oral seal throughout swallowing.

2.7. Mandibular stabilization exercises

Mandibular stabilization exercises are designed to stability the strength and function of the right and left TMJ muscle mass and to establish a everyday jaw role at relaxation and throughout motion. The exercises require the application of mild strain to the jaw by way of your index finger.¹²

2.8. Rocabado exercises

Rocabado workout include six essential components: the relaxation role of the tongue, TMJ rotation manipulate, rhythmic stabilization technique, liberation of the cervical joint, axial extension of the cervical backbone and shoulder girdle retraction. Its is designed to relieve TMJ discomfort.

2.9. Six rocabado exercises

1. Exercise number one of the Rocabado exercises has to place tongue at the roof of your mouth. Position the end just at the back of your tooth and take six deep breaths.
2. For the second exercise, maintain your tongue at the roof of your mouth and open and near your mouth six times.
3. In exercise three, your tongue stays at the roof of your mouth and hands are located at the chin to open your mouth towards mild resistance. Following that, place your hands on both sides of your jaw and open six times.
4. For exercise four, vicinity your palms at the back of your neck and bend your chin down as though nodding your head.
5. Move your chin down and back as though nodding, creating a double chin for exercise five.
6. Finally, correct your posture with the aid of using lifting your ribs and chest upward at the same time as squeezing your shoulder blades together.

3. Electrotherapy

Electrotherapeutic modalities, such as shortwave diathermy, ultrasound, laser, and TENS, are normally executed in the clinical setting. Electrotherapeutic modalities are supposed to lessen inflammation, promote muscular relaxation, and increase blood flow by changing capillary permeability. In a study completed by Gray RJ et al (1994) shows that remedies with electrotherapeutic modalities, executed early in the direction of a TMD, are useful in decreasing symptoms.¹²

4. Posture Correction

Bad posture in sitting or lying reasons prolonged overstretching of the ligaments and surrounding tissues such as those of the jaw. By learning to maintain a very good posture, it is possible to prevent or relieve your neck and jaw ache. cervical exercise and stretching -

isometrics exercises to the neck and additionally chin tucks have been performed. Stretching for the higher trapezius, scalene, semispinal muscle of head, splenius capitis, and sternocleidomastoid muscle mass. These muscle mass are immediately concerned with head positioning and their shortening produces misalignment in head and neck segments.¹³

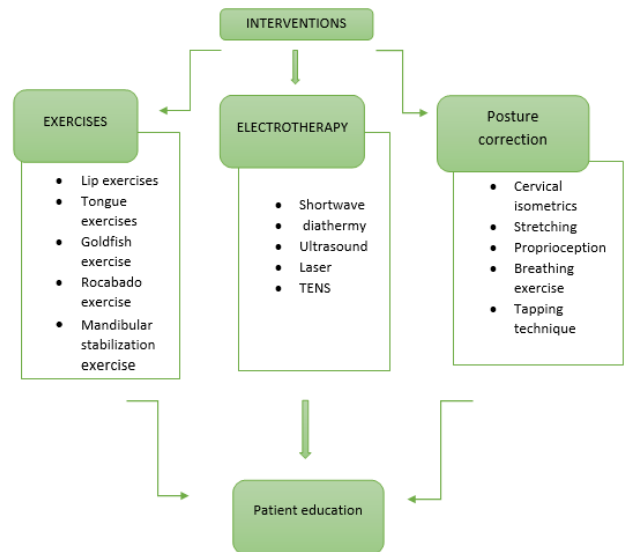


Fig. 1:

5. Discussion

In this present study found that the addition of physical therapy techniques for temporomandibular dysfunction had beneficial effects over for cervical movement impairment in subjects with features of Cervicogenic headache who had impairment of the cervical spine as well as signs of TMD.

A study published in Bio Med Research International observed that tender points in the neck are often seen in people with TMD. In fact, pain in the neck region was found to be associated with TMD 70% of the time. While one condition doesn't necessarily cause the other, the study found that as the level of neck disability increases, so does the level of jaw disability.¹³

A study published in the Journal of Oral Rehabilitation verified the correlation between TMD and neck pain in women who work with computers. It noted that neck pain is one of the most common complaints among people working with computers all day. Compared with women who reported no neck pain, women who had neck pain were more likely to also exhibit evidence of TMD.¹⁴

According to Leandri, et al.(2001), nociceptive impulses from the upper cervical spine cause reflex contractions in masticatory muscles, which can contribute to the development of TMD symptoms. Thus, joint mobilization toward the upper cervical region appears to reduce

muscular reflex contractions and to allow muscle relaxation, especially in masseter muscles, and may consequently increase maximum mouth opening.¹⁴

Subjects who performed manual therapy along with interventions like exercises, electrotherapy and postural correction showed much improvement and in reducing the cervical restriction and reduced pain along the temporomandibular joint and cervical spine also restore normal function and mobility.

Hence, multiple interventions along with patient education are need to be implemented in reducing temporomandibular dysfunction along with cervical restriction.

6. Conclusion

Variety of evidence based physiotherapy can be used for the treatment of temporomandibular disorder with or without other treatment procedures. On addition of exercises, electrotherapeutic modalities and posture correction to manual therapy shows significant improvement in reducing pain, restriction of cervical, temporomandibular joint and thereby increases the rom and reduced pain in VAS scale when compared to manual therapy alone. Therefore, multiple physiotherapy interventions are effective in temporomandibular dysfunction.

7. Source of Funding

None.

8. Conflict of Interest

None.

References

1. Wright EF, North SL. Management and treatment of temporomandibular disorders: a clinical perspective. *J Manual Manip Ther.* 2009;17(4):247-54.
2. Piekartz HV, Hall T. Orofacial manual therapy improves cervical movement impairment associated with headache and features of temporomandibular dysfunction: a randomized controlled trial. *Man Ther.* 2013;18(4):345-50.
3. Chourasia SV. Effect of mechanical neck pain on temporomandibular joint mobility in females aged 18 -30 years. *MedPulse Int J Physiother.* 2017;3(2):9-13.
4. Mototoyushi TM. Biomechanical influence of head posture on occlusion: an experimental study using finite element analysis. *Eur J Orthod.* 2002;24(4):319-26.
5. Kraus S. Temporomandibular disorders, head and orofacial pain: cervical spine considerations. *Dent Clin North Am.* 2007;51(1):161-93.
6. Calixtre LB, da Silva Grüninger I B, Haik MN. Effects of cervical mobilization and exercise on pain, movement and function in subjects with temporomandibular disorders: a single group pre-post test. *J Appl Oral Sci.* 2016;24(3):188-97.
7. Andrade AV, Gomes PF, Teixeira-Salmela LF. Cervical spine alignment and hyoid bone positioning with temporomandibular disorders. *J Oral Rehabil.* 2007;34(10):767-72.
8. Olivo SA, Magee D. Cervical musculoskeletal impairments and temporomandibular disorders. *J Oral Maxillofac Res.* 2012;3(4):e4. doi:10.5037/jomr.2012.3404.
9. Olivo SA, Silvestre RA, Fuentes JP, Costa BR, Major PW, Warren S. Patients with temporomandibular disorders have increased fatigability of the cervical extensor muscles. *Clin J Pain.* 2012;28(1):55-64.
10. Margaret L, Meneely SA, Olivo DJ. A Systematic Review of the Effectiveness of Physical Therapy Interventions for Temporomandibular Disorders. *Physical Ther.* 2006;86(5):710-25.
11. Benoitp. History and physical examination for TMD. vol. 1994. 3rd ed. Kraus SL, editor. New York, NY: Churchill Livingstone; 1990. p. 71-98.
12. Allen RJ. Physical agents used in the management of chronic pain by physical therapists. *Phys Med Rehabil Clin N Am.* 2006;17(2):315-60.
13. Pardo GB, Martín DP, Izquierdo TG, Moreno JS, De-Las-Peñas CF, Santiago RO. Manual treatment for cervicogenic headache and active trigger point in the sternocleidomastoid muscle: a pilot randomized clinical trial. *J Manip Physiol Ther.* 2013;36(7):403-14.
14. Turner JA, Dworkin SF. Screening for psychosocial risk factors in patients with chronic orofacial pain: recent advances. *J Am Dent Association.* 1939;18(4):345-50.

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