

Manual Osteopathic Management of the Temporomandibular Joint Disorders

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Author Note

The Temporomandibular joint (TMJ) is the second most common source of facial pain, second to toothache. Ten million people in the United States are affected by TMJ and roughly 25% of the population can have symptoms at some point in their lives. The morbidity of the disorder is related to significant pain on movement of the jaw. Adults of 20 - 40 years of age are most commonly affected: female to male: 4-1. Uyanik et al indentifies three distinct causes of TMJ^[1]:

1. Myofascial pain dysfunction
2. Internal derangement of the joint disc
3. Degenerative joint disease.

The third type is mostly seen in the elderly community. It is not a disorder to be taken lightly, as it affects our daily lives. If we have pain with eating and/or opening and closing of the mouth then the quality of live diminishes.

Abstract

The TMJ disorder is a painful condition that causes inflammation in the joint created by the Temporal bone in the skull and the lower jaw bone (Mandible). The abbreviation TMJ literally refers to the joint itself, although it is often used to refer to the disorder rather than the joint. The signs and symptoms are diffuse so a good diagnosis is crucial in understanding and treating the problem. The full examination may involve muscle testing, range of motion, analysis and possible Magnetic Resonance Imaging (MRI).

The Joint

The temporomandibular joint (TMJ) is the synovial joint that connects the jaw to the skull. These two joints are located just in front of each ear. Each joint is composed of the condyle of the mandible, an articulating disc, and the articular tubercle of the temporal bone. The movements allowed are side to side, up and down, as well as protrusion and retrusion. This complicated joint along with its attached muscles, allows movements needed for speaking, chewing, and making facial expressions. The articular surface of the temporal bone consists of a convex articular eminence anteriorly and a concave articular fossa posteriorly. The articular surface of the mandible consists of the top of the condyle. Articular surfaces of the mandible and temporal bone are separated by an articular disk, which divides the joint cavity into two small spaces.

The articular disk, also known as the meniscus, is a biconcave, fibro-cartilaginous structure, which provides the gliding surface for the mandibular condyle, resulting in smooth joint movement. The meniscus has three parts—a thick anterior band, a thin intermediate zone, and a thick posterior band. With the mouth closed, the condyle is separated from the articular fossa of the temporal bone by the thick posterior band. When the mouth is open, the condyle is separated from the articular eminence of the temporal bone by the thin intermediate zone.

The Trigeminal nerve innervates the TMJ and surrounding structures which explains the pain and referred pain patterns of TMJ disorders.^[2] Irritation of the mandibular branch (V3) of the Trigeminal nerve results in pain locally at the TMJ and also to other areas of V3 sensory innervation, which include the ipsilateral skin, teeth, side of the head, and scalp.

The Syndrome

As discussed earlier, there are three causes of TMJ pain:

1. Myofascial pain dysfunction (MPD) syndrome, pain at the TMJ due to various causes of increased muscle tension and spasm. It is believed that MPD syndrome is a physical manifestation of psychological stress. No primary disorder of the joint itself is present. Pain is secondary to events such as nocturnal jaw clenching and teeth grinding. Treatment is focused on behavioural modification as opposed to joint repair. This is the most common cause of TMJ pain.
2. Internal derangement (ID), where the problem lies within the joint itself, most commonly with the position of the articulating disc. Anterior disc displacement is the most common cause here.
3. Degenerative joint disease, where arthritic changes result in degeneration of the articulating surfaces. This is generally secondary to micro trauma, whiplash, osteoarthritis, rheumatoid arthritis and ankylosing spondylitis.

There is also another classification of TMJ disorders which is widely used by the National Institute of Dental and Craniofacial Research (NIDCR).

The AAOP (American Academy of Orofacial Pain) classification divides TMJ broadly into two syndromes:

- Muscle-related TMJ (myogenous TMJ), sometimes called TMJ secondary to myofascial pain and dysfunction
- Joint-related (arthrogenous) TMJ, or TMJ secondary to true articular disease

These two types often coexist in one patient, making the diagnosis and treatment more challenging.

Myogenous TMJ is more common. In its pure form, it lacks apparent destructive changes of the TMJ on radiograph and can be caused by multiple etiologies such as bruxism and daytime jaw clenching.

Arthrogenous TMJ can be further specified as disk displacement disorder, chronic recurrent dislocations, degenerative joint disorders, systemic arthritic conditions, ankylosis, infections and neoplasia.

The latter classification will be used in this paper to simplify the diagnostics and treatments of the TMJ disorders.

Symptoms

Clinical manifestations associated with TMJ disorders may be:

- Jaw clenching and bruxism (teeth grinding) due to stress, normal teeth contact 360x per night, bruxism 1325x per night.
- Biting or chewing difficulty or discomfort.
- Clicking, popping or grating sound when opening or closing the mouth.
- Dull, aching pain in the face.
- Earache, tinnitus, hear loss.
- Bi-temporal headache/migraines.
- Facial muscle pain and tics.
- Unilateral neck and shoulder pain.
- Jaw pain or tenderness of the jaw can be worsened by chewing.
- Facial asymmetry: the affected side is more concave meaning on the affected side the face is smaller.
- Locking of the jaw: Open lock occurs with the condyle dislocated anterior to the articular eminence. Close lock occurs with the anterior dislocation of the articular disc.
- Difficulty opening or closing the mouth.
- Sleep apnoea (A sleep disorder characterised by pauses in breathing or instances of shallow or infrequent breathing during sleep).

There is sometimes an audible or palpable click when there is an articular disc displacement. A click by itself is not a diagnostic tool of the TMJ disorder.

Observation and assessment of the TMJ

The diagnosis is crucial in understanding and treating the problem. The full examination will involve a comprehensive medical questionnaire; passive and active examination; muscle testing, ranges of motion; analysis; possibly laboratory tests and Magnetic Resonance Imaging (MRI).

When assessing a patient with TMJ problems the osteopath begins with a standing postural assessment observing head-neck-spine relationships. The osteopath paying special attention to the position of the TMJ in relation to the skull, anterior and posterior cervical soft tissues and shoulder girdles all of which make up the closed kinetic chain of the gnathic system. The osteopath should observe areas of stress in around the TMJ itself including the scalene, sternocleidomastoid and platysma muscles. Obvious signs of tension or stretching should be noted by the osteopath as they will indicate a stress and potential imbalance of the TMJ and will need to be reassessed during the passive examination.

Observation:

- Facial symmetry (lateral deviation of the mandible or muscle hypertrophy)
- Chin deviation can be a C or S shape curve
- If there is a S shaped curve, there are bilateral somatic dysfunctions
- Average opening of the mouth is 40mm
- Tip of the chin deviates toward the side of the disorder
- Sacral base
- Scoliosis
- Feet and ankles

Active examination:

Active examination should focus on asking the patient to perform movements of the spine specifically the cervical spine, noting restricting in movement in any direction which could be related either directly or indirectly to the TMJ via the cervical fascia, infra-hyoid muscles, anterior cervical muscles and posterior cervical muscles.

TMJ can move in six directions:

1. Up and down – the main movement used in biting and chewing
2. Protrusion and retraction – mainly used for tongue movements, talking and swallowing
3. Left and right – for grinding the food when chewing

The muscles that control these movements are:

1. Masseter muscle– this muscle is the main chewing muscle and often becomes tight from emotional stress. It extends from the zygomatic arch to the outer surface of the ramus of the mandible.
2. Temporalis muscle – supports the masseter muscle aiding it in chewing and it stabilises the bite of the TMJ. It is a fan shaped muscle and extends from the surface of the temporal fossa, deep to the zygomatic arch and inserts on to the ramus of the mandible.
3. Lateral and medial pterygoid muscles - these two muscles are found deep in the ramus of the mandible and they elevate and protrude the mandible.

Active examination should also include examination of the gleno-humeral joints which have a soft-tissue connection to the somato-gnathic system.

Finally the osteopath can ask the patient to open the mouth in all directions paying attention to any adventitious movements.

Passive examination:

Palpation by the osteopath of all the structures previously mentioned, however this time the osteopath is able to put his hands directly on the TMJ and ask the patient to open her/his mouth. This allows the osteopath direct contact with the dysfunctional joint. This palpation is best performed one-two cm anterior to the tragus, inferior to the zygomatic arch. The osteopath should simultaneously palpate the muscles around the TMJ, gathering information about the hypertonia of the soft tissues and any inequality on either side that may be creating an imbalance of movement.

Gentle palpation along the anterior and posterior structures of the cervical spine should include articulation of the hyoid bone, glenoumeral joints, clavicles, manubrio-sternal joints and ribs, all of which have a role to play in the stability of the TMJ function.

Imaging is not indicated unless there is a acute trauma. X ray is adequate. Personally I would choose MRI.

Laboratory testing is only useful for screening for rheumatoid or the other metabolic causes of joint pain (gout, pseudo gout, rheumatoid arthritis, etc)

Osteopathic Treatment

After a full assessment of the patient's condition the osteopath can start to design a treatment plan. It is also very important to see if there are any underlying causes that can be treated for such anxiety or stress or even think about an orthodontics referral if the patient awakes with TMJ pain. Osteopathically I prefer to begin treatment distal to the area of pain. After doing a general osteopathic examination and treatment (where necessary), including working as far afield as the feet, ankles, knees and hips, I eventually start to focus on structures directly related to the jaw.

Osteopathic treatments will most likely start with the dorsal spine removing any somatic dysfunction that may be reflecting in the cervical spine. Treatment may involve balancing the glenohumeral joints by treating the rotator cuff muscles and muscles of the scapulo-thoracic complex. Any tension in the scapula will be reflected in the cervical spine, anteriorly and posteriorly creating unilateral tension in the TMJ.

Osteopathic treatments of the cervical spine focuses strongly on the sub-occipital muscles and occipito-atalantal articulation onto which many TMJ-related muscles attach indirectly due to their close proximity.

Muscle-related TMJ (myogenous TMJ):

The osteopathic work around the TMJ needs to address the local muscles directly using soft tissue massage to masseter and temporalis and indirectly to the pterygoids using articulation of the jaw or muscle energy techniques.

Muscle energy technique (MET) is an osteopathic technique. MET decreases pain, spasm and increases Range of Motion (ROM). It is contraction followed by relaxation followed by stretch. Contraction-relaxation-stretch. Dr. Pourgol of the University of Medical Sciences developed a protocol: Dr. Pourgol's 525 protocol. Five seconds contraction- two seconds relaxation - five seconds stretch. The phases can be longer but it is a good guideline to follow. [3]

MET Open Mouth:

This technique is for muscles that open the jaw. The patient is supine (face up) with the mouth closed and the osteopath is seated at the head of the table. The osteopath places two fingers under the chin and asks the patient to try to open the mouth and the osteopath resists this for five seconds. The patient rests for two seconds and the osteopath brings the chin in the opposite direction for five seconds. This cycle is repeated three-five times or until no new barriers are encountered. The patient is re-assessed.

MET Close Mouth:

This technique is for muscles that close the jaw. The patient is supine (face up) with the mouth closed and the osteopath is seated at the head of the table. The osteopath places two fingers against the chin and asks the patients to try to close the mouth and the osteopath resists this for five seconds. The patient rests for two seconds and the osteopath brings the chin in the opposite direction for five seconds. This cycle is repeated three to five times or until no new barriers are encountered. The patient is re-assessed.

MET Lateral Glide:

This technique is for muscles that control the lateral glide. The patient is supine (face up) with the mouth slightly open and the jaw moved away from the affected side to engage the barrier and the osteopath is seated at the head of the table. The osteopath places the palms of both hands against the mandible and asks the patients to try to move the jaw towards the dysfunctional side (towards the side of deviated chin) and the osteopath resists this for five seconds. The patient rests for two seconds and the osteopath brings the chin in the opposite direction for five seconds. This cycle is repeated three to five times or until no new barriers are encountered. The patient is re-assessed.

The osteopath must try to be as clear as possible in which direction the jaw is being pulled so as to treat the appropriate muscles. The theory is that if during opening the mouth the jaw shifts to the right there is tension in the muscles on that same side. It is important, therefore, to treat the muscles on that side to allow some relaxation of the soft-tissues and for the TMJ to sit equally well in the condyles of both sides. Treatment to masseter can be quite painful so it is good to use gentle inhibition assessing the patients response and not working too aggressively. A gentle inhibition will not activate the muscle spindle reflex or the golgi tendon reflex.

The osteopath will most likely need to address the TMJ itself using techniques that temporarily “gap” or separate the two joint surfaces between the the condyle of the mandible and the base of the skull. This gapping allows the joint to reset itself comfortably and also may induce some movement that may have been lost due to excess tension on the restricted side.

Joint-related (arthrogenous) TMJ:

There are a few mobilisation techniques used for the TMJ:

1. Supine unilateral cephalad to caudal TMJ mobilisation
2. Supine unilateral posterior to anterior TMJ mobilisation
3. Supine unilateral lateral to medial TMJ mobilisation
4. Suboccipital release mobilisation
5. Compression/decompression
6. Correction of open lock (anterior disc disorder)

At the end of treatment the osteopath should reassess how the movement in the TMJ has changed and whether there is any improved function. This is done by asking the patient to open her/his mouth and observing any adventitious movement. Often observation is done best when standing at the head of the table with the patient lying supine. Furthermore, the osteopath can slide his finger over the joint with his little finger tucked in the joint under the ear lobe. This allows direct contact with the TMJ as it opens and closes and dysfunction can be easily palpated.

Prognosis (Outlook)

Most cases of temporomandibular disorder (TMD) respond to simple treatment and the prognosis is good. The pathology producing the pain and dysfunction should be discussed with the patient. Patients should be told about the possible prognosis of their problem. Myofascial pain and dysfunction tends to have a self-limiting course and needs simple treatment; even though these patients may have recurrences, the symptoms generally are controlled by simple treatment. A patient with TMD secondary to degenerative joint disease should be made aware of the signs of further deterioration such as increasing pain, further limitation of movement and increased joint sounds.^[4]

Self-care includes simple measures such as soft diet with gradual progression to normal diet over six to eight weeks, avoiding large bites and clenching of teeth, avoiding chewing gum and pens, keeping jaw relaxed, yawning against pressure, massage of jaw and temple muscles, use of moist heat, avoiding cradling the phone between ear and shoulder, good sleep posture with adequate neck support and passive or active range of motion exercises.

As further prevention it can be worth referring the patient to a dental practitioner who specialises in developing splints: prevention of clenching and or grinding of the teeth. They are usually made of acrylic and can be hard or soft. They can be designed to fit onto the upper teeth or the lower teeth. They may cover all the teeth in one arch (full coverage splint) or only some (partial coverage splint).

Situations when it is recommended that osteopaths should consider referring TMJ patients to a dental practitioner.

Nocturnal

The patient awakes with TMD pain.

- Wear an occlusal orthotics at night would improve sleep.

Daytime

The patient has symptoms associated with tooth-related pain such as:

- Pain occurs or intensifies upon drinking hot or cold beverages.
- Throbbing pain occurs spontaneously.
- Throbbing pain awakes him or her from sleep.

These situations would be enough to recommend a comprehensive dental examination and treatment.

Situations when it is recommended that dental practitioners should consider referring TMJ patients to an osteopath.

Cervical

The patient has neck pain worthy of treatment.

The patient has cervicogenic headaches (headaches that can be reproduced by palpating the neck).

Postural

The patient has moderate to severe forward head posture; a study suggests these patients may obtain significant TMJ symptom improvement from posture exercises in combination with TMJ self-management instructions.

The patient's TMJ symptoms increase with abnormal postural activities.

The patient desires help in changing poor sleep posture (e.g., stomach sleeping).

Outcome-Oriented

The patient did not obtain adequate TMJ symptom relief from initial therapies that did not include osteopathy therapy.

Also another referral could be to a yoga teacher or a relaxation teacher. Relaxation techniques cause reduced sympathetic activity, including muscle relaxation and reducing sensitivity to external stimuli, and provoke a general sense of well being and reduced anxiety.

References

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