Clinical Case Report Competition

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Reduction of temporomandibular joint dysfunction with massage: A case report
Reduction of Temporomandibular Joint Dysfunction with Massage: A Case Report

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Abstract

Objective:
To measure the effects of massage therapy in decreasing pain and stiffness, and increasing range of motion for temporomandibular joint (TMJ) dysfunction.

Clinical features:
A 44-year-old female has hypomobility in her left TMJ, hypertoned muscles of mastication with trigger points, and an S curve opening of the mandible with the apex to the left then the right. This is a chronic condition with an acute phase that began Feb. 4, 2009. She has decreased range of motion with mandible depression, right and left deviation and presents with muscular and capsular involvement. Her left dead molar was removed between treatment five and six. She also presents with chronic right neck and trapezius pain.

Intervention and outcome:
Treatment consisted of muscle work to the muscles of mastication, intra-oral muscle work to the pterygoids and masseter, and joint mobilizations to the left TMJ. The patient was taught contract/relax for the mandible and self tracking, both to be completed twice a day as homecare. There were five treatments over five weeks, a break of three months, then five more treatments over four weeks. Reassessment after the tenth treatment found completely decreased hypertonicity of pterygoids, normal range of motion in the TMJ, and a diminished S curve, leaving a slight C curve at the end range of depression.

Conclusion:
The combination of muscle work, joint mobilization, intra-oral massage, and homecare is an effective way to alleviate pain, diminish an S curve, and increase range of motion associated with TMJ dysfunction.

Keywords: massage therapy; temporomandibular joint dysfunction; lateral pterygoid; intra-oral massage; muscles of mastication
**Introduction**

The temporomandibular joint (TMJ) is the most frequently used joint in the body.\(^1\) This joint allows talking, eating, yawning, kissing, and even sucking motions. On average, the TMJ opens and closes 1,500-2,000 times a day.\(^2\) Four key features of TMJ dysfunction are orofacial pain, restricted jaw motion, joint noise, and restricted muscles of mastication. The TMJ is a synovial, condylar, modified ovoid and hinge-type joint with fibrocartilagenous surfaces and an articular disc.\(^1\)

The articular disc divides the joint into two different sections as shown in figure 1. The upper section consists of the inferior border of the temporal bone and the superior aspect of the articular disk.\(^2\) Translation occurs in the upper section and is the second movement of the joint. It is responsible for an average of 30-40mm of movement. The head of the condyle slides anteriorly along the articular disk with the contraction of the lateral pterygoid to open the mandible. The lower section of the joint consists of the inferior border of the articular disk and the superior border of the condylar process of the mandible.\(^2\) Rotation occurs in the lower section and is the first movement of the joint. It is responsible for 11mm of movement. It takes the occurrence of rotation to unlock the joint and allow translation to occur, thereby resulting in a fully open mouth. Without rotation, the mouth would only open a mere 30mm on average with more of a protruding chin.

The articular disk compensates for the incongruity of the two convex surfaces which engage when the mouth opens.\(^2\) The disc is avascular in the center and vascular on the anterior and posterior surfaces. This is why pain is felt when the head of the condyle moves over the anterior
or posterior edge. The disc in the TMJ is unique to any disk in the body in that it can remodel itself to its original state.²

Three major ligaments play an important role in the TMJ. The temporomandibular ligament is a thickening of the joint capsule and is the main suspensory ligament for moderate opening of the mandible. The stylomandibular ligament separates the masseter and medial pterygoids and stops the mandible from extreme openings. The sphenomandibular ligament can be associated with the medial pterygoid as it starts to blend in with it and it prevents excessive anterior movement during a wide opening of the mandible.

Two main dysfunctions of the TMJ are a closed locked mandible and an open locked mandible. A closed locked mandible occurs when the articular disk is pushed anterior to the condylar head of the mandible and the condyle does not rest in the middle to the disc.² This position limits the amount the mandible can translate and therefore, the amount the mouth can open. Closed locked is indicative of hypertoned lateral ptygoids because the superior head attaches directly on the disc and pulls it anterior, even more so as the muscles become more hypertoned.

With an open locked mandible, the patient typically hears two or four clicks from the TMJ. The articular disc is anterior to the condyle. As movement begins, the condyle moves over the
posterior border of the disc (which may cause a click) and then moves past the middle of the disc and passes over the anterior border of the disc (may result in a second click). The condyle is now sitting anterior to the disk. If the condyle cannot move back over the disc, the mouth may become locked in an open position. The same process happens to close the mouth. The condylar head has to move back over the disc to the middle (may create a third click). With further closure of the mouth, the condyle moves past the posterior border of the condyle (potentially creating a fourth click) and sits posterior to the disc.

Other than jaw movement, the TMJ is directly correlated with head positioning. The head is balanced on the spine by posterior and anterior muscles including the suprahyoids, infrahyoids and other muscles of mastication. The mandible is suspended by ligaments and muscles that are affected by the position of the head and neck. The lateral pterygoids along with the suprahypoidos open the mouth, while the medial pterygoids, masseter, and temporalis close the mouth.

TMJ dysfunction can be caused by the genetic development of muscles, ligaments and bones, or trauma to the neck, face or jaw. Head forward posture can stretch the joint capsule and lateral pterygoids causing hypertonicity, trigger points and an anteriorly displaced articular disc. If the posterior portion of temporalsis is hypertoned, it can pull the condyle posterior from the disc.
Common symptoms of TMJ disorders include jaw pain, limited or painful jaw movement, headache, neck pain or stiffness, clicking or grating within the joint, and an occasional inability to open the mouth painlessly. Joint clicking or grating with translation happening in the upper section suggests a capsular problem with a C shape opening of the mandible. This indicates the side that the C curves to is hypomobile and the other side is hypermobile. Headache, neck pain, or painful jaw movement with rotation happening in the lower section with an S curve opening of the mandible suggests a muscular imbalance problem.
Clinical Presentation

A 44-year-old female presented with chronic pain for 15 years in her left TMJ and hypertoned, painful right and left lateral and medial pterygoids and masseters. Prior to treatment, her TMJ dysfunction had been in an acute phase for four months due to a stressful event. She had decreased range of motion with depression and medial and lateral deviation of the mandible. She also had an S curve mandible opening with the apex to the left, then the right. The patient had one dead molar at the far back left side which was removed after the fifth treatment. The molar did not cause her pain but she may have compensated for it by chewing food on the right side of her mouth. She regularly chewed gum but it does not give her any pain.

The patient also presented with chronic right neck and trapezius pain, as well as regular tension headaches. The headaches were felt at the posterior neck and up the posterior aspect of her head. The patient is left handed and tilts her head to the right while writing. She clenches her teeth in stressful situations, grinds her teeth at night and has been wearing a mouth guard for four months, which has helped the pain. Stretching helped to relieve some pain and tension. If trigger points were active, her pain was a six out of ten on a visual analog scale of pain. If trigger points were not active, she described what she felt as “stiff and tender”.

Physical Examination

Examination revealed an S curve of the mandible when opening, which implied muscular restrictions with the first apex to the left, then swinging to the right including a late deviation. The latter implied a capsular problem. There was capsular tightening on the left, but no joint noise. Measuring range of motion of the TMJ, she had decreased ranges with depression, and right and left lateral deviation. Isometric muscle testing was normal for depression and right
lateral deviation scoring five out of five, which indicated full strength. Left deviation scored four out of five. She could hold her mandible to the left on her own, but when resistance was applied, she was weak and shaky.

The three-knuckle test\(^1\) was positive because she could not fit three knuckles into her mouth. A negative test would be fitting three knuckles into an open mouth. The patient could fit two knuckles in her mouth with 0.8mm remaining. Palpation revealed trigger points\(^7\) and fascial restrictions in the right and left masseter and temporalis, as well as the lateral and medial pterygoid muscles. The patient had restricted cervical spine side bending to the left at 25 degrees and the right at 30 degrees. Normal cervical spine side bending is 25-45 degrees.

**Treatment**

Treatment goals were to decrease pain, increase range of motion and decrease or hopefully eliminate the S curve. Informed consent was obtained prior to each treatment. All treatments were the same and the same homecare was given weekly. Treatment consisted of stripping superiorly to inferiorly down the temporalis and masseter muscles on the right and left side. Stripping continued down the masseter under the angle of the mandible to the origin of the medial pterygoid. Then securing the most anterior portion of the mandible, strip and fascialy release toward the angle of the mandible and up to the ear, working the anterior muscles of mastication.

Upon palpation of her sternocleidomastoids and scalenes, especially her right side, fascial release was indicated. This included mainly fingertip spreading and pull and pin, as well as stripping. A fascial spreading motion of the thumbs was applied over each masseter externally to help decrease hypertonicity and fascial restrictions.
Once the muscles were warmed up, trigger point release was applied on the right and left masseter, focusing on the section above the angle of the mandible, as well as the right and left temporalis, focusing just above the zygomatic arch.

The next section of the treatment was intra-oral work. With a gloved hand grasping the cheek with the index finger inside the mouth and the thumb outside the mouth on the masseter, gentle fascial stripping was done wherever the fascial adhesions needed to be released. Intra-oral release of the temporalis from its insertion on the coronoid process of the mandible using fine stripping movements with the index finger was also completed.

Following on, and using the index finger to reach to the right lateral pterygoid at the right condyle, the patient was asked to deviate to the right, creating a pocket. The lateral pterygoid on the right and left was fingertip stripped by supinating the whole forearm. As well, quite a bit of fascial release was indicated for the
pterygoids as a burning, pulling sensation was felt. Starting the fascial work with the index finger on the lateral pterygoid and following the release where it needed to go helped decrease hypertonicity of the pterygoids.

The same techniques used on the lateral pterygoids were applied to the medial pterygoids. After working the pterygoids on both sides, the patient was reassessed for any changes.

Joint mobilizations\textsuperscript{11} were applied to the left TMJ to increase rotatory and translation movements. While the patient was supine, a caudal glide, used to increase rotation, was applied by placing the thumb inside the mouth and laying it over the molars of the bottom teeth, all while lightly cupping the index finger around the chin. The caudal glide was held at a gentle stretch for around one and a half minutes, waiting to feel the release. Next, a ventral glide, used to increase translation, was also applied and held at a gentle stretch for roughly one and a half minutes. To finish, the patient was sidelying and a medial glide was applied by pressing with a reinforced thumb on the condyle, again with a gentle stretch for roughly one and a half minutes while waiting for the release. This mobilization was done on the left condyle. After all three joint mobilizations were completed, the patient was reassessed for any changes.

To finish the treatment, the masseter and temporalis were stripped again and any further trigger points were released.
For homecare, self tracking (created by Scott Larke, RMT) was given, which involves placing your second and third digit over the affected condyle and the other hand on the opposite side to support the mandible. As the mandible opens and closes, the patient supports herself to not let the mandible S or C curve. The premise of this exercise is that the disc in the TMJ can be reformed by properly supporting each structure mentioned above. The patient should do this exercise twice a day for ten repetitions.

Contract relax was also given for homecare which involves stretching the muscles of mastication. The patient opens her mouth to tissue tension and places the pads of her second and third fingers onto her bottom teeth. She then applies pressure as she attempts to close her mouth, allowing her two fingers to win (so as she does not close her mouth). She holds this for five seconds, then waits another five seconds for a refractory period, and applies more pressure which takes the tissue to its new barrier. She repeats this three times holding the last stretch for 30 seconds, and does this exercise twice a day.

After the fourth treatment, the patient started to notice a general decrease in pain and tension felt in her TMJ. At this point, the three-knuckle test was now negative, meaning she could place three knuckles into her open mouth, not two as was the case at the beginning of the first treatment.

Reassessment following the tenth treatment showed the S curve completely diminished leaving a slight C curve to the left with a much looser capsule. There were no active trigger points remaining in her masseters or temporalis after the third treatment and both muscles were much less hypertoned. The right and left pterygoids and left medial pterygoid had no trigger points or tenderness remaining, just a slight fascial pull when being massaged. The right medial pterygoid had no trigger points or tenderness, but the patient still felt a fascial pull down her throat when being massaged. In general, the patient felt much improvement after the seventh treatment.
Measured Ranges of Motion of TMJ

**Depression**

![Depression Graph]

**Left Deviation**

![Left Deviation Graph]

**Right Deviation**

![Right Deviation Graph]
The muscles that contract to deviate the mandible to the left include: left masseter, left temporalis, right lateral and medial pterygoids, and right temporalis.

** Manual muscle tests are tested out of five and there was no pain with any of these tests.

**Discussion**

The patient’s left upper molar was removed after treatment five. While she felt relief from the removal, it did not alleviate any of her TMJ dysfunction symptoms. However, having the tooth removed helped to even distribution of chewing food and gum, which will help symptoms in the future.

Unfortunately there was a substantial break in the middle of the treatments. The first five treatments were completed in five weeks, and then the school was closed for one month due to the summer break. The last five treatments were completed over four weeks, but were postponed for two months due to the patient’s holidays in early fall. The results after the break did show
however that the massage treatments had a positive effect as range of motion had decreased again. As well, this break gave the patient’s gums substantial time to heal after the removal of her molar, therefore not effecting the next five treatments.

The patient developed vertigo quite severely after the fourth treatment and was not able to work or do homecare for the next week. The acute phase of vertigo lasted one week and continued to bother her for the next four treatments. The vertigo did seem to match with a very stressful week and end of fiscal year paper work at her clinic.

Given that the patient also presented with chronic right trapezius and posterior neck pain, work in this area would have been beneficial; however, the treatment time only allowed for TMJ work. The intra-oral massage work on the pterygoids and joint mobilizations provided her with the most relief of the chronic hypertoned muscles and was most effective at decreasing her S curve. If the patient had done her homecare regularly, her results would likely have been even better. Because this is a chronic condition and the patient holds her stress in her TMJ and mandible and naturally clenches her teeth when stressful situations arise, regular massage treatments would be helpful for her to maintain the positive results that have been achieved.

**Conclusion**

Applying stripping and fascial techniques intra-orally to the lateral and medial pterygoids proved to be quite effective with TMJ dysfunction. Loosening the tight capsule with joint mobilizations was also effective. This brought the patient substantial relief, but it did not alleviate the bottom curve of the S curve.
The results are encouraging and lead to a firm conclusion that the above treatment is effective for TMJ dysfunction, particularly given that this patient had chronic TMJ dysfunction for over 15 years. Treating a patient that was presenting with a recent case of TMJ dysfunction would perhaps resolve much faster as well as diminish any hypomobile joint capsules. Further studies are encouraged.
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