Therapeutic Massage used to Address Orofacial Pain with Symptoms of Temporomandibular Joint Disorder and Chronic Paranasal Sinus Pressure: a Case Report

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Abstract

**Background:** Orofacial pain is characterized by any pain that is felt or referred around the head, face, and neck and affects up to 7% of the US population. The most common form of orofacial pain is temporomandibular joint disorder or TMD, which is the most prevalent treated condition associated with orofacial pain.

**Objectives:** To document the short-term efficacy of massage therapy integrated with manual therapy will reduce the severity of the symptoms associated with orofacial pain in its broadest definition.

**Methods:** The client was 29 year old male that is experiencing various degrees of cranial, neck, and muscular discomfort. Massage Therapy was performed over the course of a 5 week study in 8 sessions that lasted anywhere from 60-120 minutes. Postural charting was performed prior to each session and a goniometer was used to measure the degree of angulation from the PSIS to the ASIS. The client was given basic in home instruction and exercises to help with his postural distortions. EMG activity was recorded pre case study and
post study to record the muscle activity in the temporalis, masseter, anterior digastrics, and the sternocleidomastoid muscles bilaterally.

**Results:** The client experienced a remarkable decrease in the over pin level in the symptoms that he was experiencing before massage intervention.

**Conclusion:** This case study did show how an individual with chronic orofacial pain can have their symptoms lowered with integrative massage therapy protocols. Further research should be done with a category that is not as broad as orofacial pain. Performing a study on one of the symptoms that defines orofacial pain would be more ideal. This would rule out many of the variables a researcher can run into with a medical category so vague.

**Key Words**

Orofacial Pain, Temporomandibular Joint Disorder, Myofascial

**Introduction**

Orofacial pain in its broadest definition can affect up to 7% of the population. Its diagnosis and initial management falls between dentists and doctors and in the secondary care sector among pain physicians, headache neurologists and oral physicians. Chronic facial pain is a long term condition and like all other chronic pain is associated with numerous co-morbidities and treatment outcomes are often related to the presenting co-morbidities such as depression, anxiety, catastrophising and presence of other chronic pain which must be addressed as part of management(1). Orofacial pain is pain that is perceived to be in the region of the face and/or oral cavity. (2) It is caused by diseases or disorders of regional structures, by dysfunction of the nervous system, or through referral from distant sources. Chronic pain is one of the most frequent, costly, and disabling medical conditions in the United States, with estimates suggesting that 15% of adults experience some form of chronic pain.(3)
Orofacial pain (OFP) can arise from multiple locations around the head, face and neck and intraorally as the name suggests (4). One of the main diagnoses that readily come up in orofacial pain cases is TMJD or temporomandibular joint disorder. Temporomandibular disorders (TMD) are the most prevalent orofacial pain conditions for which patients seek treatment. Temporomandibular disorders include a number of clinical problems that involve the masticatory musculature, the temporomandibular joint (TMJ) or both. Temporomandibular joint and muscle disorders are a different group of conditions characterized by pain in the temporomandibular joint and/or masticatory muscles and limited or painful jaw movements(5). The patient may present with jaw ache, earache, toothache, facial pain, and/or headache; however, the complaint may be as benign as general facial fullness or pressure. Treatment planning depends on various factors including the chief complaint, medical history, presenting symptoms, examination, and diagnosis. In the past, TMD cases have sometimes been considered to be difficult to diagnose and problematic to treat; however, thanks to ongoing research in orofacial pain and pain management, clinicians are able to use a more standardized classification and better diagnostic and therapeutic methods to offer patients a wide range of treatment modalities with higher success rates.(4)

Symptoms and signs of TMD, to a certain extent, overlap symptoms and signs of cervical spine disorders, and clinical observations of a forward head posture. On average, TMJ dysfunction was seen in connection with a marked forward inclination of the upper cervical spine and an increased cranio-cervical angulation, but no firm conclusion could be made regarding any particular cranio-facial morphology in children studied with symptoms and signs of TMJ dysfunction.(6)

A significant problem associated with observational and experimental studies in the field of TMDs has been the lack of standardized outcome measures, which has prevented meaningful comparisons among most TMD clinical trials. This methodological problem has also been an issue for trials examining other chronic pain conditions. This issue was addressed recently with the publication of the Initiative on Methods, Measurement and Pain Assessment in Clinical Trials.(7)
Treatment of orofacial pain

Treatment of orofacial pain has many disciplines that include the use of dentists, physicians, craniosacral therapists, massage therapists, chiropractors, and even acupuncturists. A neuromuscular dentist will use a scientific protocol that utilizes various computer components to record the patients’ optimal physiologic mandibular position and function of the temporomandibular joints. They will then correlate their findings to find an optimal resting posture and function of the masticatory muscles by prescribing the patient an oral splint (8). The mandibular repositioning splint would hold the patient into their neuromuscular occlusal position. The goal of this therapy is to allow the muscles of the head, face, and neck to release their hypertonic characteristics by not allowing the patient to return their habitual occlusal relationship that caused these muscles to become shortened, resulting in spasm (9). Myofascial pain syndrome can occur in a patient with a normal temporomandibular joint and the symptoms and the pain may be referred to other areas around the head and neck, this syndrome too is another characteristic of orofacial pain. Myofascial pain syndrome is not to be overlooked when diagnosing orofacial pain patients (10). The pharmacologic management of chronic orofacial pain involves the use of medications not used routinely in the dental practice. Additionally, many drugs are used for long periods of time necessitating careful monitoring for adverse effects and potential drug interactions (11).

Another modality for orofacial and TMJ pain treatment is Chiropractic. Chiropractors are trained in identifying and correcting these areas of dysfunction. Specific chiropractic adjustments correct the misalignment of the spine and TMJ and can provide symptomatic relief (12).

Therapeutic effects of Myofascial massage are connected to many factors, such as local blood and lymph flow, muscle activity and the nervous system. The most important thing during manual therapy of the muscles of mastication is that the blood flow increases in small vessels due to the fact that muscle tension decreases and that leads to better and faster recovery around the muscle tissue and improves the range of motion. There have been journals published that delve into protocols to alleviate orofacial and myofascial pain but adequate massage research into the intranasal cavity still lacks any verifiable publishing (13). Does massage therapy and manual therapy interventions combined have an overall efficacy in treating a patient who
experiences daily chronic orofacial pain that radiates into the tempormadibular joint and into the deep facial boney structures that surround the parasnasal cavities?

Methods

Client Profile

The client is a 6 foot 0 inch, 154 pound 29 year old male that presents a multitude of orofacial symptoms. The clients’ chief complaint is that there is always this lingering sense of pressure around the temporal portion of his cranium bilaterally and that his head feels “pressurized” and this often creates the symptoms of a migraine headache. This condition creates this sense of dizziness and can impair his balance at times. From a generalized perspective, the client states that he experiences constant neck discomfort, cranial congestion, sinus pressure, and has bilateral jaw discomfort.

Hard, stressful, or exhausting physical activity is not one of the clients’ daily routines but the client does stay fairly active. The client works out three to four times a week for about 30 to 45 minutes per session. During this time the client does some cardiovascular routines and some light weightlifting. Some of these routines include pushups, pull ups, and going for regular walks. The patient’s full time job is that he is a poker player and he sits for long durations while attending this activity. After participating in this activity for an extended period of time, the patient states that his overall condition is exacerbated. Often, the client receives table side massages that do tend to relieve the symptoms but often the symptoms return a short while later. Self care has also been applied at home in the form of foam rollers, a Theracane, and general stretching techniques.

Medical Diagnosis and Treatment Recommendations for the Clients Current Condition.

The client has been diagnosed with TMJD (Temporomandibular Joint Disorder) from his general dentist who is a specialist in Temporomandibular Joint Dysfunction. The dentist recommends that the client wear a mandibular repositioning splint to align the muscles into a more harmonious neuromuscular position. Occlusal splints are generally fabricated with an acrylic resin compound that fully covers the maxillary teeth with
idealized anatomical features that builds up the height of the mandibular teeth by no less than 2mm’s (14). The patient has not accepted dental treatment for this condition, however; he is not ruling this out in the near future. Currently, the client would like for all of the symptoms to decrease in severity or abate fully so he can continue to function in his daily work practices, home chores, and work out routines without continually suffering with the aforementioned symptoms.

**Treatment Plan**

The treatment that was performed consisted of 8 sessions over the course of 5 weeks and the treatments were administered in 60-120 minute sessions. Prior to starting these treatments an extensive postural evaluation was performed that lasted anywhere from 15-20 minutes. This postural evaluation consisted of charting a possibility of 84 postural distortions. The distortions that were evaluated would be distortions on the coronal, midsagittal, and sagittal planes. The distortions that were noted acted as guide to facilitate and to coordinate treatments. Some of the postural distortions that were noted in the cranium included a superior right external auditory meatus, left lateral flexon of the cervical column, and most of the cranial bones that were assessed were anteriorly positioned to the clients left. The patient presented an elevated left shoulder that was anterior to the coronal plane and his clavicular heads followed the same distortion angle. Pelvic projection was witnessed bilaterally and the patient has a significant forward head posture that extends about 3 inches off of the coronal plane anteriorly. A goniometer reading was performed before any massage therapy was applied. The goniometer measurement was measuring the degree or the amount of pelvic extension or pelvic flexion from the PSIS (Posterior Superior Iliac Spine) to the ASIS (Anterior Superior Iliac Spine) along the coronal plane.

**Using the Patient’s Postural Distortions to Assist in Guiding the Practitioners Rationale for Treatment**

Muscular and cranial distortions were assessed according to their dysfunctional patterns and a series of massage therapy techniques and NMT techniques were applied. Most of the massage therapy techniques that were applied were deep longitudinal and horizontal glides, various myofascial trigger point releases, myofascial
warming, compressions with and without opposition, cranial mobilizations, and various friction techniques were administered. Dural Tube mobilization was administered at each session to help facilitate any connective tissue and nerve entrapments that may be located inside the cranium and around the client’s entire spine.

The first few sessions the author applied various massage techniques to elongate the muscles that may be attributing to postural distortions. It was the authors’ decision to work on getting the patient aligned on three postural planes: the midsagittal, coronal, and sagittal planes prior to focusing solely on the muscles and cranial structures above the shoulders where the patient said that all of his symptoms were coming from. The practitioner determined that the forward head posture of the client could be a source of stresses on the cranium resulting in many of the symptoms the client was experiencing. The clients’ anterior posture to the coronal plane resulted in a significant forward head posture and this was to be addressed with the use of general gliding strokes posterior to the SCM, compressions to upper trapezius, and compression to rectus capitis posterior major, and longitudinal gliding strokes to the posterior cervical neck muscles. The frequency of these treatments lasted only a few minutes per each muscle group or until the author felt a significant change in their muscle tone. The goals of these treatments were to bring down the level of muscle hypertonicity thus, resulting in a more natural head posture. A more natural head posture (NHP) is the upright position of the head of a standing or sitting subject, while it is balanced by the post-cervical and masticatory-suprahyoid-infrahyoid muscle groups, with the eyes directed forward so that the visual axis is parallel to the floor and the neck is not extended (15). The sustained muscular effort to hold the head upright against gravity will cause hypermyotonia, resulting in ischemia (16). Muscles that could attribute to keeping the patient off of the coronal plane in the pelvic and lower extremity regions were palpated and subsequently, massage therapy techniques were performed to gluteus medius, gluteus minimus, gluteus maximus, IT band, tensor fasciae latae, the hamstring group, and the quadriceps. Palpations for trigger point referrals were assessed before treating any muscle group. Deep longitudinal strokes were applied to the IT band and to the hamstring group. Deep frictional compressions were applied to the gluteal group and all of their attachments. Trigger point release techniques and cross fiber strokes to upper trapezius, pectoralis major, and the posterior attachment of levator scapulae to try and bring down the elevated shoulder, as these muscles assist in raising the shoulder when they are hypertonic (17). It is worthy to
note that every muscle group that was treated, the author also treated the origin and the insertion of the muscle group, not just the muscle belly.

External and intraoral neuromuscular techniques were applied to all the muscles of mastication and to various mandibular elevators (17). The muscles of mastication were addressed at each session with NMT massage techniques to try and bring down the clients relative pain intensity. It is imperative though that once the practitioner is palpating for temporalis TrP’s the jaw must be slightly apart to feel the more palpable bands than if the mouth is closed fully and the muscle bellies are shortened (18). Intranasal techniques were applied with the use of a finger cot that was placed into the nasal cavity with lubricant and a cotton bud. A sphygmomanometer bulb was inflated to create a balloon that ultimately applied pressure to the nasal, lacramal, ethmoidal, maxillary, and frontal bones. The pressure was released within a few seconds and the balloon was withdrawn. The reason for using this intranasal technique was to address the area that appears to be the reoccurring chief complaint region. The majority of the first sessions the client stated that he was experiencing pressure buildup around the paranasuses that radiated into the TMJ region and into the anterior portion of temporalis muscles bilaterally (18). Other modalities, like in some chiropractic clinics, call this technique Advanced Endonasal Technique or AET. Manual intranasal compression was applied with the use of the fifth finger that was inserted into the deep nasal cavity. Once the author was as possible then all of the aforementioned bones were laterally, medially, inferiorly, and superiorly pressed upon with light pressure.

The postural reality is that there is hardly ever a “picture perfect state”, however; there can be a well compensated mechanism that despite asymmetry and adaptations, function as close to optimally as possible (19). Once there had been a change and the postural distortions were improving, it would be perceived that the practitioner could really put the attention of massage techniques directly intended for the facial muscles, neck muscles, mandibular elevators, mandibular depressors, and the anterior bones of the cranium along with maintaining a more true postural correctness. The muscles of mastication were addressed at each session with neuromuscular massage intraorally and extraorally. Compressions, skin rolling, and pin and stretches were applied to the external bellies of the masseters and the masseter attachments were treated with cross fiber and with the muscle fiber frictions. The entire external surface of the temporalis muscle was subsequently treated with NMT massage protocols externally and intraorally (17).

**Computer Evaluation Prior to Massage Therapy Intervention**

Prior to the initial treatment, a Myotronics K7 EMG evaluation system workup was performed at the clients’ dental office by the author. The muscles that were represented in this scan were the anterior temporalis, belly of the masseter, anterior digastrics, and sternocleidomastoid bilaterally with the teeth apart slightly.

**Pain Severity Scale Evaluation**

Documenting the changes in the clients’ symptoms throughout the course of treatment was the practitioners’ priority. The intention was to correlate the effectiveness or ineffectiveness of massage therapy and to relate these finding back to the increase or decrease of his symptoms. Ultimately, the data that would be acquired would be graphed and evaluated and methodically examined prior to treatments. There were two scales that were given to the client before each session and the forms that were given to the client were the Bournemouth Questionnaire MSK Pain and a TMD Symptom Intensity Scale (SIS). Although there does not appear to be any published literature on the validity of the Bournemouth Musculoskeletal Questionnaire, German researchers validated the Bournemouth version for low back pain (21). The TMD SIS appears to be
widely used in many chiropractic and dental clinics as screening tool and charting mechanisms to monitor their patients’ treatment outcomes.

**Results**

The application of various neuromuscular massage techniques coupled with region specific generalized massage strokes reduced the clients’ pain level over the course of the eight treatments. The client reported that over the course of the treatments that the severity of his pain was significantly decreasing and at times the symptom were abating. With the use of massage techniques throughout the entire body some of the techniques that were applied did offer the patient relief from the pressure of the cranium and the tightness around the temporal bones, the maxilla, and the sinus cavity. The postural specific treatment that was applied to the torso and the legs generally did offer the patient relief but he felt that this was not the main source of his discomfort. Psoas treatment, IT band treatment, and vigorous treatments of the hamstring group and quadriceps group allowed the patient to get into a more normalized coronal plane alignment compared to where the patient started treatment. The anterior pelvic protrusion remained but the degree to the extent of protrusion had significantly decreased.

Many of the postural distortions that were corrected during the first series of treatments appeared to have stayed in a corrective phase and there were no relapses in misalignments, however; the patients left shoulder did remain elevated slightly. Once the coronal plane, midsagittal, and sagittal alignments were improving the orofacial symptoms were addressed more thoroughly. The orofacial muscles that were easily accessed from outside of the patient’s oral cavity were treated at every session and often times these areas were addressed multiple times throughout the sessions. The NMT TMJ specific protocols that were administered did offer the client instant relief, however; the relief lasted a few days and the client stated that his symptoms had improved from the inauguration of treatments overall.

**Intranasal Therapy Alleviated Sinus Pressure**
The client stated that once these craniofacial areas were specifically addressed he instantaneously got reprieve and these techniques were what brought about the most relief. The pressure that was built up around the maxillary and frontal sinuses continued to diminish throughout the course of the massage intervention treatments. The use of intranasal compression techniques were definitely the catalyst to the decrease in the patients overall orofacial symptoms. Neuromuscular massage coupled with specific intranasal compression techniques reduced the clients’ symptoms from the onset of treatment.

(Figure A) Total sum of weekly points assigned to Bournemouth MSK Questionaire Pain Scale Assessment

The initial intake form the client filled out: The Bournemouth Questionaire MSK Pain Scale of 7 questions showed that the client was experiencing a pain level of 31 out of 70 points total. Each question had the possibility of 10 possible points to be added to each of the 7 questions. At the end of the eight treatments the client noted that the total score was 5 in total. This resulted in an 83.88% percentage of change to be noted against the MSK pain scale questionnaire graph. (see total sum of points graph above in figure A)
The second scale that was filled out was the TMD symptoms intensity scale. The SIS scale did not have the same characteristics as the MSK scale due to its relative fluctuations in the total points that were recorded weekly. The SIS scale did show another downward trend but the spikes throughout the graph peaked and declined sporadically.

The Pre treatment and post treatment EMG recordings were analyzed and it was found that 3 out of 4 muscles groups did have a decrease in their overall muscle tension over this 5 week period. The only group that did have a slight increase in EMG activity was the anterior bellies of the digastrics. These muscles were not treated during the course of this study specifically but it may be said that working in the region had an impact on their slight elevations. The temporalis muscles change in their overall EMG activity decreasing and leveling.
out bilaterally at 1.6 from 2.1 at the LTA and 1.9 at the RTA. The L/R Masseters had nominal changes with the change from pre tx: to post tx: at 0.1. The most substantial muscle group that had the highest amount f change was the L/R SCM’s. Pre tx: LCG at 2.0 and post tx: LCG was evaluated at 0.4. Pre tx: RCG at 1.4 and post tx: RCG was evaluated at 0.5.

**Discussion**

The objective of this case report was to demonstrate if there was an overall efficacy of various NMT massage therapy protocols to address orofacial pain, myofascial discomfort and to alter or eliminate the exacerbating condition and the paranasal sinus cavity discomfort the client was experiencing on a daily basis. Can a practitioner be guided by a postural analysis before each treatment that would act as guide to see if any of three plane distortions were creating an ascending condition or a descending condition correlation to the clients’ symptoms (20). The client was given nominal in home exercises to help with the facilitation of reprogramming the clients thought processes to become more aware of his postural abnormalities but there is no way to document if this awareness assisted in helping regain a more harmonious coronal plane alignment or the change occurred strictly by the techniques that were applied. Posture chart changes can be verified because the author documented these changes prior to doing any massage therapy work on the client. The series of treatments that were administered to the client did prove to be very effective in the reduction of his broad orofacial symptoms. Orofacial pain by definition is a very broad classification in the medical community due to the many regions and symptoms that are classified. Symptoms may range from TMJD to myofacial pain and or neck discomfort (4). NMT protocols such as myofascial release, TrP releases, and normal massage techniques did get positive results but there is no way to prove if the intranasal work alone created the positive change or it was the coupling of massage therapy strokes and intranasal therapy all together (17). NMT was performed to both to the lateral and medial pterygoids intraorally and the author does have CMS documentation of the changes in pre and post treatment. The relevance of this documentation does not seem to fit with this particular study but the client did lose about 2mm in the amount of lateral shift upon maximum opening, resulting in a more vertical maximum opening and closing pattern on the frontal plane.
The improvements in his pain levels were methodically charted and the results of the pain scales were graphed accordingly to corroborate in a decrease in the pain level throughout this five week study. A reduction in the symptoms related with TMJ dysfunction, headaches, sinus pressure, and craniofacial bone discomfort symptoms were apparent and the client left this case report with diminishing levels of pain generally. The effectiveness of this integrative approach can be verified from the verbal communications with the client post treatment, the lower EMG readings, the changes in the posture chart, and the downward trend in both graphs.

There are many variables that can make a student’s treatment approach different than that of his peers: geographical laws, course curriculum, and the length of time the student has been in enrolled in the program are to name a few. Other students may acquire different results due to their lack of training in certain aspects of this field at the time they are involved within the case report. The variables that arise within each school’s curriculum at the time of the case report could alter the students’ outcomes and may or may not allow the student to achieve similar results consistently.

Future Recommendations for Further Case Studies into Orofacial Pain Syndrome

The results of this case report are not protocol or treatment modality specific enough to ensure that this treatment series is easily replicable. There needs to be more studies into how intranasal therapies along with addressing the muscles in and or around the cranium can perpetuate the pain referral phenomenon. Determining how postural alignment overall can be creating an ascending or descending condition for the client would be to the utmost use for the practitioner in the future. This would potentially rule out any additional treatment sessions the client would need to undergo and potentially shorten rehabilitation times generally. The practitioner recommends that with this diverse of a study the use of intranasal techniques should have been applied at every treatment session to rule out any variables between soft tissue treatments and manual therapy treatments.

References


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