



Clinical Case Report Competition

Okanagan Valley College of Massage Therapy

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Honourable Mention

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The effects of massage therapy on temporomandibular
joint dysfunction and related symptomology

Abstract

This study investigates the effect of massage therapy, and in particular myofascial and trigger point release, on a subject with temporomandibular joint dysfunction and related sinus, cervical spine, and headache pain. The subject was a 31-year-old female with a history of jaw pain, limited opening of the temporomandibular joint, tension headaches, cervical spine pain, and sinus pain. It is recognized that headaches and pain in the cervical spine and sinuses may accompany temporomandibular joint dysfunction (Rattray, 2005), and the treatment designed for this study drew together aspects of documented treatments for each of these complaints (Rattray, 2005).

The subject reported moderate, chronic pain, poor quality and duration of sleep, and a moderate to high level of stress during the treatment period. Six massage sessions lasting one hour each were provided over a six-week period. Symptoms were assessed subjectively and before and after each treatment, with more rigorous assessment before and after the entire series of treatments. Subjective and objective observations, a visual analog scale, a symptom questionnaire, special tests, resisted muscle testing, and range of motion testing were used to assess progress.

Subjective reports from the subject indicated continued improvement from treatments one through five, with some regression in range of motion in jaw depression between the fifth and sixth treatments, likely attributable to a longer period between the fifth and sixth treatments than between previous treatments. Improved sleep quality, reduced pain in all measured areas, and reduced anxiety during a stressful exam period were documented. These results suggest that those suffering from symptoms related to temporomandibular joint dysfunction may benefit from massage therapy modalities.

Introduction

Temporomandibular joint dysfunction is defined as a disorder of the muscles of mastication, the temporomandibular joints, and associated structures.

While many people experience occasional pain at the jaw, three factors must be present to warrant a diagnosis of temporomandibular joint dysfunction (Rattray, 2005). A **predisposition** toward the disorder, whether intrinsic (i.e. the genetic development of muscles, ligaments, or bones of the face) or extrinsic (i.e. trauma to the neck, face, or jaw) must be present. **Tissue alteration** due to factors including tooth loss, hypermobility, postural dysfunction, and trigger points must also be present. The third necessary component is **stress** and the myofascial manifestations of stress brought about by habits such as jaw clenching and bruxism. A person may have one or two predisposing factors, have jaw pain, or have clicking or popping in the jaw, but without all of the features that characterize temporomandibular joint dysfunction, it is not diagnosed as such.

Several anatomical structures are typically involved in temporomandibular joint dysfunction. Two synovial temporomandibular joints are the sites of rotation and glide of the mandible, which results in opening and closing of the jaw. A biconcave,

fibrocartilagenous disc increases congruency between the bony surfaces in the joint. The disc is hypovascular and non-innervated, but pain associated with disc displacement is common due to its attachment posteriorly to highly innervated retrodiscal tissue. Anteriorly, the disc attaches to the lateral pterygoid muscle, which is a key structure in the treatment of this disorder. Other muscles involved bilaterally are temporalis, medial pterygoid, masseter, supra- and infra-hyoid muscles, and to a lesser degree, muscles of the cervical spine. Three major ligaments bind together the bones of the temporomandibular joint. The temporomandibular, sphenomandibular, and stylomandibular ligaments act to keep the structures of the jaw firmly opposed. Movements available at the joint are depression, elevation, lateral deviation, and protrusion (Magee, 2006).

The decision to focus this treatment series on the jaw was based on an assessment of the three factors necessary for a diagnosis of temporomandibular joint dysfunction. The subject's health history revealed an extrinsic predisposition to this disorder in the form of a whiplash injury eleven years prior to this treatment. The subject presents with facial asymmetry, though it is unclear whether it is due to asymmetrical development of facial bones or tissue alteration in the form of hypertoned facial muscles on the right side which pull the jaw out of alignment. No medical imaging has been carried out, so this remains unknown. There has been a suggestion in the past that the subject's jaw may require re-setting at some point, so presumably bony asymmetry was observed by another healthcare professional. Trigger points are present in the muscles of mastication; therefore, tissue alteration has occurred. Stress, and the clenching and bruxism that accompany it, are also factors in the subject's pain. Though unqualified to diagnose the subject with temporomandibular joint dysfunction, the practitioner ascertained that the three components of the disorder were present and that treatment for the disorder would likely produce favorable results.

The treatment plan applied in this case study took shape following the review of literature on other courses of treatment for this disorder. Temporomandibular joint pain is being addressed through acupuncture, chiropractic care, dental interventions, occlusal splints, muscle injections, medication, laser treatment and electrotherapy, a variety of physical therapies, and surgery. A large American study documented that two thirds of respondents used complementary and alternative treatments in the treatment of temporomandibular disorders, and that of those, people receiving massage ranked it as the most satisfactory and helpful (DeBar et al., 2003). A recent case study of interest documented the success of the strain-counterstrain technique in reducing symptoms of temporomandibular joint dysfunction (Eisensmith, 2007).

This study does not consist of an original treatment approach for temporomandibular joint dysfunction and related symptoms. It brings together and modifies previously documented massage therapy treatment protocols and adds to the body of literature on the subject. This study's purpose is to add to the body of knowledge regarding the efficacy of soft tissue manipulation as a primary or adjunct treatment for this disorder.

Case History

A 31 year-old female student and shipping clerk volunteered for this study. Both her schooling and her occupation require the subject to maintain a seated position for hours at a time, and the subject reports the postural habit of resting her chin in her hands while at work and school. She initially complained of cervical pain, and on further questioning with regard to other painful areas, identified her jaw as another area of concern. It has been painful for over five years, though the exact onset is unknown. It may be related to an MVA in 1996 during which the subject suffered minor whiplash. The subject reported that the whiplash injury resolved shortly after the accident.

The subject has pain at rest and on palpation of her right temporomandibular joint, temporalis, masseter and myelohyoid muscles. Mandibular depression is significantly limited, with deviation to the right visible in resting position and exacerbated on jaw opening. The pain is aggravated by clenching and stress. The subject has a custom-made night guard to reduce bruxism while sleeping. She uses it during stressful periods, but is not consistent in its use. The subject was receiving periodic massage and ongoing chiropractic treatment for mild cervical pain, though she discontinued chiropractic treatment for the duration of this study. She had not sought treatment for her jaw pain other than obtaining the night guard from her dentist.

Past health issues that may be related to the subject's current jaw pain are the aforementioned whiplash, inter-scapular pain and tension, neck pain, headaches, and chronic sinusitis. It is unclear which factors may be the sources and which may be the results of referral pain, but previous treatments to the inter-scapular and cervical areas focusing on trigger point release have not brought about any resolution of the jaw pain. This study will investigate the results of treating the jaw as the primary area of complaint and addressing the cervical spine, sinus pain and shoulder tension as secondary complaints.

All past surgical procedures and conditions were related to the reproductive system and do not likely have any relation to the current complaint. Use of medication is infrequent and primarily for relief of headache pain. The only ongoing medication is a contraceptive.

The subject is an active individual with good eating habits and an awareness of the link between stress and physical health. Her expectations for this course of treatment include decreased pain, better sleep quality, and an increased sense of relaxation and well-being during a stressful period.

Assessment

Symptoms were assessed before and after the course of treatment using both qualitative and quantitative measures. The Cyriax Model was the framework for assessment, which included subjective information and objective observation. The subject's chief complaints guided the measures of progress, so jaw pain, headache, neck pain, sinus pain, and sleep quality were measured.

To gain subjective information about the subject's complaint, she was asked to fill out a confidential patient history form produced by the Massage Therapy Association of British Columbia. Additionally, she filled out a questionnaire regarding temporomandibular joint dysfunction designed for use in this study (see appendix 1). The initial interview was focused on the location and aggravating factors for her pain, and any activities of daily living affected by her condition. The subject tracked hours and quality of sleep, painful episodes throughout the treatment, and discomfort related to treatment immediately afterward. She also tracked the frequency and severity of headaches. The Visual Analog Scale (Magee, 2006) was used before and after each treatment to ascertain the average level of pain at the jaw, head, cervical spine, and sinuses for the preceding week. It is a quantitative measure of perceived pain consisting of a 10 cm horizontal line with a description of extremes of pain at each end but without intervals along the continuum. A subject indicates his or her level of pain without a numerical reference from the previous treatment to guide his or her perception. It is considered a reliable measurement tool and is used frequently (Hertling and Kessler, 2006). To assist in this estimate, the subject kept notes on her pain levels throughout the week and used them to determine an average.

Objectively, postural assessment, observation of movement of the jaw, motion palpation of the jaw and the cervical spine, fascial assessment of all involved areas, active and passive range of motion of the jaw and cervical spine, and resisted muscle testing of the muscles of mastication were performed. The Chvostek test for involvement of CN VII (Magee, 2006) and the Three Knuckle test (Rattray, 2006) for range of motion at the jaw were performed. Active and passive range of motion at the cervical spine and jaw and the Three Knuckle test were performed before and after each treatment with the remainder of assessment performed before and after the course of six treatments (see Figures 1 and 2.). Based on the results of pre-treatment assessment, the subject and the practitioner set goals for the course of treatment.

Treatment Plan

The treatment protocol applied during the course of this study was based on the goals of the subject and practitioner, and was derived from a combination of sources. The subject wished to decrease the severity of jaw pain and the frequency and severity of headaches, neck pain, and sinus pain. The practitioner hoped to facilitate the subject's goals by reducing trigger points and fascial restrictions at the head and neck, restoring proper postural alignment of the head on the neck, and improving the client's tissue health and relaxation response, ultimately improving the likelihood of better sleep.

Specific techniques were chosen for their effects on fascial and muscular structures, and ordered so as to finish with the most sedative techniques to facilitate better sleep. Six treatments were provided over a three-week period, with three treatments in the first week, two in the second week, and one in the third week. Two treatments per week would have been ideal. This became evident when, in the third week, there was some regression of the client's progress. Each treatment was an hour in duration (with an additional 10 minutes for interview and assessment), which was appropriate for the number of treatment areas involved and allowed for a treatment of sufficient length for

the desired relaxation effect.

The subject was treated in supine, with a thermophore applied to the chest and abdomen during treatment to increase relaxation. The subject was instructed in the use of diaphragmatic breathing to reduce pain perception and increase relaxation. She was reminded throughout the treatment to resume diaphragmatic breathing. excellent

The subject's neck and chest were treated bilaterally with broad and specific fascial work to open the chest. In the neck, sternocleidomastoid was treated bilaterally (not simultaneously) with GTO release followed by picking up of the muscle belly to release intra-muscular fascial adhesions. Trigger point release via ischemic compression was applied as trigger points presented and Swedish techniques were used to increase muscle pliability and reduce head-forward posture. Next, the scalenes were addressed. Neuromuscular techniques, trigger point release and passive range of motion were applied to left side first, and then the right, as the right temporomandibular joint was affected. As the range of motion at the neck was within normal limits, the focus of this portion of treatment was to reduce referral pain into the head. Treatment of the head and neck began very lightly during the first treatment due to an existing headache and progressed in depth as the treatments progressed and tissue health increased.

The jaw was treated next. Bilateral hair-pulling over temporalis and specific fascial work over masseter and behind both ears introduced touch to the painful area and released fascial restrictions, which were considerable over the right temporalis. As the jaw deviated to the right on opening and palpation of the right revealed increased tone of the masseter and a subtle click on jaw closing, it was deemed the affected side (Friedman, 1997). Trigger point release and muscle stripping were applied to the left masseter, temporalis, and mylohyoid. The same treatment was then applied to the right side, eliciting considerable discomfort that diminished consistently over the course of the six treatments. Following extra-oral work to the muscles of mastication, medial and lateral pterygoid and masseter were treated intra-orally (note: intra-oral work was performed in sessions two through six only, in part to describe the process and gain informed consent of the subject and in part because she presented with a headache and mild nausea during the first treatment). Lateral and medial pterygoids and masseter are accessed intra-orally as detailed in Rattray on page 602-603. They were treated with ischemic compressions and gentle frictions to reduce hypertonicity, increase circulation, and lengthen the muscles (especially lateral pterygoid, which attaches to the anterior aspect of the articular disc at the temporomandibular joint and is implicated in disc displacement and altered joint mechanics). The subject was asked to actively open and close the jaw throughout the treatment to reduce the sensation that locking was about to occur and to reduce discomfort associated with prolonged opening of the jaw. The mandible was mobilized inferiorly as described in Hertling and Kessler on page 655 (Hertling and Kessler, 2006). Treatment of the jaw was largely derived from Rattray's description of treatment for temporomandibular joint dysfunction (Rattray, 2005).

The third treatment area was the face, and specifically the sinuses. It consisted of stroking over the forehead, down the temples and sides of the face, and medially to laterally over

the nose and maxillary sinus area toward the angle of the mandible, taking into account the pathways of lymphatic drainage. More than addressing the sinuses in a clinically significant manner, this was meant to acknowledge the sinus component of the subject's complaint and offer some gentle touch that the subject could replicate at home if desired.

Finally, the scalp and suboccipital area were treated for significant fascial adhesions and trigger points. Hair pulling and fingertip kneading were used to increase pliability and circulation to the area, while trigger points were treated with ischemic compressions. GTO release to the suboccipitals was applied with the intention of positively affecting the subject's head-forward posture. Light stroking from the top of the head, down the sides of the face, neck, and shoulders integrated all treatment areas. The treatment concluded with long-axis traction to the cervical spine and an occipital hold.

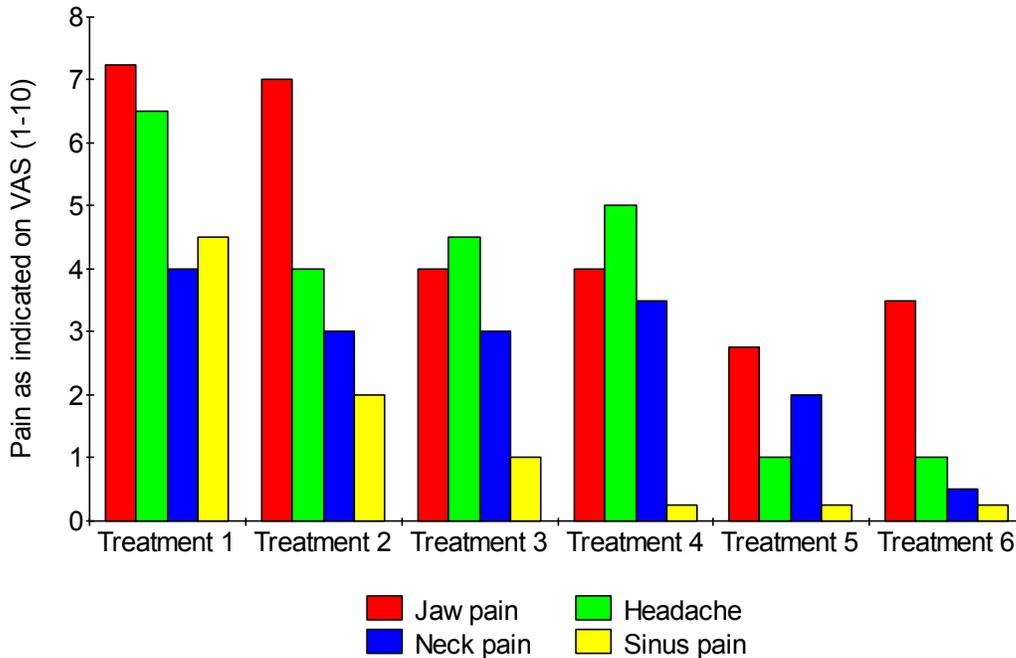
Homecare was assigned to reduce pain following treatment and to encourage greater range of motion at the jaw. Following her report of discomfort following the first treatment, the subject was instructed to apply an ice pack wrapped in a towel to the right masseter for 10 minutes twice during the evening immediately following treatment. Additionally, she was instructed to perform gentle muscle stripping in a downward motion on both sides of the jaw for 10 minutes daily, followed by pain-free opening and closing of the jaw to habituate her to greater movement at the jaw. The subject was to eliminate the habit of resting her jaw in her hands at work and at school, as this promotes further compression of the temporomandibular joint and associated structures.

Outcomes

The subject exhibited a decrease in pain levels in all measured areas from the beginning to the end of the treatment series (see graph below). Measured using a Visual Analog Scale, average weekly pain levels at the jaw, head (measured as frequency and severity of headaches), neck, and sinuses fluctuated from week to week but responded favorably to treatment overall. Jaw pain decreased steadily from weeks one to five of the study, but rose slightly during week six, possibly due to the greater length of time between the fifth and sixth treatments. Neck and headache pain decreased significantly overall, but increased concurrently in the third week of treatment. The stress of a university exam period and poor postural habits while studying likely contributed to this, though massage had a very positive immediate effect on pain in these areas. Sinus pain peaked prior to the first treatment and decreased steadily during the treatment series. As sinus pain was not a major focus of the treatment, it is possible that a decrease in pain and congestion in the head or outside factors such as a decrease in airborne allergens contributed to this.

Figure 1.

Subjective average weekly pain levels



Jaw opening improved during the course of treatment (see table below). The three-knuckle test showed improvement from two knuckles (2.75 cm) to nearly three knuckles of the non-dominant hand (4.25 cm), or full range of motion according to Magee, who notes that 35 to 50 mm of opening constitutes full range of mandibular depression at the temporomandibular joint. The quality of the movement improved steadily throughout the course of treatment, going from jerky and reluctant to smoother and less apprehensive. Range of motion at the cervical spine was within normal limits before and after the study, but stiffness and apprehension had decreased following the course of treatment.

Table 1. Pre-Treatment Measurement of Mandibular Depression

	TX 1	TX 2	TX 3	TX 4	TX 5	TX 6
Jaw opening (cm)	2.75	3.25	3.5	3.75	4.25	4.25

According to the subject, sleep quality improved significantly and sleep quantity improved from an average of five hours per night in the week preceding the first treatment to an average of seven hours per night by the final week of treatment. The subject commented that receiving massage was the only form of self-care she experienced during the heavily-scheduled period in which the study was conducted, and felt that her decision to prioritize getting enough sleep was prompted by the feeling of restfulness she felt following her massage treatments. She also increased the use of her

mouth guard due to education on the interrelatedness of stress, bruxism, jaw pain, headache, and neck pain.

Objectively, the most remarkable change observed by the practitioner over the treatment series was the increase in responsiveness of the subject's tissues. Muscular and fascial pliability, reporting of pain on a pain scale during treatment, and speed of trigger point release indicated a significant increase in tissue health from the first to last treatment. Treatment of muscles intra-orally progressed very quickly in terms of depth and aggressiveness of treatment.

The client attended every session as scheduled and was compliant with home care, icing when required and reducing habits that contribute to jaw pain. She was very open to education on her condition, and took full advantage of the treatments to improve her physical and mental state of health.

The goals of both the subject and the practitioner were satisfied over the course of treatment, to differing degrees. The subject saw a decrease in the severity of jaw pain and the frequency and severity of headaches and sinus pain. The practitioner noted increased tissue health in the jaw, head, and neck. There was also an increase in the subject's recognition of a feeling of relaxation and its link to better sleep. The practitioner's goal of restoring proper postural alignment of the head on the neck was lofty given the brief duration of the study and the fact that client education was focused on the jaw rather than on postural awareness. Postural assessment did not reveal a significant change in alignment during the course of this study.

Re-assessment of the subject three weeks following the last treatment in the series revealed sustained reduction in jaw and sinus pain and headaches, though neck pain was estimated to have returned to pre-treatment levels. Sleep quality and quantity have remained at the same level as measured immediately post-treatment. The subject has worked on replacing her habit of resting her jaw on her hands when seated with intentional stripping the masseter inferiorly. This has likely helped to sustain the improvement in range of motion achieved at the jaw during the study.

Discussion and Conclusion

The decrease in pain perception, increase in range of motion at the temporomandibular joint, increased ease and comfort of movement at the joint, and improved sleep patterns are all positive indicators for the use of massage therapy in the treatment of this subject. The results of this study are consistent with previous knowledge about myogenic origins of pain and limited motion associated with temporomandibular joint dysfunction. While a longer course of treatment would be ideal, the treatment protocol was successful as administered and outcomes were as expected.

This case is useful in that it illustrates the gains that can be made in a relatively short period of treatment and at no inconvenience to the patient. At one time, it was suggested to the patient that it may be beneficial in the future to break and re-set her jaw,

necessitating a long period of recovery with her jaw wired shut and her food liquefied. While massage therapy certainly cannot alter bone structure, it may reduce the discomfort of temporomandibular joint dysfunction to the point that activities of daily living are not affected and invasive surgery is avoided.

Due to the complexity of the temporomandibular joint and the fact that dental issues can contribute to pain in the area, a therapist must be able to communicate with dental professionals in cases where this is warranted. This case study would have benefited from input from the subject's dentist. If a study of this nature is repeated, a consultation with the subject's dentist or orthodontist and examination of any x-rays in their possession would be of interest.

In conclusion, this case study demonstrated that massage therapy led to a significant reduction in symptoms related to temporomandibular joint dysfunction. Massage is a valuable, cost-effective, non-invasive treatment for this condition. Further randomized controlled trials should be conducted to clearly establish the benefits of massage therapy for those suffering from pain and limitation of range of motion at the temporomandibular joint.

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