Clinical Case Report Competition

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Massage therapy as an effective intervention for temporomandibular joint dysfunction
Abstract

The objective of this case study was to illustrate the effects of massage therapy on a subject with temporomandibular joint dysfunction (TMJD). Massage therapy treatment focused on the muscles controlling the temporomandibular joint (TMJ) to improve range of motion, decrease pain, and decrease the presentation of other TMJD associated symptoms.

The subject was a 27-year-old female in good systemic health, having suffered soft tissue injuries from a motor vehicle accident (MVA) in 2008, when she was doctor diagnosed with TMJD. A total of fifteen 30-minute treatments were administered twice per week. Treatments focused on myofascial, swedish, neuromuscular, and joint mobilization techniques on muscles of the scalp, muscles of mastication, muscles of the cervical spine, and associated structures of the jaw. Assessment measures included TMJ opening and closing, or ‘gait’, TMJ maximum depression, standing posture, and a journal recording frequency of headaches and pain levels.

Results included a 100% decrease in headaches, decrease in pain (58%) and impact on daily life (73-100%; see Figure 2), a 42% decrease in stress, decreased muscle imbalance, improved TMJ ‘gait’ (see Figures 4 and 5), and improved posture (see Figure 3). Subject’s sleeping habits did not improve, nor did maximum TMJ depression. The subject experienced a number of positive outcomes, both orthopedic and psychosocial.
Due to the positive results gained after treatment, the study supposed that massage therapy should be considered an effective intervention for TMJD.

Key words: temporomandibular joint (TMJ); temporomandibular joint dysfunction (TMJD); mastication; pterygoids; jaw pain; headaches

Introduction

Temporomandibular Joint Dysfunction (TMJD) is a disorder involving the joint, the muscles of mastication (chewing), and associated structures\(^1\) presenting as pain, limited motion, and muscular tenderness, all aggravated by function.\(^2\) The temporomandibular joints are some of the most frequently used in the body\(^3\), and complex in nature due to their sliding and gliding actions, their associated condyle, and their symmetrical function.\(^2\) Respiration, posture, speech, chewing, and breathing all affect the TMJ, and consequently problems with the latter can negatively impact TMJ function.\(^2\) Though some confusion exists surrounding the exact diagnosis, it's thought that predisposition (including trauma), tissue alteration, and stress are all required criteria.\(^1\)

There are many factors that can contribute to TMJD. Trauma, as one might experience from a car accident or sports injury, can lead to poor structural alignment or muscle imbalance that will negatively impact the function of the TMJ. Dental work or tooth loss can have similar effects to that of trauma. Stress manifesting as tooth grinding or jaw clenching
can lead to or aggravate TMJD symptoms.\(^1\) Sinus problems can indirectly affect neck and back posture as well as jaw positioning.\(^6\) Common symptoms of TMJD include clicking or popping in the joint; headaches; hypertoned masticatory, head, and neck muscles; decreased range of motion; ear stuffiness; and postural dysfunction.\(^1\) Presence of one or more symptoms does not necessarily constitute a diagnosis of TMJD.\(^1\)

TMJD affects, or has affected, more than 20% of the average population and most commonly occurs in 20-40 year old females.\(^2\)

Prognosis is generally good when the condition is new, and when the patient is diligent in avoiding aggravating factors like jaw clenching, tooth grinding, and chewing gum.\(^1\) Home care and stress management are essential. Treatment approach depends on the cause. If joint dysfunction or muscle imbalance is found or suspected to be the cause, massage therapy and therapeutic exercises are appropriate methods of treatment.\(^6\)

Current management includes physical therapy, stress management, medication, dental splints, or surgery.\(^1\)

Previously published research suggests massage therapy is beneficial for relief of TMJD symptoms.\(^1, 2, 3, 4, 5, 6\)

It is believed that massage can alter pain perception, improve circulation, improve range of motion, improve lymphatic flow, reduce edema, reduce adhesions and fibrotic/scar tissue formation, relax muscles
and improve their resting length, improve respiratory function, decrease stress levels, and increase feelings of relaxation. Therefore, massage therapy as an intervention for TMJD should decrease jaw pain, correct muscle imbalance, improve tissue health by reducing adhesions and fibrosis, and decrease stress levels that aggravate or contribute to TMJD.

It is hypothesized that regular sessions of massage therapy including Swedish techniques, myofascial techniques, neuromuscular therapy, and joint mobilization will improve temporomandibular joint range of motion and increase quality of life in an individual with temporomandibular joint dysfunction (TMJD).

**Case study subject**

The subject is a 27-year-old female in good health. She is an office manager and a dance instructor who suffered a motor vehicle accident and 2008, and was subsequently doctor diagnosed with TMJD. The subject primarily suffers from TMJ pain and headaches, creating an increased sense of anxiety and decreasing her perceived quality of life. When discussing quality of life, the following were considered: perceived stress levels due to pain; implications on activities of daily living; quality of sleep; occurrence, intensity, and frequency of headaches; and presence of pain. The subject also suffers low back pain, which she believes is secondary to her original MVA symptoms.
Since 2008, the subject has utilized several different types of treatment, of which she found massage therapy the most beneficial for relief of her symptoms.

Currently the subject reports jaw pain, daily headaches, poor sleep, and feelings of anxiety. She uses Ibuprofen to manage pain.

**Methods**

Assessment tools included observation and video analysis of TMJ ‘gait’, cervical spine posture, TMJ depression, and the Dallas Pain Questionnaire.

Observation and video recording of TMJ ‘gait’ opening and closing of the jaw, was analyzed for deviation, ease of movement, and range of motion. Opening and closing of the mouth should occur in a straight line. Any deviations to either side, forming a C or a reverse C, indicating hypomobility of the joint on the side of the deviation; or an S or reverse S curve, which indicates muscle imbalance, were noted.

Cervical spine posture with attention to head forward posture was assessed using photographs. Head forward posture can increase tension on the muscles of mastication and surrounding structures, resulting in abnormal positioning and ultimately pathological remodeling of the joint.

TMJ depression was measured using a measuring tape. Maximum opening of the jaw was measured between the maxillary and mandibular incisal edges, as outlined in Hertling & Kessler, with normal mandibular opening between 35 and 50mm.
Perception of pain was assessed using the Dallas Pain Questionnaire. The questionnaire allows the subject to place a mark between 0% and 100% in response to pain, pain’s impact on daily activities, and pain’s impact on mood & emotions. A visual analogue scale was also used to respond to the following questions by placing a mark through a line, rating the topic at its worst in the past 24 hours (see Appendix a).

Treatments were administered as 30-minute sessions, twice weekly for a total of 15 treatments. Treatments focused on muscles of the cervical spine, muscles of the scalp, and muscles of mastication – both intra and extra oral. Muscles were treated based on the subject’s presentation at treatment time. The subject was treated in a supine position, and oil was not used, except for during the first treatment. Seven of the treatments performed excluded intra oral work.

The first treatment was the only to begin in the prone position, and began with muscle squeezing and myofascial release including unrolling, picking up, and bowing to the upper trapezius muscle. Picking up was also used along the cervical spine erector spinae muscles. Effleurage was used to spread a small amount of oil. Fingertip kneading in a bowing fashion towards midline was used on splenius capitus and splenius cervicis muscles. With the subject supine, active myofascial was employed to pectoralis major muscles, with the muscle belly pincered in the therapist’s
hands while the subject’s arm was passively brought into extension, abduction, and external rotation. The lateral attachment of upper trapezius was released by the therapist approximating this area (at the lateral end of the clavicle and the acromion process), sinking in with 2 fingers or knuckles, and adding pressure as tissue released, as well as pushing the glenohumeral joint inferiorly for added stretch. The hyoid bone was mobilized. Fingers were hooked under the mandible with pressure directed superiorly and slightly anteriorly to indirectly release mylohyoid and geniohyoid muscles. Myofascial spreading was used along the zygomatic process. Fingertip kneading was used on the temporalis muscle. Fascial hair pulling was used along the scalp, as well as fascial ear twists, in both clockwise and counterclockwise directions to each ear. The therapists thumb contacted the tragus and loaded into the joint space then applied gentle pressure anteriorly and inferiorly.

The remaining treatments were more consistent and used a combination of some, but not all of the following techniques, depending on the subject’s presentation that day. Fingertip kneading was used to the scalp with focus on the temporalis muscle. If a trigger point in temporalis was palpated, pressure was applied until it was released. Myofascial hair pulling and ear twists were used – the ear twists intending to affect the auricular muscles. Fingertip kneading was used at the mastoid process to release muscles that attach here. Fascial spreading was used superiorly and inferiorly from each surface of the zygomatic process, using the therapist’s thumb and index finger, working laterally to medially. The
therapist sunk into the lateral pterygoid off the condyle of the mandible, under the zygomatic process. Skin rolling, a myofascial technique, was used over each masseter muscle – usually performed twice on the left side, and 3 or 4 times on the right, depending on the fascia’s resistance. Fingertip kneading was used to masseter, in one or two passes, from zygomatic arch to ramus of the mandible. On days with intra oral work, the therapist used (with gloved hands) a pincer grip on the masseter muscle and kneaded the muscle. The hyoid bone was mobilized. Gentle fingertip kneading was used to the suprahyoid muscle group, in an inferior to superior direction. Fingers were hooked under the inferior surface of the mandible, as previously described, to help release muscles that attach there. After release along the lower mandible, the medial pterygoid muscle was palpated at the angle of the mandible, and pressure was applied and maintained until some release was felt. On days with intra oral work, the therapist slid a gloved finger between the subject’s cheek and upper molars then hooked the finger superiorly and posteriorly, locating the lateral pterygoid. Pressure was applied to the subject’s tolerance for 5-8 seconds, and released for 2 seconds, for 5 cycles to each lateral pterygoid muscle. On days with intra oral work, the medial pterygoid was located by the therapist sliding a gloved finger at the last lower molar, sliding to the medial surface and inferiorly past the gum towards the floor of the mouth. Pressure was applied to the subject’s tolerance for 5-8 seconds, and released for 2 seconds, for 5 cycles to each medial pterygoid. The sternocleidomastoid muscle was picked up
and bowed, from its origin at the mastoid process to its insertion at the clavicle. Attachment release was used to the scalene muscles by palpating the transverse processes of the cervical spine vertebrae at which they originate, and sometimes at the ribs (rib one or rib two) at which they terminate, if these muscles were particularly hypertoned that treatment. Each side of the mandible was cupped in the heels of the therapist’s hands, drawing the mandible into distraction (inferiorly) and gliding anteriorly. The subject was asked to deviate the mandible to the right. The therapist maintained the deviation while the subject relaxed, then a contract relax stretch was employed with the subject contracting, attempting to return deviation to midline against the therapist’s resistance; the therapist then took up the slack. This was repeated twice, for a total of 3 contractions, and then the entire cycle was repeated on the opposite side. Fingertip pressure was applied to the suboccipital muscles. A cranial base release off the occipital bone with gentle traction was used. With the subject seated, at the end of treatment, the therapist’s thumb contacted the tragus and loaded into the joint space, then applied gentle pressure anteriorly and inferiorly.

Homecare instructions included self-massage of the sternocleidomastoid muscle, with which the subject was diligent for at least 3 minutes a day throughout treatment. Progressive muscle relaxation was suggested to the patient, as stress and anxiety seemed to play a role in exacerbating the subject’s condition. Videos were selected online that instructed the subject to tense up and relax different muscle
groups from toes to head, allowing optimal muscle relaxation following contraction. The subject tried this exercise once, and found it hard to make time for and focus on. The subject was instructed to stretch her temporalis muscles, bilaterally, by grasping hair at the root, overtop of temporalis, anchoring the muscle, and slowly depressing the mandible for a hold of 30 seconds, twice per day. Self stretching involves the subject lengthening her soft tissue, using body weight as the stretch force. The subject was instructed to self-massage the scalp for 2 minutes per day with fingertip kneading, as well as each masseter muscle, also for 2 minutes bilaterally per day.

Results

The subject’s perception of pain interrupting sleep did not change throughout intervention. The subject reported relying less on Ibuprofen for comfort (83%; 67%; 67%; 50%), felt that pain interfered less with social life and job, and felt less depressed as a result of pain by the end of intervention. Headache frequency decreased during treatment. During initial assessment the subject stated always experiencing constant headaches that changed throughout the day. Preceding the 6th treatment, the subject reported having no headache at treatment time or that day, and remained headache free until the date of the 10th treatment, at which point the subject was finishing her menstrual cycle, which she stated is usually accompanied by headaches. Treatments 12 through 15, and non-treatment dates between, remained headache free.
Figure 1. Ratings throughout treatment of four selected (most relevant) criteria from the Dallas Pain Questionnaire: Section 1 – Pain and Intensity; Section 7 – How much pain interferes with sleep; Section 10 – How much pain interferes with work; Section 13 – How depressed the subject has been since the onset of pain.

As seen above in Figure 1, pain’s interference with sleep did not change throughout intervention. Pain and intensity, pain’s interference with work, and depressed feelings from pain all decreased substantially by the end of intervention.

As part of reassessment, the subject was asked to rate certain criteria based on its peak in the last 24 hours. Pain at its worst decreased throughout intervention. Headache at its worst decreased throughout
treatment, to no headaches by the end of intervention. Stress level due to pain decreased from initial assessment to first mid-treatment reassessment, then increased between the first mid-treatment and second mid-treatment reassessments, and finally decreased by the end of intervention. Pain’s interference with subject’s quality of life followed a similar pattern. Pain’s interference with work and/or sleep also steadily declined throughout intervention. See Figure 2:

Figure 2. Ratings of criteria, at their worst, in the previous 24 hours, tracked throughout treatment. Interference 1 references how pain has interfered with mood/happiness/enjoyment; interference 2 references how pain has interfered with work and/or sleep.

Maximum jaw depression did not improve throughout treatment. See Table 1:
Table 1. Jaw depression

Head forward posture decreased over the course of treatment as can be seen in Figure 3:

Figure 3. Sagittal view of posture at 4 intervals: pre treatment, midpoint check 1, midpoint check 2, post treatment.

TMJ Gait improved from an obvious S curve to an almost straight line. More deviation is noted in the breakdown of TMJ ‘gait’ before versus after intervention, as seen in Figures 4 and 5:

Figure 4. TMJ ‘gait’ before intervention
Discussion

The treatment as performed in this study showed to be effective in the management of TMJD symptoms. The subject's perception of pain's interference with her life, both activities and quality of life, decreased substantially (Figure 1, Figure 2). Headaches no longer bothered the subject at the end of the treatment course. Ease of range of motion of the TMJ increased, though overall depression did not increase. Depression of the mandible in TMJ 'gait' presented as a straighter line towards the end of intervention indicating that both joints are moving in unison and muscular imbalances have been addressed, thereby decreasing potential problems at the joint. Functional opening, TMJ depression, did not increase, but was within normal limits (35-50mm, or 3.5-5cm) before, during, and after treatment, being recorded at 3.5cm at its worst. Only 25-35mm (or 2.5-3.5cm) of TMJ depression is necessary for everyday activity.

The decrease in pain, and in pain’s impact on daily life, coincides with previous studies. A case report by Melissa Joan Pierson, MT was successful in decreasing pain, stress, and muscle hypertonicity in a subject with TMJD, and increasing neck range of motion and maximal opening.
A similar intervention was used, 45 minute massage therapy treatments and homecare, suggesting similar results should be seen. Results produced in this case study support that physical therapy can be an effective form of treatment for those with TMJD.\textsuperscript{5}

These results may impact other Registered Massage Therapists (RMTs) in terms of aiding with a treatment plan and/or techniques to implement. Should RMTs be aware of the benefits of certain techniques, or possible gains in range of motion or decrease in pain score that may result, they may wish to implement parts of this treatment plan into their own based on the specific presentation of their own patient.

These results may be of interest to other health care practitioners, including family doctors and dentists, should relief of symptoms, restoring muscle balance, decreasing stress, or a holistic and non invasive approach be amongst the practitioner’s goals for their patient. Given its beneficial results, massage therapy can be considered as an intervention by these health care practitioners for their patients with TMJD.

These results demonstrate to the health care industry massage therapy’s impact on increasing range of motion of joints, increasing quality of life, decreasing instances of headache, decreasing stress, improving posture, and improving muscle balance.

The inconsistency in this study may be considered a flaw. Since the subject was treated as she presented each treatment, instead of the therapist following a more consistent treatment regime, the treatments are less reproducible. Assessment techniques could have been more
thorough and precise, by including cervical spine ranges of motion measured with a goniometer, lateral deviation of the jaw, and a more detailed account of clicking, popping, and crepitus produced by the TMJ upon movement. Homecare is an important part of the intervention, and psychosocial factors like stress are a major component of TMJD. Had the subject been able to adopt a stress management routine, or regularly participated in progressive muscle relaxation, positive results may have been yielded sooner and/or been more profound.

Conclusion

Massage therapy is an effective intervention for those with TMJD and should be considered by health care practitioners when they are referring their client for care. Regular treatments with a massage therapist may be able to address both the orthopedic and psychosocial aspects of TMJD, and relied upon to improve and/or increase TMJ range of motion, decrease pain, decrease headaches, and decrease stress.

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References


