

Massage therapy decreases frequency of diurnal bruxism of a 61 year old woman: A case report

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Introduction

The intent of this case report was to study the effects of massage therapy on the diurnal bruxism of a 61 year old woman presenting with no temporomandibular joint pain.

Within the general medical literature, bruxism has been defined as “involuntary, non-functional, rhythmic or spasmodic gnashing, grinding and clenching of teeth (not including chewing movements of the mandible)” (Dorland, 2003). There are two types of bruxism: nocturnal and diurnal. Nocturnal bruxism, which occurs during sleep, is characterized by both a grinding-type and a clenching-type activity and is associated with complex micro-arousal phenomena occurring during sleep, the pathophysiology of which is yet to be clarified (Lavigne, G.J, et al., 2003). Diurnal bruxism, which occurs while awake, is characterized by a clenching-type activity and is associated with psychosocial factors and a number of psychopathological symptoms (Manfredini, D., et al., 2009).

The estimated prevalence of bruxism in the general adult population is reported to be 20%, predominantly occurring among females (Lavigne, G.J. et al., 2008).

Typical symptoms are abrasion of the dental hard surface, chipping or even fractures of teeth and prostheses, pain in the affected muscles and joints, and teeth which are sensitive to biting (Rugh and Orbach, 1988; Greene et al., 1998). The consequences of chronic bruxism range from sore jaw, facial pain, exposing the inner layers of teeth from the repetitive wearing away of enamel, tooth loss, hearing loss, and temporomandibular disorder (Sutin, A.R., et al., 2010).

Literature Review

The relationship between bruxism and temporomandibular disorder (TMD) is unclear. TMD is described as “a collective term embracing a number of clinical problems that involve the masticatory musculature, the temporomandibular joint (TMJ) and associated structures, or both” (Okeson, 1996). In Kalamir, et al.’s review (2007), screening criteria consisted of studies using the keywords bruxism, temporomandibular, jaw, randomized controlled trial, survey, epidemiological, and longitudinal. Other types of research such as uncontrolled studies, case studies, case series and reviews were not included. Of the 172 studies identified, 101 found bruxism to be related to TMD, with 71 showing inconsistencies or no significant relationship.

According to Kalamir, et al. (2007), the general consensus of the bruxism-TMD connection consists of: TMJ dysfunction due to tooth wear and subsequent jaw misalignment or malocclusion, myofascial strain, fatigue or fibrosis of masticatory muscles, and capsulitis and adhesions within the temporomandibular joint space.

There has been a shift away from purely mechanistic treatments of using the occlusal splint, towards a biopsychosocial approach, which includes EMG feedback and cognitive behavioral therapy (CBT) (Gardea, et al., 2001). Complementary and alternative therapies such as massage, exercise, acupuncture, and chiropractic care are also presented as successful TMD treatments (DeBar et al., 2003).

While evidence is inconclusive, Lobbezoo, J. et al. (2008) suggest that bruxism can be managed with the “triple-P” approach: Plates, Pep talk and Pills. Occlusal appliances to protect the teeth, counseling to address the client’s behavior and awareness of the disorder, and pharmacological interventions with centrally acting drugs for short periods, outline their management approach. Furthermore, they recommend that the disorder be assessed by a multidisciplinary team that includes dentists, psychologists, and medical specialists. Notably, Lobbezoo, J. et al. also suggest the inclusion of relaxation and lifestyle and sleep hygiene instructions.

The literature presented the commonly found association of stress and anxiety with bruxism, with most studies focused on nocturnal bruxism (Ahlberg, et al., 2013, Sutin, et al., 2010). Yet, a study done in Japan concluded that “daytime clenching” was associated with anxious tendency and total muscle activity in the clenching group was 3.5 times greater compared with the non-clenching group (Hiroshi, E. et al., 2011). Lavigne, et al. (2008) maintain that diurnal bruxism is associated with nervous tic and reactions to stress. They also state that the physiology and pathology of diurnal bruxism is unknown, although stress and anxiety are considered risk factors.

Since massage therapy has been found to decrease cortisol (“stress hormone”) and increase serotonin and dopamine (neurotransmitters that are involved in the reduction of depression) (Field, et al., 2005), it may have an indirect impact on bruxing behavior. Additionally, two case reports written by massage therapists and published in peer-reviewed journals investigate the effects of massage therapy on TMD. Both reported sleep bruxism as a symptom experienced by the subject (Eisensmith, L.P., 2007, Pierson, M.J., 2011). Furthermore, both included intraoral massage techniques (as well as other massage interventions) with a decrease in symptoms reported.

Studies investigating the efficacy of intraoral myofascial therapies (IMTs) for chronic TMD are rare according to Kalamir, et al. (2011). Their RCT (randomized controlled trial) published in 2011 investigated whether chiropractic IMT and the addition of education and self-care were more effective than no-treatment or IMT alone for 5 outcome measures--intercisoral opening range, jaw pain at rest, jaw pain upon opening, jaw pain upon clenching, and global reporting of change. Participants were studied over the course of 1 year. Compared with their controls at 6 months and 1 year, results showed statistically significant differences in the 5 outcome measures in both treatment groups. The study suggests that both chiropractic IMT and additional education and self-care (IMTESC) surpassed lack of treatment of chronic

myogenous TMD over the course of 1 year, with IMTESC having more of an impact than IMT at 1 year. The successful outcomes of the IMTESC group support the multimodal approach to TMD management.

Another RTC published in 2014 by physical therapists (Gomes, et al.) concluded that massage therapy on the masticatory muscles and the use of an occlusal splint lead to an increase in mandibular ROM. However, pain measurements were not taken in this study. The authors explained that individuals with TMD display reduced blood flow to the masticatory muscles due to vasoconstriction caused by muscle hyperactivity. And consequently, the buildup of by-products or hindrance of the transport of nutrients and metabolites triggers pain. Massage therapy (external) and occlusal splint are used to stimulate local blood flow and reestablish “normal muscle status” (Gomes, et al., 2014).

Although there is a need for more randomized controlled trials of massage therapy on TMD symptoms to show abundant evidence of efficacy, overall consensus from the literature review suggests that massage therapy may play an important role in a multidisciplinary approach to treating bruxism and TMD.

The Case

Subject

The subject is a 61 year old female, slightly overweight and inconsistently active at low impact (e.g., rides exercise bike). She was diagnosed with Type II diabetes in 1996 and currently takes medication by injection to control her blood sugar levels. She is also taking medication for depression (Wellbutrin) and high cholesterol (Vytorin).

She began to experience daytime, uncontrolled teeth grinding or diurnal bruxism in 2005. According to the subject, she was diagnosed with “oromandibular dystonia” by a neurologist and an ear, nose, throat (ENT) specialist. However, her dentist labeled it as “bruxism” and she, herself, considers it bruxism. Before massage therapy, she tried two modes

of treatment: medication and botox injections. Her neurologist at the time said the bruxing had a Parkinsonian-like quality and prescribed 3 different Parkinson's disease medications, all of which resulted in bad side effects she was unable to tolerate. Next, she received botox injections to the masticatory muscles, once every three months. The subject reported that the bruxism stopped for longer than 2 weeks with the initial treatment, but bruxing returned before the next allowed treatment time.

The first time I met the subject, she was seeking a treatment to stop the bruxing. She felt like the activity was completely involuntary and she had no control over it. Her concern had an anxious undertone since she was concerned about the health of her teeth. The subject stated she did not brux in her sleep, but only during waking hours. She was very stressed by the act of grinding itself since she found it annoying and abnormal. While the bruxing seemed to begin "out of the blue," she dates the diagnosis according to when her youngest child graduated high school, which may not be entirely unrelated. She was a stay at home mom then and now that her children are grown and living elsewhere, she continues to be in the home while her husband works. Being an "empty nester" may have triggered some additional anxiety.

No pain is present in the temporomandibular joint or the masticatory muscles while bruxing, although the subject stated that a pain in an anterior tooth at the lower jaw, the main area she where she perceives her teeth grinding together, would become apparent during prolonged episodes of bruxing. Additionally, the subject develops a strange taste in her mouth with prolonged bruxing. Initially the subject reported that her dentist did not see a breakdown of the crown on the tooth she mostly grinds on, but in a recent session, the subject reported that her dentist recommended a crown replacement due to tooth wear. She was very distressed by this news.

Initially, the subject was unaware of specific triggers of her bruxing behavior, but over the course of treatment, we discussed connections and developed self-treatments to use in

between massage sessions. It became clear that stressful life events, ranging from a death in the family to a disagreement with a sibling, would trigger the start of a bruxing episode. Other mundane periods of inactivity such as reading for a long stretch of time, watching TV for an extended length of time, or being sick in bed all triggered her diurnal bruxism.

While the client does not work at a regular day job, she has been busy unpacking after a recent sale of their former home in the midwest. She also travels regularly with her husband, at least every few months, either to the midwest, Europe, along the east coast of the U.S. and as far away as Hawaii and Alaska where relatives live. Bruxing would often be triggered before a trip to see relatives. During vacations, the subject would typically be bruxism-free unless she was sick during the trip.

Treatment

As of December 2014, the subject continues to receive massage therapy. She began sessions in April 2013. She scheduled appointments roughly every two weeks (sometimes weekly), for mostly 90 minutes sessions (8 were 60 minute sessions). The author decided to end monitoring of treatment at the 40th massage therapy session when the client indicated she did not want to continue seated intraoral neuromuscular therapy (NMT). The subject also received acupuncture treatments for 3 sessions while also receiving massage therapy after about one year of receiving massage therapy only.

Typically sessions began with external neuromuscular therapy massage to the neck and jaw, then progressed to intraoral NMT supine and continued with Reiki and full body Swedish and deep tissue massage. Reiki is a system of energy healing in which the practitioner places her hands gently and lightly in different positions on the client's body, transmitting universal energy to the subject, in support of the body's self-healing properties. Reiki is known as a modality that fosters deep relaxation.

As time passed, sessions were tailored to the subject's preferences (e.g., Reiki was no longer included after 10 months of treatment). A 4 month gap in treatment occurred while the subject was living out of state, during which time she received weekly massage and exercised more regularly at a nearby health club. Upon her return and at the author's suggestion, seated intraoral NMT was used during 2 sessions.

No pretreatment measurements were taken initially in April 2013. At the first seated intraoral NMT session on 10/30/14, the subject presented a wider than normal intercuspal opening of 50 mm. No pain was present with opening the mouth and the quality of this movement was normal. Laterotrusion was challenging for the client. She had difficulty moving her lower jaw laterally, independent of her lips and with some tries she was confused which direction she was moving her jaw. Laterotrusion to the right was beyond normal at 15 mm. A measurement to the left was not taken due to the client's inability to perform the lateral movement of the jaw with clarity (e.g., she would move her mouth/lips at the same time).

At the beginning of each appointment, the author would briefly interview the subject, asking if bruxing had occurred since the last session and what seemed to trigger the episode. During most sessions a 30 to 40 minute focus was dedicated to head, neck, and jaw massage.

The following sequence was typically used at the beginning of most sessions. No massage lubricant was used at the head, neck, and jaw. In general, the author would pause to compress at areas of muscle tissue that were palpated as tense. During some sessions the subject was asked for feedback about a referral sensation, but typically the subject did not report any.

1. Petrissage and pincer grasping at the upper trapezius bilaterally, simultaneously and individually.
2. Thumb and finger compressions at the posterior neck with a focus just lateral to the cervical spinous processes bilaterally, one side at a time. The author's hand cradled the subject's

neck. When compressions were applied, the weight of the subject's head would allow for the author's thumb to sink into the tissues.

3. Muscle attachments at the transverse processes of the cervical vertebrae were palpated and individually compressed and stroked in a cephalad-caudal direction.
4. Finger glides at the suboccipital muscles bilaterally, one side at a time.
5. Pincer grasp to the sternocleidomastoid muscles individually with cross fiber friction at sternal and clavicular attachments and mastoid processes.
6. Cross fiber friction strokes at the mandible attachment of masseter and proximally at the zygomatic arch attachment.
7. Downward thumb glides along the body of the masseter while subject would slowly open her mouth.
8. Compressions to temporalis, moving the scalp in the same direction as the muscle fibers.
9. Coronoid process was palpated externally at the jaw by asking the client to open her mouth. Finger friction was used at the tip of the coronoid process.

The following sequence details the intraoral neuromuscular therapy work that was used in the majority of sessions. The intraoral seated work used in 2 sessions at later dates was fairly similar, although possibly more accurate in palpation due to the author attending a second TMJ training (by a different instructor and school) just prior to beginning seated work. Each side of the jaw was worked on in entirety individually.

1. Using a gloved hand, the author placed her index finger in the client's mouth and with her thumb on the outside of the cheek, she pincer grasped the masseter, pausing at areas that were palpated as tense and also moving the fingers in opposite directions to friction the muscle body.
2. Temporalis attachment was palpated by inserting an index finger into the subject's mouth at the upper jaw and gently stroking the coronoid process.

3. Next, the inferior section of the lateral pterygoid was palpated by pushing an index finger towards the back of the upper jaw, medially, beyond the coronoid process.
4. The belly of the medial pterygoid was treated by placing an index finger between the upper and lower molars, medial to the teeth, and moving posteriorly until palpated.
5. The sides of the tongue were swept with an index finger.
6. The floor of the mouth was briefly compressed with an index finger at the inside of the mouth and the index finger of the other hand externally under the chin.

Basic effleurage, pincer grasping, thumb/finger compressions and deep forearm glides were the primary techniques used on the rest of the body with the most detailed deep tissue work occurring at the upper thorax, between the scapula. Traditional petrissage was avoided due to the adverse effect it has on the author's medial elbow tendonitis. The abdomen, gluteus muscles and lateral hip rotators were typically skipped for the full body massage, although with Reiki, a hand was placed at the abdomen just below the belly button.

Relevant results

Dates	# of days	Bruxism present?	Intraoral NMT used? When?
5/2/13-5/9/13	7	no	yes, 5/2, 5/9
5/23/13-5/30/13	7	no	yes, 5/23
6/19/13-6/30/13	11	no	yes, 6/19
7/11/13-7/26/13	16	no	yes, 7/3, 7/26
8/28/13-9/12/13	16	no	no, but had dental work

Discussion

A combined treatment makes it difficult to discern the specific massage therapy techniques that are effective in treating diurnal bruxism. Was the intraoral NMT or full body massage or both key in helping the subject stop bruxing behavior? What role did self-massage play during the course of treatment?

Encouraging the client to engage in self-massage was pivotal in providing a coping strategy between massages. The employment of self-care began with asking the subject about her beliefs pertaining to bruxism. At the initial session she was resigned to thinking that she had no control over the bruxing. As time passed and she saw that self-massage could stop her bruxing behavior, her attitude changed and she became motivated to take self-responsibility more regularly.

Over the course of sessions, into 2014, the subject did not exceed 16 days of no bruxing until she was away for an extended vacation with family in the summer of 2014. During that time she received traditional deep tissue massages and exercised regularly, but did not receive intraoral NMT. From this perspective, it appears that a reduction in anxiety and managing stress effectively were the main components of leading a bruxism-free life.

From the very first sessions, it became clear that certain life events were triggers for the start of a bruxing episode. On 8/29/13, when the subject reported becoming more aware of these triggers (e.g., busy schedule, reading for long periods of time), she also reported that self-massage of her chin was helpful in stopping the bruxing. On 9/12/13, she also reported the addition of jaw massage when self-massaging her chin. From 8/28/13 to 9/12/13 was one of her longest bruxism-free periods (i.e., 16 days).

Previous to this 16 day hiatus, from 5/2/13 through 7/26/13, the subject had progressively longer bruxism-free periods. Throughout these periods, the client received intraoral NMT supine.

However, to complicate cause and effect relationships further, the subject reported that dental work seemed to calm down her bruxing behavior. For example, on 7/31/13, the subject reported that she began bruxing again in anticipation of a relative's burial, but a teeth cleaning stopped the bruxing. In previous sessions, was it intraoral NMT on specific muscles that contributed to less bruxing or simply the stimulation given to the inside of the mouth? Or was it the relaxation of a deep tissue massage? Or was the subject's anxiety reduced when the dentist or dental hygienist would tell her that her teeth were in good condition? Perhaps it was all of these factors combined that helped the subject.

The subject did not receive intraoral NMT on 8/29/13, 9/12/13, 9/26/13 and a period of bruxing off and on (9/12/13-10/10/13) corresponded with this change in treatment. Interestingly, she requested no intraoral NMT because she had received dental work during this period. After intraoral NMT resumed on 10/10/13, on 10/17/13 the subject reported no bruxism for 7 days. This change might lead one to think that the intraoral NMT was key in changing bruxing behavior. But again, was it the intraoral NMT or the stimulation to the inside of the mouth? These questions might be explored further with a RCT.

At a massage session on 10/23/13, the subject reported being able to stop the beginning of a bruxism episode with self-massage. This indicated an improvement from previous self-massage efforts which helped slow the frequency instead of stopping the episode from even starting. The subject continued to use self-massage as a management technique and eventually added an intraoral focus to the masseter while in the shower.

Another factor to consider would be the acupuncture sessions the subject received on 4/16/14, 4/24/14, and 5/8/14 prior to her summer vacation. During this time she also received intraoral NMT. At this point, the subject also reported that since acupuncture sessions began, she did not feel the urge to brux. What caused this change? The combination of massage therapy and acupuncture? Or just the acupuncture? This sounds like another interesting proposal for a RCT.

Beyond studying the efficacy of massage in reducing bruxism frequency, this case report has highlighted the importance of client-massage therapist rapport, the balance between effective massage treatment and level of client comfort, empowering a client with self-care suggestions, and the impact of a client's beliefs on treatment.

It became clear that massage treatment was most effective when the client was able to relax deeply during a session. The link between anxiety and bruxing makes massage therapy a viable treatment if a client finds massage to be anxiety reducing and responds to the massage techniques with relaxation.

Perhaps until the subject chooses to manage her anxiety effectively through other methods (e.g., regular exercise), she will continue to use bruxing as a coping mechanism. While massage in this case did not end the bruxing behavior completely, results indicate that receiving massage therapy and employing self-massage were both effective in reducing the frequency of diurnal bruxism.

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