Case Report

Resolving Chronic Masticatory Myofascial Pain in a Bruxism Patient: A Case Report on Effective Treatment Approaches

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Abstract

Chronic myofascial pain, often caused by trigger points in the masticatory muscles, results in significant muscle soreness due to factors such as muscle overuse, injury, poor posture, stress, and parafunctional habits. A 21-year-old woman presented with persistent pain in the right cheek and temple, rated 8 out of 10 on the numeric rating scale (NRS), exacerbated by bruxism and stress. Clinical examination revealed tenderness in her masticatory muscles, trigger points, restricted mouth opening, and altered occlusion. She was diagnosed with myofascial pain. Treatment included patient education, self-care strategies, occlusal splint therapy, trigger point injection, and low-level laser therapy. After 10 months, her pain score was reduced to 1 on the NRS, with improved occlusion and decreased muscle soreness. This case highlights the effectiveness of conservative and minimally invasive treatments, including education, occlusal splint therapy, trigger point injection, and low-level laser therapy, in addressing chronic masticatory myofascial pain related to bruxism. Identifying and addressing the underlying causes are essential for successful management.

Keywords: Bruxism, Laser therapy, Myofascial pain, Occlusal splint, Trigger point injection

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Introduction

Myofascial pain syndrome is often caused by trigger points within the masticatory muscles, which are the primary sources of muscle soreness and pain.[1,2] Several theories explain the formation of these trigger points[2], including masticatory muscle overuse, masticatory muscle injury, muscle spasm, pain originating from the central nervous system, and poor posture for extended periods. Dentists should understand the causes of this condition to effectively plan and implement treatment strategies.

Treatment for patients with masticatory myofascial pain can be divided into 2 categories based on reversibility.[3,4] Reversible treatments include jaw exercises, occlusal splint therapy, massage therapy, muscle stretching, pharmacotherapy, acupuncture, other physical therapies such as transcutaneous electrical nerve stimulation (TENS), ultrasound therapy, iontophoresis, and biofeedback. Irreversible treatments include occlusal adjustment or equilibration, and surgical procedures. Although occlusal adjustment can help reduce muscle activity, distribute occlusal forces, and alleviate myofascial pain in patients with masticatory myofascial pain who also have altered occlusion[5,6], reversible treatments should be initially recommended to start managing this group of patients.[7] Irreversible treatments should be considered only if additional treatment is necessary.

Occlusal splints are a widely recognized conservative treatment for masticatory muscle pain, commonly used to alleviate symptoms. However, their effectiveness for chronic muscle pain remains uncertain, with studies reporting variable results.[8] To enhance therapeutic outcomes, occlusal splints are often combined with other treatment modalities. One such intervention is trigger point injection (TPI), a procedure in which a local anesthetic is administered to inactivate trigger points, thereby reducing muscle tension and providing significant pain relief.[9] Additionally, low-level laser therapy (LLLT) has gained attention as a non-invasive option, known for its painless application and potential to promote tissue healing and reduce inflammation.[10]

In patients with masticatory myofascial pain and bruxism, studies using electromyography have found that the muscle activity in bruxism patients is higher than that in normal individuals during bruxism and at rest.[11] This suggests that bruxism may contribute to or exacerbate myofascial pain.[11,12] Therefore, dentists should address bruxism and myofascial pain simultaneously to achieve optimal treatment outcomes.[13] The objective of this case report was to present the methods for disease assessment, diagnosis, and conservative treatment for a patient with masticatory myofascial pain, bruxism, and altered occlusion.

Case Report

A 21-year-old Thai woman sought treatment at the Chulalongkorn Dental Hospital for persistent right cheek and temple pain, rated 8 out of 10 on the numerical rating scale (NRS). The pain, a dull ache with sharp bursts, had lasted for about 2 years and caused difficulty in speaking and using her jaw. She had habits of gum chewing, bruxism, and frequent stress. Previous acupuncture, acetaminophen, and pregabalin treatments were ineffective. Magnetic resonance imaging of the brain and trigeminal nerve demonstrated no abnormalities.

Upon clinical examination, the face of the patient appeared symmetrical (Fig. 1A). Trigger point was identified in the right masseter, specifically at the insertion of the muscle (Fig. 1B). Palpation revealed muscle tenderness with spreading pain noted in the masseter and temporalis muscles (Fig. 1C). Other masticatory muscles were also tender when palpation was performed (Fig. 1D and 1E). Additionally, clicking sounds were observed in the left and right temporomandibular joints (TMJ). Intraoral examination revealed that the patient could open her mouth 39 mm. With finger assistance, mouth opening increased to 45 mm. During the occlusal examination with a thin metal foil strip in the intercuspal position, only 3 pairs of teeth made contact: 17/47, 16/46, and 27/37 (Fig. 1F-1H). Right lateral excursion showed working contacts at teeth 14/44 and 13/43, as well as non-working contact at teeth 27/37, while left lateral excursion revealed working contact at teeth 23/33 and non-working contact at teeth 17/47. The patient reported pain in the masseter muscles on both sides during mouth opening, lateral excursions, and protrusion.

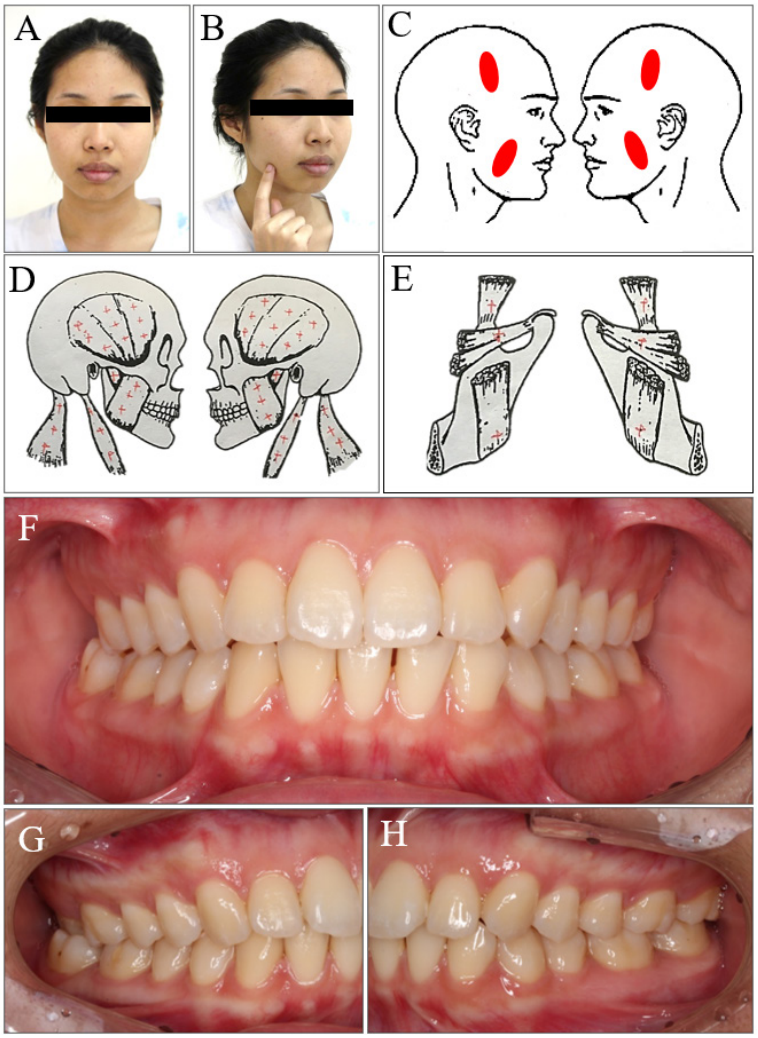

Figure 1 *Preoperative images: A) Frontal facial profile depicting a symmetric face, B) Trigger point location marked on the relevant area by the patient, C) Diagrams illustrating muscle pain spreading within the boundaries of each muscle, D) Sites of muscle tenderness during extraoral muscle palpation: red plus signs indicate tenderness at the temporalis (anterior, middle, and posterior fibers), masseter (superficial and deep parts), sternocleidomastoid, and trapezius muscles, E) Sites of muscle tenderness during intraoral muscle palpation: red plus signs indicate tenderness at the temporalis tendon, medial pterygoid (insertion part), and lateral pterygoid (insertion part) muscles, F) Frontal view of occlusion in the intercuspal position (ICP), G) Right view of occlusion showing a crossbite at teeth 17/47, and H) Left view of occlusion.*

The diagnosis for this patient, based on the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD)[7], comprised 1) Myofascial pain, 2) Disc displacement with reduction, and 3) Sleep bruxism. The contributing factors identified were habits of gum chewing, stress, bruxism, and occlusal instability.

The patient received dental care that included explaining the disease, its causes, and contributing factors. She received self-care instructions, including avoiding chewing gum and hard or sticky foods. The patient was advised to manage stress by practicing gratitude, engaging in conversations with others, and taking deep breaths. Training was provided to help her maintain a resting jaw position by placing her tongue tip against the palatal rugae, particularly when teeth grinding was felt during the day. Warm compresses using moist towels were recommended for 15-20 minutes daily. A Michigan-type hard occlusal splint was made for nightly use (Fig. 2A), with cleaning instructions provided. This appliance aimed to reduce muscle activity, relax the masticatory muscles, and prevent the adverse effects of sleep bruxism.[14] Furthermore, it reduced intra-capsular pressure in the TMJs, facilitating the return of the articular disc to its normal position.[14] Then, TPI with 3% mepivacaine (without epinephrine)

was administered into the trigger point within the right masseter muscle (Fig. 2C). The trigger point was fixed with 2 fingers (flat palpation technique)[15] and injected with a 30-gauge needle. The needle was inserted into the trigger point in multiple directions without withdrawal from the skin.[16] After the injection, the patient's muscles were stretched through passive hand stretching. The mechanism of TPI involves the mechanical disruption of the trigger point with a needle to terminate nerve endplate dysfunction and relieve prolonged pain.[17] Moreover, dual-wavelength low-level laser therapy (Multiwave Locked System (MLS), Mphi D model, ASA, Arcugnano, Italy), which combined 905 nm pulsed emissions with 808 nm continuous emissions, was applied to both masseter muscles under the supervision of a physiotherapist. The laser protocol was configured in trigger point mode with continuous pulsed wave (CPW) modulation, a modulation frequency of 10 Hz, a duration of 1 minute, and an intensity set to 100% (Fig. 2D). This selected protocol was divided into 2 phases. Firstly, the scanning phase was conducted by positioning the MLS laser probe perpendicular to the treated area and moving it along the masseter muscles for 2 minutes per side. Secondly, the trigger point phase, the MLS laser probe was positioned perpendicular and in contact with the trigger point of the right masseter (Fig. 2E). The probe was moved to 4 points around the trigger point, with 1 minute for each point, totaling 4 minutes for the trigger point phase. Regular follow-ups were conducted to monitor treatment progress.

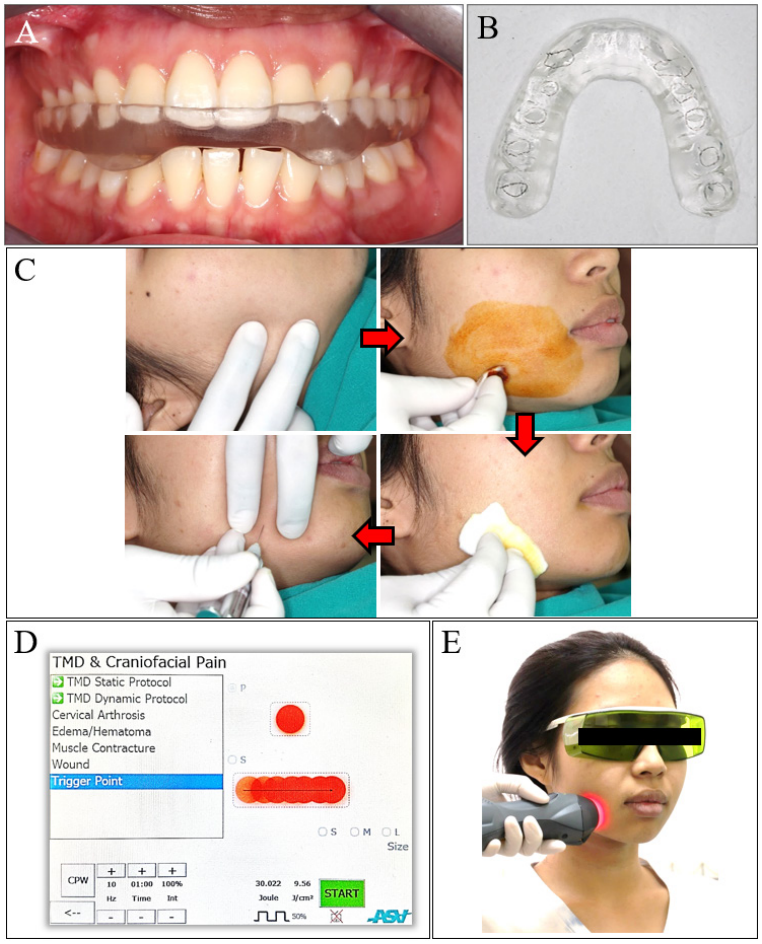

Figure 2 *Treatment modalities: A) A Michigan-type hard occlusal splint was placed on the upper arch, B) Wear facets on the occlusal splint were marked with a pencil, C) Trigger point injection technique: The trigger point was stabilized with 2 fingers. The facial skin was disinfected with iodine and 70% alcohol. A 30-gauge needle was used to inject 3% mepivacaine without epinephrine into the target trigger point. Multiple injection directions were used without withdrawing the needle from the skin, D) Laser protocol: The treatment was performed in trigger point mode with continuous pulsed wave (CPW) modulation, a frequency of 10 Hz, a duration of 1 minute, and an intensity set to 100%, and E) Low-level laser therapy applied to the trigger point at the right masseter muscle.*

The patient consistently wore the occlusal splint daily, despite significant wear on it (Fig. 2B). After 2 months, although she wore the splint every night and her pain level had decreased to 5 out of 10 in NRS (Fig. 3A), she still had muscle pain which interrupted her life. So, during this visit, she received an initial TPI, with a follow-up scheduled for 1 month later. At the 3-month follow-up, she reported a 70% reduction in pain and received a second TPI. At 6 months, she was pain-free at times and occasionally did not wear the splint but still experienced minor muscle soreness. In addition, her joint clicking sounds had disappeared on this visit (Fig. 3C). Treatment included a session of LLLT and encouragement to continue using the splint. At the 10-month follow-up, her pain level was down to 1 out of 10 on NRS (Fig. 3A), with only mild tenderness in the masseter muscles. There were no clicking sounds from TMJs (Fig. 3C), and she could open her mouth 45 mm (Fig. 3B and 4A). The occlusion had improved, with 7 pairs of teeth contacting in the intercuspal position (Fig. 4B and 4C), and no occlusal adjustment was needed.

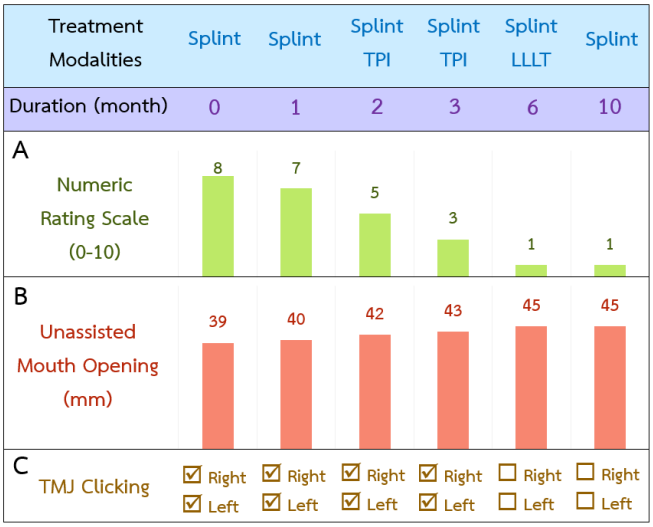

Figure 3 *Treatment outcomes: A) Numeric rating scale (pain score) reported by the patient at each visit, B) Unassisted mouth opening, measured as the interincisal distance when the patient opens their mouth without assistance, and C) Joint clicking, indicated by a marked box if the patient experiences a clicking sound.*

Figure 4 *Post-treatment: A) Measurement of unassisted maximum mouth opening using a ruler after treatment (45 mm), B) Intraoral photographs showing frontal views of dental occlusion before (top) and after (bottom) treatment, and C) Occlusal contacts measured by the thin metal foil strips (8 micrometers) in intercuspal position (ICP) before and after treatment, illustrating changes in occlusal contact distribution. Red marks indicate contact points.*

Discussion

The chronic myofascial pain in this patient is primarily attributed to unawareness of how bruxism impacts her symptoms.[18] Bruxism directly affects the masticatory muscles, leading to significantly increased muscle activity compared with unaffected individuals.[11] This dysfunction from muscle contraction can alter occlusion, and conversely, changes in occlusion can further increase masticatory muscle activity.[19] Additionally, the patient's psychological state, including depression, anxiety, and stress, exacerbates the muscle pain.[20,21] Despite previous treatments, such as acupuncture and medication, the condition of the patient condition persisted because the underlying causes and contributing factors of the masticatory muscle pain were not addressed. Therefore, it is crucial for dentists to identify and manage the diverse underlying causes of this condition in each individual.

The diagnosis of masticatory muscle pain as myofascial pain based on a detailed pain history and muscle palpation.[7, 22] The patient typically reported pain in the jaw and temple, modified by jaw movement.[7] During palpation, the patient confirmed pain location, reported similar pain, and described pain spreading within the muscle boundaries.[7] This case, with multiple sites of muscle tenderness, should be differentiated from fibromyalgia. According to the American College of Rheumatology criteria, fibromyalgia requires widespread pain in all 4 quadrants (both the left and right side of the body, above and below the waist) and tenderness in 11 or more of 18 tender points.[23, 24] Since this case involved only orofacial pain, she was diagnosed as myofascial pain, not fibromyalgia. Accurate diagnosis is essential for proper treatment.

Counseling and patient education for self-care can effectively reduce masticatory muscle pain and increase jaw range of motion.[25] The benefit of counseling and education is cost-effectiveness, reducing risk behaviors that exacerbate pain and improving treatment outcomes for patients with psychological issues.[25] This patient had suffered from chronic pain for over 2 years, leading to frustration and emotional distress. Despite multiple treatments, no significant relief was achieved, affecting her daily life. A thorough evaluation is essential, but equally important is the compassionate approach of the dentist —actively listening and understanding the concerns of the patient to develop an effective, patient-centered treatment plan. Recommendations should be tailored to address the specific problems and contributing factors of each patient.

Occlusal splint therapy is commonly used for patients with masticatory muscle pain. This treatment helps increase mouth opening, reduce pain intensity, and alleviate joint pain.[26] Occlusal splints have been shown to decrease the electromyographic activity of the masticatory muscles during rest, swallowing, and clenching.[27] This helps the muscles stay in a more relaxed state. Additionally, splint use can improve sleep quality in patients with myofascial pain.[28] Systematic reviews have demonstrated that occlusal splints offer multiple benefits and are often recommended for treating masticatory myofascial pain.[26]

Fujii *et al.* compared changes in occlusion after occlusal splint therapy between patients with and without myofascial pain.[29] The study found that the number of occluding teeth either increased or remained unchanged in both groups. Specifically, 30% of patients with myofascial pain experienced an increase in the number of occluding teeth and improved occlusion.[29] Comparing the 2 groups, patients with myofascial pain showed more significant changes in occlusion following splint therapy than those without pain. This case revealed occlusal instability as a contributing factor. Initiating treatment with occlusal equilibration instead of a conservative approach could lead to irreversible and potentially harmful outcomes. Instead, muscle pain was managed first, allowing for a re-evaluation of occlusion. This approach ultimately demonstrated that occlusal adjustment was unnecessary, emphasizing the importance of conservative management before irreversible procedures. Notably, occlusal instability improved after muscle pain was addressed, indicating that it was not the initiating factor but rather a perpetuating effect of muscle pain.

TPIs can be performed by dentists using a dental syringe to inject anesthetics directly into the trigger point. The use of anesthetics may be optional. TPIs involve administering substances such as anesthetics, botulinum toxins, corticosteroids, or even saline to inactivate trigger points, reduce muscle tension, and alleviate pain.[9,30] Okeson reported that anesthetics alone may not effectively eliminate trigger points.[16] However, he recommended using anesthetics with the injection, as they provide immediate pain relief during the procedure and aid in diagnosing the condition. After localized anesthetic injection, referred pain should also decrease.[16] Blasco-Bonora *et al.* found that TPIs in patients with bruxism and myofascial pain effectively reduced pain and improved jaw range of motion.[31] Moreover, TPI is considered the gold standard treatment for myofascial pain syndrome, effectively relieving muscle tension and pain.[15] In particular, TPI with local anesthesia has shown superior effectiveness in treating masticatory myofascial pain compared to dry needling, acupuncture, botulinum toxin-A, granisetron, and platelet-rich plasma.[9] Contraindications for TPIs include active bleeding, bleeding disorders, acute muscle tears, allergies to the injection solution, and open wounds.[32]

LLLT has gained increasing attention as a non-invasive and safe treatment modality, however, its effectiveness is uncertain.[33] Several studies support the use of LLLT to manage pain in the masticatory muscles[34,35], suggesting it can be used as an adjunct to other treatments.[36] When low-level laser is applied to the myofascial trigger point region, it enhances microcirculation within the muscles, improves the oxygen supply to hypoxic cells, and removes metabolic waste products. This process helps disrupt the muscle pain cycle. Although LLLT is widely used to manage myofascial pain and has shown effectiveness with no reported side effects[37], the high cost of laser machines makes it less accessible for general dental clinics. Moreover, further research is needed, as there is no consensus on the optimal wavelength, energy density, and treatment protocol.[37,38]

Other treatment options include soft tissue mobilization[39], ischemic compression[40], medications such as analgesics, anti-inflammatory drugs, and muscle relaxants[41], as well as acupuncture[42], TENS[43], ultrasound therapy[44], injection of botulinum toxin type A[45], and injection of platelet-derived growth factors.[46] Despite the range of available treatments, no single method has proven to be markedly more effective than others, largely due to the incomplete understanding of the pathogenesis of masticatory myofascial pain. Therefore, this case report provides insight into the effectiveness of treatments in one patient, and further studies are needed to explore these interventions in other patients.

Conclusion

Although there are various methods for treating masticatory myofascial pain, understanding the underlying causes of pain is crucial for effective treatment. Conservative approaches, including patient education, occlusal splint therapy, trigger point injection, and low-level laser therapy, have proven effective in managing chronic masticatory myofascial pain associated with bruxism.

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Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

Consent

Written informed consent has been obtained from the patient to publish this journal.

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