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CASE REPORT

Integrated approach of splint, face and full-body yoga, and smartphonebased cognitive behavioral therapy for temporomandibular disorder: A case report

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ABSTRACT

Background: Temporomandibular disorders (TMD) can result from stress, occlusal imbalance, trauma, and poor posture. Stress often triggers parafunctional habits such as clenching, leading to masticatory muscle hyperactivity, fatigue, stiffness, and pain radiating to the head and other body regions. Conservative therapies include splints, yoga, and cognitive behavioral therapy (CBT). Objective: To report the management of a TMD case diagnosed as myofascial pain with spreading and arthralgia using a combination of stabilization splint, face and full-body yoga, and smartphone-based CBT. Case Report: A 28-year-old female presented with muscle pain radiating to the head, neck, and lower back, and limited mouth opening. She had a history of clenching. DC/TMD Axis I confirmed myofascial pain with spreading and arthralgia; Axis II showed mild depression (score = 6). Treatment comprised a stabilization splint, face and full-body yoga, and smartphone-based CBT over six weeks. Post-treatment, mouth opening increased from 25 mm to 33 mm, depression score decreased to 1, and muscle tension was significantly reduced. The patient reported improved quality of life and awareness of parafunctional habits. Conclusion: A multidisciplinary approach integrating splint therapy, yoga, and smartphone-based CBT effectively reduces TMD symptoms. Splints and yoga relax muscles, while CBT enhances stress management and awareness of clenching, contributing to therapeutic success. (IJP 2025;6(2):136-141)

Introduction

Temporomandibular disorders (TMD) is a term used to describe a range of pain and dysfunction conditions affecting the temporomandibular joint (TMJ), the masticatory muscles, and associated surrounding structures. It is one of the leading causes of chronic orofacial pain.[1] TMD can significantly affect an individual's quality of life, particularly during activities such as speaking, chewing, and mouth opening. The prevalence of TMD is reported to be around 10–15% in the general adult population, with the majority of patients being women between the ages of 20 and 40.[2] The prevalence among adolescents is estimated to be approximately 27%.[3] Given its high incidence and functional impact, identifying the specific type and characteristics of TMD is crucial for establishing an accurate diagnosis.

The Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) is a widely used diagnostic framework for systematically classifying various types of temporomandibular disorders. According to the DC/TMD, TMD can be categorized into TMD-related headache (including myalgia, arthralgia, and myofascial pain), intraarticular TMJ disorders, and degenerative TMJ disorders. Among these conditions, myofascial pain is the most commonly encountered, affecting approximately 45.3% of the global population.[3] In addition to its high prevalence, individuals with TMD are at greater risk of experiencing depressive symptoms, difficulties in daily activities, and reduced quality of life. The pain associated with this condition is typically dull and persistent, making it the most frequently reported symptom. Beyond musculoskeletal pain, the disorder is also characterized by tenderness on palpation of the TMJ and masticatory muscles, as well as limited joint mobility. When the pain is not confined to the stimulated area but radiates to other muscles or regions of the body, the condition is classified as myofascial pain with spreading.[4]

The causes of TMD are multifactorial, involving a complex interaction between occlusal, psychological, individual behavioral, traumatic, and environmental factors. One factor frequently associated with the development of TMD is psychological stress, which can increase autonomic nervous system activation, leading to involuntary muscle tension such as clenching, especially during waking hours. Prolonged muscle tension contributes to TMJ dysfunction, triggering pain symptoms and limited jaw movement.[4,5]

TMD management should be individualized and comprehensive, taking into account its underlying multifactorial etiology to ensure targeted, effective, and sustainable treatment.[4] Management of myofascial pain with spreading typically involves conservative approaches, including the use of stabilization splints to position the jaw in centric relation, reduce parafunctional activity, improve occlusal load distribution, and alleviate muscle tension.[6] Additionally, physical therapies such as stretching exercises and muscle relaxation through yoga have been shown to effectively reduce muscle tension, enhance

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Table 1. Examination of pain intensity and palpationof masticatory muscle and TMJ (0= no pain, 1= discomfort, 2=pain)

Examination	Region	
	Right	Left
Temporalis	Ant : 1 Med : 0 Post : 0	Ant : 0 Med : 0 Post : 0
Tendon temporalis	1	0
Lateral pterygoid	1	0
Masseter	Superior : 2 Middle : 1 Inferior : 1	Superior : 0 Middle : 0 Inferior : 0
Regio submandibula	2	0
Sternocleidomastoideus	Posterior : 1 Anterior : 1 Klavikula : 1	Posterior : 0 Anterior : 0 Klavikula : 0
Splenius Capitis	1	-
Trapezius	1	0
Maximum mouth opening without pain (mm)	25 mm	
Maximum mouth opening with pain (mm)	28 mm	
Maximum assisted opening	33 mm	
Lateral Movement	5 mm	13 mm
TMJ Pain	1	0
TMJ noises	Open : - Close : -	Open : - Close : -
Headache	-	-
Tinitus	-	-
Static Occlusion	Right : Klas II 1/2P Angle (molar relationship) Left : Klas I Angle (molar relationship)	
Dinamic Occlusion	Canine guidance Overbite: 4 mm Overjet: 3 mm	
Midline deviation during maximum mouth opening	Deviation to the right during mouth closure	

Table 2. Treatment evaluation

Parameter	Initial Condition	2 Weeks Follow up	6 Weeks Follow up
Maximum mouth opening without pain (mm)	25 mm	28 mm	33 mm
Lateral Movement	Right : 5 mm Left : 13 mm	Right : 8 mm Left : 13 mm	Right : 11 mm Left : 13 mm
Muscle Examination			
Temporalis	Right Ant : 1	Right Ant : 1	Right Ant : 0
Tendon temporalis	Right : 1	Right : 1	Right : 1
Lateral Pterygoid	Right : 1	Right : 1	Right : 1
Masseter	Right Superior : 2 Middle : 1 Inferior : 1	Right Superior : 1 Middle : 0 Inferior : 1	Right Superior : 0 Middle : 0 Inferior : 1
	Right : 2	Right : 2	Right : 0
Regio Submandibula	Right	Right	Right
Sternocleidomastoideus	Posterior : 1 Anterior : 1 Klavikula : 1	Posterior : 1 Anterior : 1 Klavikula : 0	Posterior : 0 Anterior : 0 Klavikula : 0
Splenius Capitis	Right : 1	Right : 0	Right : 0
Trapezius	Right : 1	Right : 1	Right : 0

Figure 1. Frontal and lateral profile of the patient's face

blood flow, and improve posture, all of which contribute to alleviating TMD symptoms.[7] Although various physical and conservative therapies are effective in symptom reduction, addressing psychological factors also plays a crucial role in the onset and persistence of TMD symptoms.

Therefore, to achieve a more comprehensive management approach, cognitive behavioral therapy (CBT) has increasingly been used to help patients regulate emotional and behavioral responses that may aggravate TMD.[8] The use of app-based CBT has become a convenient treatment option, allowing patients to monitor and control jaw activity anytime and anywhere. One available application, BRUXISM + Fix Teeth Grinding, has proven effective in controlling and reducing clenching behavior. A multidisciplinary app- roach that addresses occlusal, muscular, and psychological factors is essential for achieving optimal outcomes.

In this case, the management of myofascial pain with spreading was conducted using a stabilization splint, physical 'exercises including face and full-body yoga, and appbased CBT via BRUXISM + Fix Teeth Grinding.

Case Report

Case Presentation

A 28-year-old female patient presented to RSGM USU with a primary complaint of jaw pain and discomfort in the preauricular region, neck, shoulder, and right arm, radiating to the lower back, persisting for the past two weeks. The patient reported no history of TMJ clicking or audible joint sounds. She also disclosed a parafunctional habit of forceful jaw clenching during periods of psychological stress, which was evidenced by bigonial widening and horizontal alveolar bone resorption at the cervical one-third of nearly all mandibular teeth figure 3.

Prior to initiating treatment, a comprehensive examination was conducted to assess the patient's complaints, including extraoral and intraoral evaluation, palpation of the masticatory muscles and TMJ, and panoramic radiography.

Closed Mouth: Right: mandibular condyle positioned in the glenoid fossa; Left: mandibular condyle positioned in the glenoid fossa o Open Mouth: Right: mandibular condyle positioned anterior to the articular tubercle; Left: mandibular condyle positioned at the summit of the articular eminence.

The mouth opening pattern is less than the normal range (40 mm), with a rightward deviation observed during opening.

Myofascial Pain with Spreading and Arthralgia. Etiolog y: Parafunctional habits such as clenching due to stress. Clinical features: Myofascial pain with spreading. Pain on palpation of multiple muscles (temporalis, temporalis tendon, masseter, sternocleidomastoid, lateral pterygoid, submandibular region) involving more than two muscles, with pain not triggered at a single point. Athralgia; Pain elicited on palpation of the right intra -auricular region. AXIS I; TMD pain screening score: 6 indicating presence of TMD (a score >3 indicates presence of TMD). AXIS II; Chronic Pain Scale: Grade III (moderately limiting) Pain Intensity (CPI) 60 (point =3) high intensity pain. Pain-related limitation 50 (point =2). Jaw Function Limitation Scale: Mastication

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Figure 2. Intraoral examination

Figure 3. Panoramic radiograph

Figure 4. Temporomandibular joint radiograph

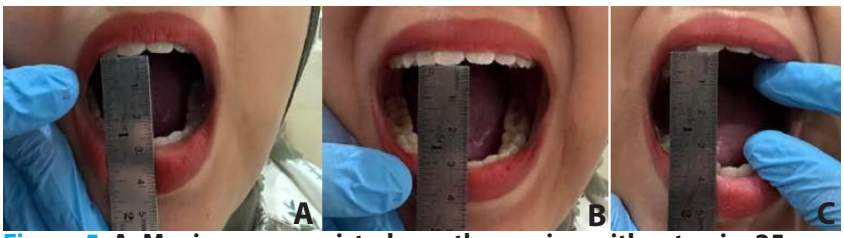

Figure 5. A. Maximum unassisted mouth opening without pain: 25 mm, B. Maximum unassisted mouth opening with pain: 28 mm, C. Maximum assisted mouth opening: 33 mm (soft end feel)

Figure 6. A. Working model , B. Survey on model

limitation score: 2.6 2.22 ± 0.13 (chronic TMD). Mobility limitation score: 3 2.22 ± 0.13 (chronic TMD). Verbal and non, verbal communication limitation score: 1.75 0.72 ± 0,10 chronic TMD; Patient Health Questionnaire. Depression (score 6) mild depression. GAD – Anxiety (score 4) <6 indicates mild anxiety. Patient Health Questionnaire. Physical symptoms (score 13) A score of 6–9 indicates the presence of severe physical symptoms. Oral Behavior (Score 26) 25-62 indicates that the patient's oral behaviors are contributing factors to TMD.

Based on a comprehensive examination, the patient was diagnosed with myofascial pain with spreading and arthralgia, atributed to psychological predisposition and the parafunctional habit of clenching, which contributed to the development of TMD. The treatment plan included fabrication of an upper jaw stabilization splint, face and fullbody yoga for muscle relaxation and postural improvement, psychological education for stress management and elimination of parafunctional habits contributing to TMD symptoms, and the use of the BRUXISM+Fix Teeth Grinding application to monitor jaw activity. The patient's prognosis is considered good due to her cooperative attitude, willingness to undergo treatment, and awareness of the need to modify harmful habits.

During the first visit, both subjective and objective examinations were conducted, followed by Phase I definitive treatment. This included patient education to explain the psychological mechanism underlying her condition, specifically how stress triggers clenching and its effects on the masticatory muscles, as well as the subsequent spread of discomfort to other body regions. The stages of treatment and the primary goal—relief of muscle and TMJ pain—were also explained.

Subsequently, fabrication of the stabilization splint began with anatomical impressions figure 6A, calculation of the vertical dimension of occlusion (VDO = 70.8 mm) and vertical dimension at rest (VDI = 74.9 mm), allowing the determination of the patient's freeway space, measured at 4 mm. After obtaining the working model, a survey was conducted on the model to establish the optimal tooth contour height for the splint figure 6B.

During the second visit, a facebow transfer was performed, and the centric relation (CR) position was determined using a 4 mm leaf gauge. The patient was instructed to move the mandible forward and then backward, repeating this movement two to three times. When the mandible reached its most posterior position, the patient was asked to bite lightly—just enough to hold the leaf gauge in place—and maintain this position for 15 minutes. This mandibular position was considered the centric relation. If no discomfort or pain was reported in the TMJ, the fabrication of the stabilization splint proceeded.

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Figure 7. A. Transfer facebow, B. Centric relation determination using a leaf gauge

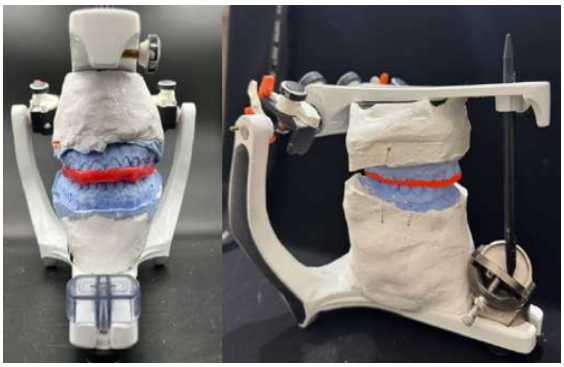

Figure 8. Wax-up result of the splint

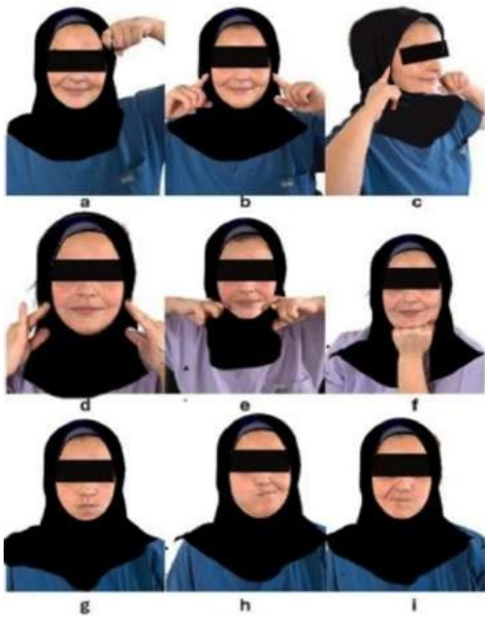

Figure 9. Face yoga movements

Figure 10. Full body yoga

Subsequently, a wax-up was performed with a 4 mm anterior height increase and a canine guidance occlusal scheme. This was followed by a try-in on the patient, and the process was completed with packing and polishing of the splint.

Home treatment continued with face and full-body yoga exercises, performed three times per week for six weeks, with each movement repeated 10 times. The facial yoga exercises were performed bilaterally to enhance overall tightening and relaxation of the facial and neck muscles. The facial yoga movements were as follows figure 9: Bend the index fingers and place them on the forehead, applying pressure to the temporal muscle area. The patient was instructed to massage the temporalis muscles using the index and middle fingers. The patient was asked to massage the masseter muscles using three fingers. The patient used fingers to create tension in the neck muscles. The patient was instructed to press the tongue against the roof of the mouth while raising the chin to engage the neck muscles. The patient was asked to tilt the head to the right and left to stretch the neck muscles, holding each position for a count of 10.

Full-body yoga was conducted under the guidance of a certified yoga instructor, three times per week for six weeks. Hatha yoga was employed, consisting of breathing exercises, warm-up routines, relaxation techniques, yoga asanas to improve posture, and meditation focused on breath control. Each session lasted approximately one hour, with particular emphasis on combined movements involving the upper extremities and neck, along with breathing exercises. During the warm-up phase, muscles were stretched through targeted exercises designed to enhance flexibility and release tension.

As an adjunctive therapy, the patient was instructed to download the BRUXISM+Fix Teeth Grind application to monitor jaw activity and increase awareness, thereby improving jaw control. The app provides hourly notifications (adjustable) to remind the patient to keep the jaw relaxed. The patient was also asked to record the jaw condition in the app (relaxed, grinding, or touching), allowing the application to maintain a log of jaw activity.

During the third visit, the stabilization splint was inserted. Splint stability and retention were checked, and centric and eccentric occlusion were evaluated using articulating paper, followed by selective grinding of any traumatic areas. Vertical dimensions were measured before and after splint insertion. The occlusal height of the splint was set according to the patient's freeway space, which was 4 mm. The patient was instructed to wear the splint 24 hours a day, except during meals, with a follow-up visit scheduled one week after insertion.

Follow-up visits were conducted 1–2 weeks after splint insertion to assess the patient's complaints,

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Figure 11. BRUXISM+Fix teeth grind notification

Figure 12. A. During occlusion, B. Right lateral movement, C. Left lateral movement

muscle condition, and mouth opening. During these visits, any issues related to splint placement, including traumatic occlusion, were evaluated using articulating paper. Additional follow-ups were scheduled two weeks after insertion to reevaluate the patient's symptoms from the first follow-up and continued until the complaints resolved.

Evaluation of outcomes at two and six weeks demonstrated improvements in mouth opening, a reduction in depression levels, and a significant decrease in muscle tension, as summarized in the table below.

Discussion

Temporomandibular disorders (TMD) in patients are often characterized by pain in the masticatory muscles and temporomandibular joint (TMJ), necessitating accurate subjective and objective examinations, diagnosis, and identification of underlying etiology to establish an appropriate treatment plan.[4] Myofascial pain with spreading is a muscular pain condition characterized by active trigger points that not only cause localized pain but also radiate to other regions involving more than two fasciae. One of the primary causes of this condition is the parafunctional habit of clenching, often triggered by psychological stress. During stress, sympathetic nervous system activity increases, elevating muscle tone and inducing repeated, involuntary contractions of the masticatory muscles. This parafunctional activity results in local ischemia due to capillary compression, leading to the accumulation of chemical mediators such as serotonin, bradykinin, prostaglandins, and substance P, which irritate nerve endings and induce pain. This process facilitates the formation of myofascial trigger points that can spread to surrounding muscles via peripheral and central sensitization mechanisms.[3-5]

Studies by Karamat (2022) and Slade (2013) have demonstrated that TMD patients with mild to moderate psychological burden can achieve favorable treatment outcomes through education and behavioral management.[9,10] TMD is a complex condition, and therefore, a multimodal therapeutic approach is recommended. In this case report, a combination of stabilization splint therapy, physical exercises, and cognitive behavioral therapy (CBT) was employed. The stabilization splint provides mechanical unloading of the temporomandibular joint and masticatory muscles, reducing parafunctional activity and intra-articular pressure, which in turn promotes muscle relaxation and decreases mechanical resistance during mouth opening.[1,6] In addition to occlusal intervention, physical exercises play a critical role in alleviating neuromuscular tension and improving mandibular function in TMD patients.

In this patient, TMD-related pain was primarily localized in the masticatory muscles, neck, and lower back. Therefore, postural and body relaxation exercises were recommended. One commonly practiced form of body relaxation is yoga. A study by Atilgan (2024) demonstrated that yoga can be beneficial in managing myofascial pain in TMD patients.[11] This effect is further enhanced through face and full-body yoga, which target the musculoskeletal system and the autonomic nervous system; postural stretching and breath regulation have been shown to increase parasympathetic dominance and peripheral blood flow, thereby reducing the accumulation of pain mediators such as substance P and bradykinin.[11,12]

Furthermore, yoga postures that focus on stretching the neck, upper back, and facial muscles can help release tension in areas commonly associated with trigger points in TMD patients.[12] Controlled breathing techniques have also been shown to reduce stress hormone levels, such as cortisol, which indirectly decreases parafunctional habits like clenching or bruxism that aggravate myofascial pain. Several studies have also indicated that yoga promotes positive neuroplasticity, helping to reduce central sensitization, which underlies the spread of pain. Thus, yoga not only addresses peripheral symptoms such as muscle pain but also contributes to the modulation of pain perception at the central nervous system level.[11] While different physical and conservative treatments can effectively reduce symptoms, managing psychological factors is also essential, as they significantly influence the development and persistence of TMD symptoms which can be effectively targeted through smartphone-based

cognitive behavioral therapy (CBT).

Smartphone-based CBT interventions play a role in modifying patients' psychological factors and habits, including increasing awareness of parafunctional activities such as clenching.[4,5] The American Academy of Craniomandibular Disorders states that CBT is an important adjunctive treatment for TMD, as care cannot rely solely on brief dental consultations.[13] Therefore, patients need to learn to manage their condition independently. According to Sverdlov (2018), CBT helps TMD patients recognize pain, parafunctional activities such as clenching, and excessive muscle activity. Its primary goal is to encourage patients to voluntarily avoid or limit oral activities, thereby exerting a therapeutic effect on the underlying causes of the disorder.[14] The key to successful CBT is active and voluntary participation by the patient, along with the belief that adherence to CBT will reduce pain. Moreover, smartphone-based applications facilitate care anywhere and can provide feedback based on accumulated and analyzed data.[13,15]

Conclusion

A multidisciplinary approach integrating stabilization splint therapy, face and full-body yoga, and digital cognitive behavioral therapy (CBT) using the BRUX-ISM+Fix Teeth Grind application has been shown to effectively reduce pain and improve mandibular function in TMD patients with myofascial pain with spreading and arthralgia. The innovation in this case lies in the application of a digitally integrated conservative therapy that addresses both physiological and psychological aspects through self-monitoring of jaw activity and parafunctional habits. This model introduces a novel paradigm in TMD management, emphasizing multidisciplinary collaboration, personalized therapy, and the potential to serve as a prototype for digital-based conservative programs in prosthdontics for TMD and orofacial pain rehabilitation.

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