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OCCLUSAL SPLINTS (NIGHT GUARDS) FOR MANAGING SLEEP BRUXISM: CASE STUDY

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Abstract:

Background: Sleep bruxism is a frequent disorder characterized by the involuntary grinding or clenching of teeth while sleeping. It can lead to a variety of dental and orofacial issues. **Aims:** The current study is a short-term case study (two months) that aims to assess the effectiveness of occlusal splints in managing sleep bruxism. **Material and Methods:** The selected case was a 34-year-old female who presented to private clinics in Zawia City (Ser Al Jamal Clinic) with symptoms of tooth grinding (bruxism). The patient had been suffering from temporomandibular joint (TMJ) disorder, headaches, and grinding teeth every night for many years. The occlusal splint (night guard) was fabricated from a thermoplastic material with the use of a vacuum machine. The case underwent clinical assessments before and after utilizing occlusal splints with questionnaires for the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) and the sleep assessment questionnaire (SAQ). In addition, the patient uses the visual analog scale to assess the severity of muscle pain and headaches daily. **Result:** The study assessed the effectiveness of an occlusal splint (night guard) in treating bruxism symptoms in patients. The patient was instructed

to use the guard daily for two months, and their symptoms were assessed using a visual analog scale. After treatment, the patient reported reduced nocturnal bruxism and improvements in muscle pain and sleep breathing. Overall, the occlusal splint showed promising results in alleviating bruxism symptoms. **Conclusion:** Soft occlusal splints effectively control bruxism, but correct diagnosis, a treatment plan, and multidisciplinary monitoring are necessary due to the multifactorial etiology.

Keywords: sleep bruxism, nocturnal, clenching, occlusal splint (night guard), temporomandibular disorders.

Introduction

Bruxism is a common pathological activity of the stomatognathic system, characterized by teeth grinding and clenching during parafunctional movements. This condition can lead to various issues, such as tooth wear, orofacial pain, and temporomandibular disorders [1]. The etiology of bruxism is multifactorial, involving systemic, psychosocial, neurophysiological, structural, hereditary, and stress-related factors [2].

Bruxism is prevalent among children due to immature masticatory neuromuscular growth and development, resulting in improper and painful occlusion of upper and lower teeth during eruption [3]. The prevalence of bruxism in children and adolescents ranges from 13.5% to 33%, with girls being more likely than boys to acquire temporomandibular disorders (TMD) at any age [4]. Early detection and treatment of TMD symptoms, which worsen with age, is critical for preventing advancement and preserving permanent teeth and the stomatognathic system [4-5].

Various therapies are available for treating bruxism, including occlusal splints made of acrylic or silicone [6]. Additionally, the occlusal splint with Vibratory Stimulation (VibOS) has shown promising results in managing pain related to TMD [6-7]. Early detection and treatment of bruxism symptoms are crucial for preventing further complications and preserving the stomatognathic system [8].

Therefore, Sleep bruxism, a condition causing involuntary grinding or clenching of teeth during sleep, is a significant issue. The absence of effective management strategies has led to the need for alternative solutions. This case study investigates the effectiveness of occlusal splints, or night guards, in managing and controlling sleep bruxism. The proposed study of short term is to evaluate the signs and symptoms of bruxism before and after using occlusal splints. The soft splint-based material is chosen for its flexibility, protection of permanent teeth, and resistance to drilling. The study purposes to provide valuable insights into the potential benefits of using night guards as a coping mechanism for sleep bruxism.

Material and Methods:

1. Patient

History

A female has been experiencing nighttime tooth grinding, causing jaw pain, and teeth wear for at least ten years.

1. Clinical Case:

A 34-year-old female patient with recurrent facial pain and clenching teeth at night was diagnosed at a private clinical in Zawia City. She had no significant medical history and had no other oral habits. The patient was well-built, had a normal gait, straight posture, and a mesomorphic body type. She had 26 teeth in her oral cavity and showed nasal breathing and an

adult swallow pattern. A night guard appliance was selected for treatment, fabricated using an alginate impression and dental stone, and fabricated for the maxillary arch (figure 1a-b).

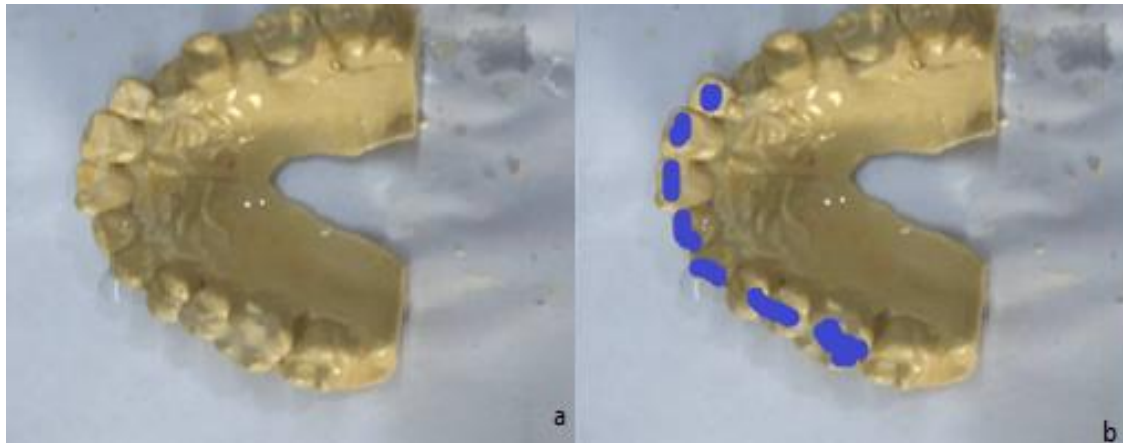


Figure 1: a. Occlusal Facets. b. (blue marker) occlusal facets

2. Treatment Plan:

2.1 Diagnosis:

Clinical examination at Ser Jamal clinic revealed a mean maximum mouth opening of 40.12 ± 6.5 mm, and the RDC/TMD questionnaire was used for differential diagnosis [9]. The questionnaire consists of two parts: a history section focusing on patient history, pain, and symptoms, and a clinical examination involving mandibular movements, noises, and muscular palpation. The extraoral examination involves Axis I RDC/TMD tests to check for muscle and joint pain, measure the maximum aperture of the mouth, analyze opening and closing patterns, and use a stethoscope for auscultation. The procedure also checks for muscle pain and articulation, ultimately leading to the diagnosis of TMD of muscular origin or joint.

The patient underwent an intra-oral examination, found no carious lesions, periodontal disease, or occlusal problems, and completed a questionnaire for diagnostic criteria for RDC/TMD.

The Axis II of the RDC/TMD was utilized to assess the impact of behavioral and psychosocial factors on TMD treatment, including chronic pain, depression, physical symptoms, and jaw

movement limitations [9].

The Sleep Assessment Questionnaire (SAQ) has 19 questions, with the highest sensitivity and specificity at 16, dividing individuals without and with sleep disorders [10].

2.2. Laboratory procedures: Occlusal Splint (night guard) Fabrication:

A soft occlusal splint (night guard) made from flexible rubber material with a thickness of 3 mm is recommended for mild to moderate stridor patients, providing comfort and cushioning against tooth compressive forces.

2.2.1. The fabrication of an occlusal splint:

a. The dentist taken the impression of the patient's teeth by using stock plastic tray and alginate impression material (figure 2).



Figure 2: Alginate Impression of the patient.

b. A master cast of a patient's teeth was fabricated by pouring the obtained patient's teeth impression with dental stone. And then the model was trimmed and shaped accurately to represent the patient's teeth and gums.

c. The occlusal splint (a night guard) was made by a thermoplastic (silicon) sheet, which was heated in a vacuum machine (Easy-Vac) to create a night guard. The heated sheet then placed over the model, creating a tight fit to capture its shape (figure 3)

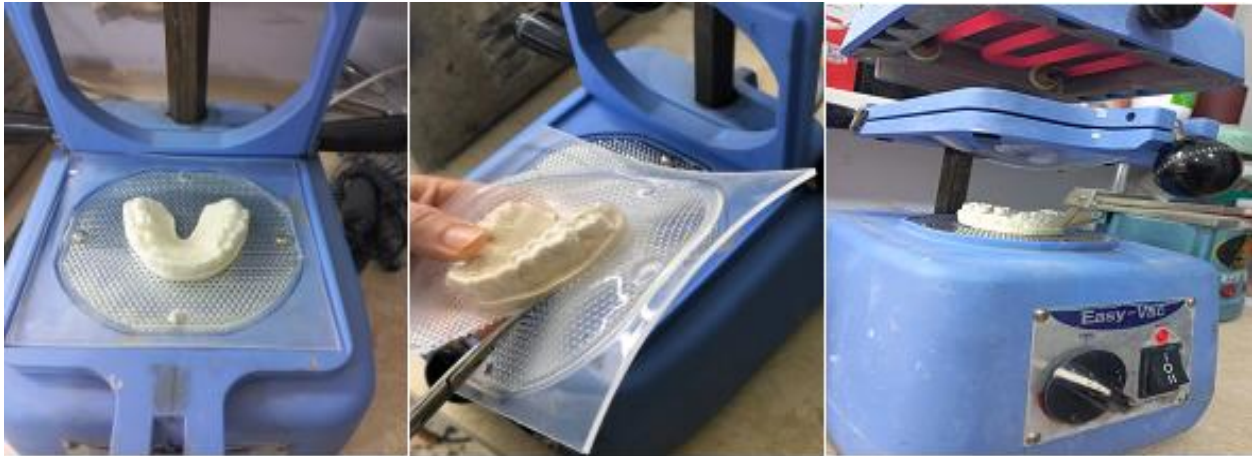


Figure 3: Modified maxillary cast within vacuum-forming machine and procedure.

d. After vacuum forming, the sheet is cooled to harden, excess material is trimmed, adjustments are made for fit and comfort, rough edges are smoothed, and the night guard is fitted over the teeth without discomfort or bite interference (figure 4).

Figure 4 Night Guard Appliance Fabricated on Maxillary Arch



Results:

The patient was instructed to use a night-guard device daily for 2 months, note snoring, and

assess muscle pain and severity of headache using a visual analogue scale which rated with five degrees of severity.

The indications and symptoms prior to therapy with occlusal splints (Night Guard) are:

During the palpation examination, the patient reported mild pain in the masseter muscle motor end plate from both sides. There were no crackles or pops during the opening and closing movements. In the extension of the vertical movement, the patient experienced no pain in the TMJ but suffered pain in the masseter muscle (pain in the front of the ear) on both sides, including the maximum mouth opening, with or without assistance. The patient's occlusal facets were observed during further examination, indicating attrition (Figure 1). Following a thorough history and clinical examination, bruxism was diagnosed. The patient experienced insomnia, long movements during legs and arms, and difficulty breathing at night due to mouth breathing, as reported in the RDC/TMD questionnaire.

The patient met grade II criteria for chronic pain graduation, including moderate pain intensity. Pain intensity features over 50 and less than 3 inability points. The patient with sleep disorders was identified using the Sleep Evaluation Questionnaire (SAQ).

The indications and symptoms following therapy with the occlusal splints (Night Guard) are:

The patient experienced significantly reduced nocturnal bruxism after daily use and full board for 2 months but needed to change the occlusal splint due to attrition. The visual analog scale notes indicate that the individual still reported pain in the masseter muscle, although it was less intense than when they were before treatment. After treatment, palpation tests showed a decrease in

sensitivity in the masseter muscle. According to the Sleep Assessment Questionnaire (SAQ), the patient observed improvements in breathing during sleep.

Discussion:

Bruxism and temporomandibular are prevalent in adolescents and children, requiring early diagnosis and intervention to prevent progression and potential consequences like damage to the stoma, academic performance, chronic pain, and systemic diseases [1]. Bruxism treatment has been the subject of various therapies, including both single and combined methods. The present study did not utilize the proposed tooth restoration treatment due to its lack of impact on vertical dimension, function, or aesthetics.

However, Gao (2019) suggested that various treatments have been proposed, including tooth restoration using composite resin hybrids [11]. According to Gupta (2010), restorative methods can be used in appropriate circumstances to restore the vertical dimension [12].

In the current study, the use of an occlusal splint resulted in reduced headache complaints and significantly enhanced mouth breathing in the short term (2 months), similar to Giffoni (2015) [8]. Occlusal silicone splints have shown short-term benefits in reducing headaches and improving mouth breathing, but its long-term effectiveness remains unclear.

Torii and Chiwata (2010) proposed that occlusal adjustment is done to eliminate premature contacts that could harm the TMJ, with a focus on centric occlusion and centric relation. The goal of occlusal adjustment is to enhance occlusion and decrease premature contacts, thus preventing abnormal jaw movements, but it is a permanent procedure that should be approached with caution [13].

Pettitt et al. (2022) suggest that systemic therapies, such as medication and medical procedures, may also be considered for temporary relief, while psychotherapy has been suggested as a beneficial treatment for anxiety and guilt improvement in young children with bruxism. Psychological factors, such as stress level and personality type, have been linked to the development of bruxism [14].

Gomes et al. (2014) suggest counseling and self-awareness techniques are recommended to help manage bruxism symptoms. Different therapies, such as complete ram and low-intensity laser treatment, have shown varying degrees of success in increasing mouth opening capacity [15].

However, the most common treatment for bruxism in dentistry is the use of an occlusal splint due to its reversible nature, which does not alter jaw growth and development. Macedo et al. (2007) suggest that occlusal splint usage should commence early in therapy, as long-term use does not effectively eliminate the nocturnal bruxism habit [16]. Karakis et al. (2014) discovered that after post-pavement plaque removal in bruxism patients, the nocturnal activity of the masseter muscle increases to pretreatment levels [17].

Jones (1993) reported a 22-month headache alleviation from a girl using an occlusal splint, possibly due to neuromuscular balance achieved with an operating system [18]. Regarding the case, it was reported in the current work that the use of an occlusal splint reduces headaches. Soft splints provide pain relief and prevent future tooth damage by absorbing bite force, preventing abrasion, delayed eruption, and enamel malformation, especially in hyperactive patients [19].

Conclusion

The occlusal splint is a reversible treatment method that effectively controls bruxism by creating a barrier between the upper and lower teeth. It reduces teeth grinding and clenching, protects tooth enamel, alleviates jaw pain and headaches, improves sleep quality by reducing grinding sounds and discomfort, and prevents further dental issues like tooth fractures, gum recession, or temporomandibular joint disorders. This treatment method offers numerous benefits for patients with bruxism.

The study suggests that the night guard effectively controls bruxism in adults but should only be used when the masticatory system's adaptive capacity is exceeded. The literature lacks information on long-term treatment efficacy for bruxism, which is not entirely eradicated but can be controlled in young children with maturity and tooth eruption.

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