

## Management of bruxism associated with temporomandibular disorder: case report

## Manejo do Bruxismo associado a Disfunção Temporomandibular: relato de caso

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### ABSTRACT

Studies have found the association between episodes of bruxism and the presence of signs and symptoms of temporomandibular disorder (TMD). The aim of the present study was to report the diagnosis and palliative therapy of bruxism associated with TMD. Patient, 23 years old, male gender, presented at dental clinic, complaining of pain in the temporomandibular joint on the left side and alteration of the form of the anterior teeth. During the anamnesis it was documented that this symptom was recurrent and reported the habit of grinding teeth. The clinical examination observed discrepancy between the centric relation and the maximum habitual intercuspation, unsatisfactory protrusive guide, presence of wear facets, clicking and mandibular deviation during mouth opening. The Research Diagnostic Criteria for Temporomandibular Disorders (RDC / TMD) questionnaire was applied to diagnose TMD. By means of specific algorithms this disorder was classified as myofascial pain, disc displacement with reduction and osteoarthritis, all affecting the left side. Thus, it was proposed the assembly of the models in semi-adjustable articulator for occlusal mapping and waxing diagnosis, then the occlusal adjustment by selective wear and material addition was executed. After this procedure, the occlusal splint was installed as a palliative therapy for bruxism. This case report suggests that the dental approach by means of occlusal adjustment and occlusal splint, in a patient diagnosed with bruxism and temporomandibular disorder, reduces the signs and symptoms that affect the components of the Stomatognathic System.

**Indexing terms:** Bruxism. Occlusal adjustment. Occlusal splints. Temporomandibular joint dysfunction syndrome.

### RESUMO

*Estudos tem encontrado a associação entre os episódios de bruxismo e a presença dos sinais e sintomas de disfunção temporomandibular (DTM). O objetivo do presente trabalho foi relatar o diagnóstico e terapia paliativa do bruxismo associado à DTM. Paciente, 23 anos,*

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*gênero masculino, apresentou-se à clínica odontológica, queixando-se de dor na articulação temporomandibular do lado esquerdo e alteração da forma dos dentes anteriores. Durante a anamnese foi documentado que esse sintoma era recorrente e relatado o hábito de ranger os elementos dentais. No exame clínico observou-se discrepância entre relação cêntrica e máxima intercuspidação habitual, guia protrusiva insatisfatória, presença de facetas de desgaste, estalido e desvio mandibular durante o movimento de abertura bucal. O questionário Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) foi aplicado para diagnosticar a DTM. Por meio de algoritmos específicos essa desordem foi classificada como dor miofascial, deslocamento de disco com redução e osteoartrite, todos acometendo o lado esquerdo. Desta forma, foi proposto a montagem dos modelos em articulador semi-ajustável para mapeamento oclusal e enceramento diagnóstico. Em seguida o ajuste oclusal por desgaste seletivo e acréscimo de material foi executado. Finalizado esse procedimento, a placa estabilizadora da oclusão foi instalada como terapia paliativa para o bruxismo. Esse relato de caso sugere que a abordagem odontológica por meio do ajuste oclusal e placa oclusal, em paciente diagnosticado com bruxismo e disfunção temporomandibular, reduz os sinais e sintomas que afetam os componentes do Aparelho Estomatognático.*

**Termos de indexação:** *Bruxismo. Ajuste oclusal. Placas oclusais. Síndrome da disfunção da articulação temporomandibular.*

## INTRODUCTION

Bruxism has been defined as an oral habit characterized by involuntary clenching (centric bruxism) and/or grinding the teeth (eccentric bruxism). This habit can manifest itself during sleep, named sleep bruxism (SB) or wakefulness [1]. In addition, it has been proposed that bruxism can be classified as possible (cases in which the diagnosis is made through self-report and clinical examination) or definitive (cases in which the diagnosis is made through clinical examination associated with polysomnography) [2].

Studies report that university students are a more vulnerable group to trigger SB [3,4]. This fact is related to the irregular pattern of sleep, in other words, changes in sleep cycles. Moreover, the accumulation of extracurricular activities, related preferences to sleeping time and waking time can be conflicting, exposing these individuals to diverse situations of stress that can also affect the quality of sleep [5].

Another relevant factor is the association between bruxism and temporomandibular disorder (TMD) [4,6]. The TMD is a set of alterations of the craniofacial region involving the muscles, the temporomandibular joint and related structures [7]. About 37.5% of the population presents signs or symptoms associated with that dysfunction, affecting mostly the female gender. This disorder has multifactorial etiology [8] and among these factors are, psychological changes (stress and anxiety), postural [9], systemic abnormalities (articular disc abnormalities) and the presence of occlusal overload and occlusal interference.

Although the cause-effect relationship has not yet been defined, studies evidence positive correlation between the parafunction and signs of TMD [10]. In this context, the aim of the present study was to report the diagnosis and palliative therapy of bruxism associated with temporomandibular disorder.

## CASE REPORT

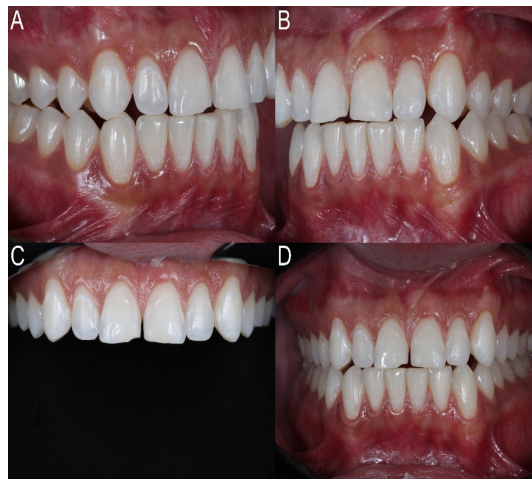
A 23-year-old male patient sought a dental clinic at Morgana Potrich College – FAMP (Mineiros, Goiás – Brazil), complaining of pain in the temporomandibular joint of the left side and alteration of the shape of the superior anterior teeth (figure 1).

In anamnesis was reported that this symptomatology was current and had started 6 years ago. When questioned about the intensity of pain, by the Visual Analogue Scale (VAS), he quantified it on 7. This symptom was recurrent, well localized and intensified in the morning. Besides that, reported the habit of grinding teeth. During the examination of muscle palpation, no painful was evident. However, he presented with a left click and mandibular deviation during the mouth opening. In the intraoral examination wear facets on teeth 13, 23, 33, 43 e 46 were observed.

When performing mandibular manipulation, a discrepancy between the centric relation (CR) and maximal habitual intercuspidation (MHI) was observed. In the left and right lateral movements (figures 2A and 2B), group function was noted. Both with absence of occlusal interference. In the protrusion movement, the patient did not present a functional protrusive guide (figures 2C and 2D).



**Figure 1.** Frontal view of the oral cavity.

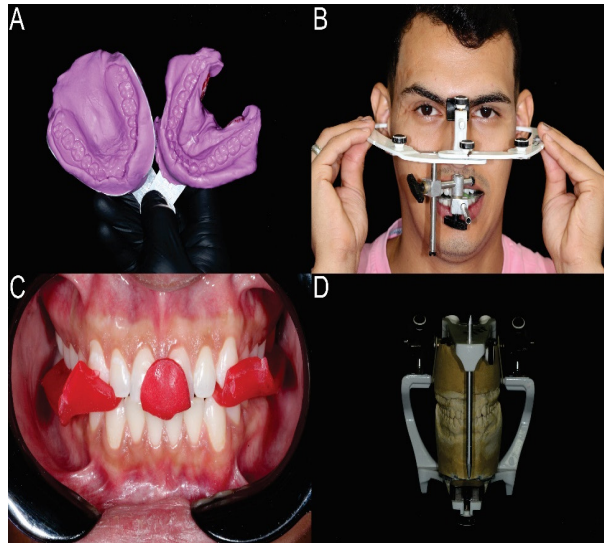


**Figure 2.** View of right laterality (A) and left laterality (B) movement; (C) Presence of wear facet; (D) Unsatisfactory anterior guide.

To obtain the differential diagnosis of TMD, the questionnaire Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) [11] was applied. This questionnaire is composed of two axes, being the first one related to the patient's history, presence of pain and other signs and symptoms correlated with TMD. The second part consists of a clinical exam that includes verification of amplitude and deviation during mandibular movements, besides registering the occurrence of noises on the temporomandibular joints when presents and the execution of muscular palpation. After the questionnaire filling and by means of specific algorithms it was possible to classify the patient with a temporomandibular disorder in myofascial pain, disc displacement with reduction and osteoarthritis, all affecting the left side.

The patient also was submitted to an orthodontic evaluation and there was no need to use an orthodontic appliance. Based on anamnesis and clinical findings and after the signing of the Informed Consent Term, it was proposed mounting of the models in semi-adjustable articulator (SAA) for occlusal mapping and occlusal adjustment, restoration in composite resin of teeth 12, 11, 21, 22, 33, 43 and 46 and installation of the occlusal splint due to the presence of self-reported bruxism and its signs and symptoms correlated.

Initially, the mold with alginate (Hidrogum 5 Zhermack, Badia Poesine, Italy) and confection of the study models with type III plaster (Asfer, São Paulo, São Caetano do Sul, Brazil) were obtained (figure 3A). For the assembly of the upper model in articulator the facial bow and bite fork were used (4000-S Bio-art, São Paulo, São Carlos, Brazil), with the purpose of obtaining the intercondylar distance and the inclination of the occlusal plane (figure 3B).



**Figure 3.** SAA mounting. (A) Obtaining the molds; (B) Registration for mounting the upper model; (C) Registration for mounting the lower model; (D) SAA Mounted Models.

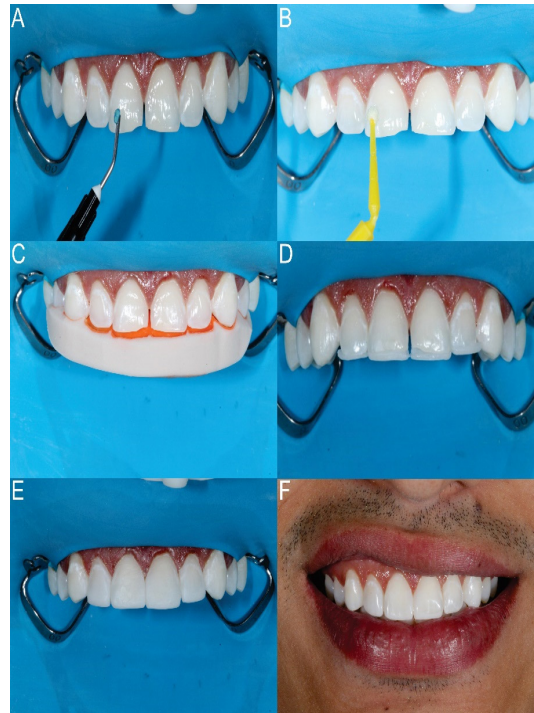
In the assembly of the lower model, the Lucia jig [12] was made, with the functions of desoccluding the posterior teeth, deprogram the neuromuscular activity avoiding occlusal interferences and promote the muscular relaxation to facilitate the manipulation of the mandible in CR. The mandibular position was recorded in Lucia jig by means of chemically activated acrylic resin (Red Lay, São Paulo, Pirassununga, Brazil). Subsequent registration of the posterior contacts was obtained with wax 7 (Newwax 7, Rio de Janeiro, Quintino, Brazil) (Figure 3C). The figure 3D represents the finalization of the models' assembly for diagnostical purposes.

Once the occlusal mapping was completed in SAA, the adjustment was initiated clinically with diamond drill 3118F (KG Sorens São Paulo, Cotia, Brazil) and carbon paper (Accufilm Red/Black, Parkell INC, USA).

To reestablish the protrusive guide and aesthetic of the anterior teeth (12, 11, 21, 22, 33 e 43), the occlusal adjustment was chosen by addition. Initially, prophylaxis was performed with a pumice stone (Lysanda, São Paulo, Vila Prudente, Brazil), rubber cup (Microdont, São Paulo, São Paulo, Brazil) and Robinson brush (Microdont, São Paulo, São Paulo, Brazil). Subsequently the color selection was performed (XWB, Z350 XT 3M, São Paulo, Sumaré, Brasil). Then, the modified absolute isolation was made with 0 and 00 staples (Golgrand, São Paulo, São Caetano do Sul, Brazil) and rubber cover (Madeitex, São Paulo, São Jose dos Campos, Brazil), to initiate the restorer protocol. The conditioning with phosphoric acid 37% (Condac37 FGM, Joinville, Santa Catarina, Brazil), was applied for 30 seconds in the dental enamel (figure 4A), washed with water jet, followed up by the moisture management (Scott, Texas, Dallas, USA). Subsequently, two layers of conventional adhesive were applied (figure 4B) (Single Bonde 2 3M, São Paulo, Sumaré, Brazil) and photoactivated only the second layer for 20 seconds each element with curing light (Schuster Emitter D, Rio Grande do Sul, Santa Maria, Brazil). The increments of composite resin (XWB, Z350 XT 3M, São Paulo, Sumaré, Brazil) were inserted on the incisal face on elements 12, 11, 21 e 22 (Figures 4C, 4D and 4E). After the insertion, each increment was light cured for 40 seconds. After finalized this step, the restorations were adjusted in occlusion centric relation.

Then, the polishing was realized with polishing tips (Enhance, Dentsply, Rio de Janeiro, Petrópolis, Brazil) and flexible Sof-Lex discs (3M-ESPE, St Paul, MN, USA), on intermittent movements (figure 4F). These steps were also adopted for the restoration of element 46.

The occlusal adjustment was finalized after the elimination of the difference between CR and MHI, removal of premature contact, presence of uniform bilateral occlusal contacts on centric movements (figures 5A and 5B) and presence of anterior guide (figure 5C and 5D).



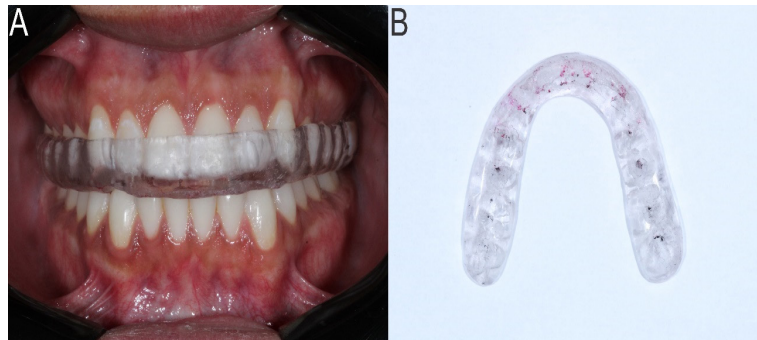
**Figure 4.** Restorative Protocol. (A) Application of phosphoric acid 37%; (B) Adhesive system application; (C, D and E) Insertion of composite resin; (F) Restoration finished.



**Figure 5.** Occlusal adjustment completed. (A and B) Uniform and bilateral occlusal contacts; (C and D) Presence of protrusive guide.

To make the occlusal splint in acrylic resin thermally activated (JET, São Paulo, Campo Limpo Paulista, Brazil), the molds (Hidrogum 5 Zhermack, Badia Poesine, Italy) and functional models (Asfer, São Paulo, São Caetano do Sul, Brazil) were obtained and assembled in SAA (4000-S Bio-art, São Paulo, São Carlos, Brazil). The adjusts were realized observing the maximum contact distributed during the opening and closing movements and the presence of a guide on a canine and protrusive guide (figures 6A and 6B). After the occlusal splint was installation and during the control consultation,

the patient again quantified the pain through the VAS, obtaining a score 1. The decrease in symptoms was observed after seven days and the follow-up period was fifteen days.



**Figure 6.** (A) Front view of occlusal splint; (B) Occlusal splint adjusted.

## DISCUSSION

The present case report describes the clinical conduct of an individual with bruxism associated with temporomandibular disorder. The dysfunction was diagnosed using the RDC / TMD questionnaire. This tool is truly operationalized for TMD examination and diagnoses by providing detailed instructions as well as diagnostic algorithms [11].

Studies affirm that the presence of parafunctional habits can influence on the triggering of TMD [9,13]. According to Demjaha et al. [14], the hyperactivation of masticatory muscles due to the bruxism events does not cause only pain but can contribute to changes on the biomechanics of temporomandibular joint. Other observed consequences on the structures of the stomatognathic system include fractures on restorations, disc displacement, non-carious cervical lesions and periodontal alterations [15].

Historically, some authors believed that occlusal interferences could be considered as determinant factors on bruxism cause. Currently, there is no clinical and scientific evidence that supports this theory [16]. However, to establish homeostasis, initially the occlusal adjustment (OA) was accomplished. The aim of this procedure was to seek the occlusal stability coincident with the correct settlement of the condyle on the mandibular fossae of the temporal bone (occlusion in centric relation), minimizing overcharge, eliminating traumas and occlusal interferences, proportioning the distribution of forces on the long axis of the dental elements [17].

In addition, the occlusal adjustment promotes changes in the surfaces of the teeth or restorations, either by selective wear or by adding restorative materials [17]. In the present clinical case, for restoration of the protrusive guide, the AO was chosen by addition of composite resin in the upper anterior teeth. The direct restorative adhesive materials are routinely used in modern dentistry due to various features such as good aesthetics and satisfactory physical and mechanical properties [18]. Other advantages of the composite resin use are the conservation of dental structure, less clinical time and lower cost when compared to ceramic materials [19]. It is important to note that the effective protrusive guide protects the posterior teeth in excursive movements, avoiding lateral forces on these dental elements. In addition, occlusal balance increases the longevity of restorative procedures [17]. After the finalization of OA, the elimination of the discrepancy between MHI and CR was observed, bilateral and uniform occlusal contacts on the centric movement, anterior guidance gliding and separating the posterior teeth during all mandibular excursions.

Due to the presence of self-reported bruxism and signs of traumatic occlusion, the occlusal splint was installed. Although this parafunctional habit presents a multifactorial character, there is still no specific strategy or definitive treatment for its cure [20]. In the dental field, the occlusal splint is one of the most acceptable forms of palliative therapy

in the short and medium terms [21]. The mechanism of action of the intraoral appliance is based on the neuromuscular reflex and decrease of intra-articular pressure in temporomandibular joint. Moreover, improvement the occlusal balance and/or mandibular, prevents against dental elements wear and promotes the relaxation of hypertrophied muscles [22]. In the study of Matsumoto et al. [23], in which they evaluated the intermittent use of the occlusal splint compared to the continuous use, observed a statistically significant reduction of the electromyographic activity in the masseter muscle, immediately after the insertion of the device.

The occlusal splints are made by different materials such as acetate, acrylic resin or both. In the present case, the material of choice was the thermally activated acrylic resin. Some advantages of this material are ease of technique, color stability, less shrinkage of polymerization and satisfactory polishing [24]. In addition, when comparing the rigid occlusal splints with the resilient device, it is observed that the latter increases the electromyographic activity of the masticatory muscles. Thus, the use of rigid or semi-rigid occlusal splints for patients diagnosed with bruxism is recommended.

Knowing the multifactorial characteristic and the different forms of treatment for bruxism and TMD, there is no more effective therapy [25]. However, the association between psychological interventions, pharmacological therapy, physiotherapy, acupuncture, laser therapy and dental procedures present better results when compared with isolated therapies [26].

## CONCLUSION

This case report suggests that the dental approach by means of occlusal adjustment and occlusal splint, in a patient diagnosed with bruxism and temporomandibular disorder, reduces the signs and symptoms that affect the components of the Stomatognathic System.

## Collaborators

MVA Oliveira and MAF Porto participated in the literary search, development of the case report, preparation of the manuscript and editing of the manuscript. PC Simamoto-Júnior participated in the editing of the manuscript and revision of the manuscript. UP Coelho participated in the development of the case report and editing of the manuscript. LC Cabral participated in the study design, definition of intellectual content, development of the clinical case, editing and revision of the manuscript and referral of the article.

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