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STABILIZING PLAQUES AS PREDITOR RESPONSE OF TEMPOROMANDIBULAR DYSFUNCTION: BRIEF REVIEW

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ABSTRACT

Introduction: Temporomandibular disorders, which cause anatomical changes in TMJ structures, are capable of promoting degenerations on the disc surface and in the articular bones. DTM has an incidence of more than 2.0 million cases per year in Brazil and is considered a dysfunction of multifactorial etiology.

Objective: The aim of this study was to brief review of the literature and discuss the main factors supporting the temporomandibular dysfunctions and your main predictors.

Methods: Experimental and clinical studies were included (case reports, retrospective, prospective and randomized trials) with qualitative and / or quantitative analysis. Initially, the key words were determined by searching the DeCS tool (Descriptors in Health Sciences, BIREME base) and later verified and validated by MeSh system (Medical Subject Headings, the US National Library of Medicine) in order to achieve consistent search.

Literature Review: TMD is the most common orofacial pain condition. Its prominent features include regional pain in the face and preauricular area, limitations in the movement of the mandible and noise of the TMD during mandibular movements. TMD affects up to 15.0% of adults and 7.0% of adolescents. Chronic pain is the overwhelming reason that TMD patients seek treatment. Thus, TMD can be associated with general health problems, depression and other psychological disabilities and can affect the patient's quality of life.

Conclusion: more evidence is needed such as cohort studies, case control or cross-sectional analytical studies, investigating each risk factor and creating a useful consensus to standardize and define clinical behaviors on the treatment and prevention of TMD in a safe and efficient manner.

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INTRODUCTION

The temporomandibular joint (TMJ), considered one of the most complex joints in the human body, consists of the mandible head, mandibular fossa of the temporal bone and articular disc, which is practically free of irrigation and innervation due to its formation by dense fibrous tissue (Bilgiç *et al*., 2017). The articular morphology has variations in the forms, being the most accepted the biconcave, biplanar, rounded, biconvex, hemiconvexs, folded and thickening of the anterior band. Histology shows that in articulations with abnormal structure can be found cellular components of healing and granulation, such as fibroblasts and fibrocytes (Bilgiç *et al*., 2017; Patel *et al*., 2017). The stomatognathic system is a set of structures that encompass bones, teeth, muscles, glands, nerves and joints (Patel *et al*., 2017). In some situations the capacity of these components to act simultaneously is altered, characterizing temporomandibular dysfunction (TMD), a painful joint disorder that affects 50.0% to 75.0% of the population. Temporomandibular disorders, which cause anatomical changes in TMJ structures, are

capable of promoting degenerations on the disc surface and in the articular bones (Rani *et al*., 2017). DTM has an incidence of more than 2.0 million cases per year in Brazil and is considered a dysfunction of multifactorial etiology, including its causes: trauma, parafunctional habits, emotional factors and malocclusion. In addition, they have a symptomatology characterized by headaches, pain and / or joint noises, pain and / or ringing in the ears and difficulty in mastication and mouth opening (Bilgiç *et al*., 2017; Patel *et al*., 2017; Rani *et al*., 2017). Due to the symptoms presented, TMD is considered the most common cause of pain and non-dental orofacial limitation, being able to interfere in the quality of life of its patients, promoting difficulty in performing daily activities and their psychosocial behavior. Since pain is detrimental to physical and mental health, knowing how to identify it is fundamental to the conclusion of an effective treatment plan for temporomandibular disorders (Kalaykova *et al*., 2017). Therefore, multidisciplinary treatment is key to success. However, the use of the stabilizing plate, or occlusal plaque, has had impressive results in improving the TMD clinical picture, besides being a non-invasive treatment, it has low cost, which facilitates patient consent (Harrell, 2017).

The use of the occlusal plates is done with the intention of temporarily stabilizing the position of the mandibular joint, as well as to improve the functional structure and protect the support structures and the teeth from possible excessive wear. Also states that the use of the stabilizing plate reduces irregular muscular action, propitiating the reorganization of the neuromuscular activity and considerably improving the pain picture (Harrell, 2017; De Alcântara Camejo *et al*., 2017). Not only that, the occlusal plaque is capable of promoting homogeneous bilateral contacts between opposing teeth, ensuring optimal occlusion. It also allows an increase in space. Thus, articulating, leaving the joint overloading the overloads offered by the pathological process (De Alcântara Camejo *et al*., 2017).

There are several types of occlusal plaques indicated for the treatment of TMDs, including stabilization, also known as Michigan, and the most used anterior positioning (Bilgiç, 2017; Rajapakse, 2017). The mechanism of action by which the occlusal plates work is not fully defined. However, it is known to be a reversible therapy and therefore it is necessary for the patient to undergo proper use of the plate, as prescribed. It is also known that the stabilizing plate should have its material chosen individually, since each plate is directed to a specific etiological factor. The use of the plaque proved to reduce the pain symptoms caused by TMD, but it is advisable to associate with multidisciplinary treatments to stabilize the disease completely (Ballenberger *et al*., 2011). Thus, the aim of this study was to brief review of the literature and discuss the main factors supporting the temporomandibular dysfunctions and your main predictors.

METHODS

Experimental and clinical studies were included (case reports, retrospective, prospective and randomized trials) with qualitative and / or quantitative analysis. Initially, the key words were determined by searching the DeCS tool (Descriptors in Health Sciences, BIREME base) and later verified and validated by MeSh system (Medical Subject Headings, the US National Library of Medicine) in order to achieve consistent search.

Mesh Terms

The words were included "Stabilizing Plates" "Temporomandibular Dysfunction", "Temporomandibular Articulation" and “Headache”. For further specification, the "anterior maxilla" description for refinement was added during searches. The literature search was conducted through online databases: Pubmed, Periodicos.com and Google Scholar. It was stipulated deadline, and the related search covering all available literature on virtual libraries.

Series of Articles And Eligibility

A total of 40 articles were found involving temporomandibular dysfunction. Initially, it was held the exclusion existing title and duplications in accordance with the interest described this work. After this process, the summaries were evaluated and a new exclusion was held. A total of 15 articles were evaluated in full, and 11 were included and discussed in this study.

Literature review

In this context, TMD is a generic term for pain and dysfunction involving the masticatory muscles and temporomandibular joints. TMD is the most common orofacial pain condition (Bilgiç, 2017). Its prominent features include regional pain in the face and preauricular area, limitations in the movement of the mandible and noise of the TMD during mandibular movements (Patel, 2017). TMD affects up to 15.0% of adults and 7.0% of adolescents. Chronic pain is the overwhelming reason that TMD patients seek treatment. Thus, TMD can be associated with general health problems, depression and other psychological disabilities and can affect the patient's quality of life (Patel, 2017; Rani *et al*., 2017). Malocclusion is an etiologic factor of the temporomandibular joint disorder. One study showed the prevalence of TMD and the relationship between TMD and the type of occlusion (1). A sample of 923 children (463 girls and 460 boys, 7-12 years old). Information was collected on functional occlusion, tooth wear, mandibular mobility and temporomandibular joint and muscle pain recorded by palpation.

Headache was the only symptom of TMD reported by children. The results showed that one or more clinical signs were recorded in 25.0% of the individuals, most of them mild. Prevalence increased during the developmental stages, with a higher prevalence among women. In this study, several participants with TMD presented malocclusion. Early treatment may be important in the prevention of severe TMD. Significant associations were found between the different signs, and TMD was associated with posterior crossbite, anterior open bite, Class II and III malocclusion (Bilgiç, 2017). Another study with twenty patients was randomized to Incobotulinumtoxina A with 170 units or saline injection of the masticatory muscles (Patel, 2017). The pain scale reported by the patient (0-10) was recorded at 4 week intervals after the injection for 16 weeks. Patients receiving a saline injection were initially assessed for pain reduction in the first 4-week interval and if they still had significant pain were rolled into the IncobotulinumtoxinaA arm (Patel, 2017). Pre-injection pain scores were similar among patients. Although there was a statistically significant reduction in pain score in the placebo group one month, there was a larger overall decrease in mean pain scores in patients injected with Incobotulinumtoxin A

initially. All patients initially injected with placebo crossed into the Incobotulinumtoxin A group. Similar results were observed when analyzing composite muscle mastication tenderness scores. There was no significant change in the use of medication for pain. We demonstrated the usefulness of IncobotulinumtoxinaA in the treatment of patients with TMD with pain, despite the use of pain medication and other conventional treatments (Patel *et al*., 2017). Based on another study involving students, the results showed that among the study groups, 15.0% were found to have TMDs. Of the affected students, 79.0% of the women and 21.0% of the men had symptoms. Of the signs and symptoms present, it was verified that 7.0% of the students presented sound in the temporomandibular joint followed by pain in 3.0 % and fatigue in 2.0% of the students (Rani *et al*., 2017). In the clinical examination, the limited oral opening was found in 6.0% of the students followed by blocked mandible in 1.0%, mandibular deviation in 0.6% and mandibular jaw rigidity in 0.6% of the individual. In summary, the Helkimo index is a well-founded index for assessing TMD in a specific population. The signs and symptoms of TMD were present among the students, although the low prevalence of TMD was found in the students (Rani *et al*., 2017).

Evaluations indicate that recently published work on the diagnostic criteria for TMD is reliable and valid (Kalaykova *et al*., 2017). These criteria cover the most common types of TMD, which include pain-related disorders (myalgia, headache attributable to TMD and arthralgia) as well as TMD associated disorders (mainly disc disorders and degenerative diseases). As peripheral mechanisms probably play a role early in TMD, a detailed muscle examination is recommended (Kalaykova *et al*., 2017). Persistence of pain involves more central factors, such as sensitization of supraspinal neurons and second-order neurons at the dorsal horn / trigeminal nucleus level, imbalanced antinociceptive activity and strong genetic predisposition (Harrell *et al*., 2017). The etiology is complex and not yet clearly understood, but several biological and psychosocial factors of risk for TMD have been identified (Harrell *et al*., 2017). Several studies indicate that TMD patients improve with a combination of noninvasive therapies, including behavioral therapy, pharmacotherapy, physical therapy, and occlusal devices (Harrell *et al*., 2017).

DISCUSSION

Temporomandibular Dysfunction (TMD) is considered the main cause of non-dental pain in the orofacial region. It can affect dentate and edentulous individuals, with or without dentures. In a literature review, it appears that TMD affects the female gender in a greater proportion than the male gender, with a ratio ranging from 3: 1: to 5: 1, with the mean age varying between 30 and 40 years (De Alcântara Camejo *et al*., 2017; Rajapakse *et al*., 2017; Ballenberger *et al*., 2017). However, the etiology of TMD is not fully elucidated, since it is believed to be multifactorial, and may be attributed to occlusal, neuromuscular and emotional factors (Rajapakse, 2017; Ballenberger *et al*., 2017). The signs and symptoms of TMD are often related to complaints of chronic headaches and to orofacial structures, with TMD patients being common to report pain in the preauricular regions, in the face, temples, during oral opening, in mastication and speech, May also present joint noises (Ballenberger *et al*., 2017; Chebbi *et al*., 2016; List, 2016).

Individuals who present a discrepancy between the Centric Relationship (CR) and the Maximum Intercuspation Habitual (MIH), greater than 2.0 mm, can be considered as having a TMD risk factor (List, 2016; Chebbi, 2016). It is also common for edentulous patients to present TMD due to occlusal changes, instability of the prostheses and iatrogenies. One of the features widely used to treat patients with occlusal instability and who are carriers of TMD is the occlusal plaque. The two types of plates most used are: the stabilizer plate / myorelaxante and the repositioning plate (Chebbi, 2016). The use of plaque with a stabilizing purpose in individuals with great occlusal instability is a subject rarely explored in the literature (Chebbi, 2016). There are few reports on its clinical effectiveness in reducing or eliminating painful symptoms of muscles associated with the stomatognathic system and signs and symptoms of occlusion-related disorders (Bilgiç, 2017; Patel *et al*., 2017). This article aims to present the report of two cases of patients with TMD, with significant occlusal instability, submitted to temporary treatment by means of stabilizing plates, to reduce muscle and joint pain (Rani *et al*., 2017). Regarding the etiological factors of TMDs, much has been researched, but this is a matter of great debate and still far from being clarified (Bilgiç, 2017; Patel *et al*., 2017; Rani *et al*., 2017). Currently, it is believed that it has a multifactorial involvement and dental occlusion is one of the mentioned factors, but it can not be considered as the only risk factor (Bilgiç, 2017; Patel *et al*., 2017; Rani *et al*., 2017). Other factors should be considered to treat patients with TMD.

Conclusion

More evidence is needed such as cohort studies, case control or cross-sectional analytical studies, investigating each risk factor and creating a useful consensus to standardize and define clinical behaviors on the treatment and prevention of TMD in a safe and efficient manner.

Conflict of interests

There is no conflict of interest between authors.

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