

OCCLUSAL SPLINTS: TYPES, MATERIALS AND PROPERTIES - A LITERATURE REVIEW

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Literature review

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ABSTRACT

Temporomandibular Disorder (TMD) is considered the major cause of non-dental pain in the orofacial region and the most crucial symptom for which patients seek

medical attention, negatively affecting quality of life. The plates have gained prominence as a treatment for TMD but the success or failure of the occlusal plates will depend on their correct selection and indication, materials for making and adjusting, in addition to the cooperation of the patient. The purpose of this study is to highlight the most used types of occlusal plaques, their advantages, disadvantages, indications and contraindications, in addition to identifying and analyzing the materials currently used in their manufacture. A literature review was conducted with searches on articles from the electronic databases PubMed, Virtual Health Library (BVS) and Google Scholar with the descriptors: disfunção, placa oclusal, tratamento, dysfunction, plate, occlusal and treatment. We also use bibliographic information from Okeson (2013). From the data collected in this literature review, it can be concluded that the occlusal plaque is considered a conservative and reversible method and has stood out for its low cost and high success rate. This study demonstrated that the most advantageous material for the manufacture of the plates was the photopolymerizable resin. However, the dentist must be attentive to a correct diagnosis, selection and indication, preparation and adjustment materials, in addition to the patient's cooperation in order to provide the appropriate treatment.

INTRODUCTION

The teeth, mandible, maxilla, temporomandibular joint (TMJ) and masticatory muscles are the components of the stomatognathic system (SS). Both the region of the masticatory muscles and that of the neck are affected by the neuromuscular system, because the SE is directly related to the cervical spine. Temporomandibular disorder (TMD) is the most common disorder due to defects in this system or factors that prevent it from working in harmony. The American Academy of Orofacial Pain (AAOP) has defined temporomandibular disorder (TMD) as a term that involves clinical problems in the masticatory muscles, temporomandibular joint (TMJ) and associated structures (SEIFELDIN AND ELHAYES, 2014; DUTRA AND SEABRA ET AL., 2016; TRIZE AND CALABRIA ET AL., 2018)

Neuromuscular, occlusal and emotional factors can be attributed to the etiology of TMDs. Its main causes may be bruxism, psychological illness, traumatic injuries resulting from chewing, extreme opening of the mouth and dental treatments. In addition, TMD can affect dentate and edentulous individuals, whether or not they have prostheses. (SEIFELDIN AND ELHAYES, 2014; LIMA AND OLIVEIRA ET AL., 2016)

Temporomandibular disorder signs and symptoms are confined to the TMJ region or frequently related to complaints of chronic headaches and orofacial structures, so it may be common for patients with TMD to report pain in the eyes, shoulders, preauricular regions, on the face, in the mandibular region, neck, temples, during oral opening, chewing and speaking, and may also present articular noises, crackling and crackling. This disorder can also be associated with pain on palpation in the region of the masticatory muscles. (SEIFELDIN AND ELHAYES, 2014; BRAGA AND DINELLY, 2017; LIMA, 2015)

Symptoms range from minor to disabling. Tinnitus, jaw deviation, locking, lateral movement limitations, protrusion, opening and closing are common signs. Pain being the most crucial symptom for which patients seek medical attention. TMD was considered the major cause of non-dental pain in the orofacial region, impairing social functioning, as well as physical and psychological well-being. (SEIFELDIN AND ELHAYES, 2014; TRIZE AND CALABRIA ET AL., 2018)

Anamnesis and clinical examination are fundamental for a correct diagnosis and later treatment, it is in these stages that there is the evaluation of mandibular movements, masticatory pattern, odontogram, parafunctional habits, occlusal analysis and joint muscle examination. The goal of TMD treatment is to eliminate or decrease pain and restore normal SS functions. (LIMA, 2015; MARTINS AND AQUINO ET AL., 2016)

It is important to remember that the first treatment option, when necessary, must be a reversible and non-invasive modality, without forgetting that each clinical case must be evaluated individually. For this reason, the Technological Evaluation Conference (1996), recommended the use of occlusal plaques for the treatment of pathology. The plaques have also gained prominence for being low cost and having a high level of success in clinical cases. (LIMA, 2016; BRAGA AND DINELLY, 2017, LIRA, 2016)

The purpose of the aforementioned plaques is to stabilize occlusal relationships, redistributing forces, preventing mobility and wear of teeth, reorganizing the function of the TMJ and masticatory muscles, in the treatment of masticatory muscle pain and in the reduction of parafunctional habits. However, the success or failure of the occlusal plaques will depend on its correct selection and indication, materials for preparation and adjustment, in addition to the cooperation of the patient. (MARTINS AND AQUINO ET AL., 2016; LIRA, 2016; LIMA, 2015; BRAGA AND DINELLY, 2017)

In view of the importance of the correct choice of your cooking material, the selection and indication of the type of plate, the present literature review was carried out, with the objective of highlighting the most used types of occlusal plates, their advantages, disadvantages, indications and contraindications. -indications, in addition to identifying and analyzing the materials currently used in its manufacture.

LITERATURE REVIEW

1. TYPES OF OCLUSIVE PLATES

1.1. PLACA ESTABILIZADORA/MICHIGAN:

It is the most used type of plaque, because it causes less risk of irreversible occlusal changes to the patient, such as anterior open bite, dental extrusions and pathological migrations. They are indicated to protect dental wear caused by bruxism and daytime tightening and to protect teeth restored with porcelain and dental implants. Its use is also indicated for the treatment of intracapsular disorders by reducing the load on the TMJ. Its goal is to reduce muscle hypertonicity; protect teeth and periodontium from parafunctional habits; eliminate occlusal interference and consequently reduce or eliminate painful symptoms; enable mandibular repositioning, removing the instability factor as a cause of TMD, taking the condyle to a more stable position in the articular fosse; also used in order to increase the vertical dimension. It must completely cover one of the dental arches, and during protrusion the lower caninos teeth must touch the device with uniform forces, but the incisors must present a more attenuated touch; in centric

relation, all inferior vestibular cusps must be on a flat surface and the device must be “as polished as possible” so as not to irritate the soft tissues. The thickness of this type of plate should be approximately 1.5 to 2 mm in the molar region, and can be made for both the maxilla and the mandible, however, it is used preferentially in the maxilla, due to the greater retention and stability, in addition to the ease of making. (ANDRÉ AND BIGLIAZZI ET AL., 2011; SAAVEDRA AND BALAREZO ET AL., 2012; LIMA, 2015; BRAGA AND DINELLY, 2017)

1.1. PREVIOUS POSITIONING PLATE:

dible assume a more protrusive position than the usual maximum intercuspation position. Its main objective indication is cases in which there is anterior displacement of the disc with reduction, but they are also indicated for patients with joint sounds and in cases of TMJ lock. Its objective is to promote a better condyle-disc relationship in the articular fossa, preventing the condyle from pressing on the retrodiscal region, allowing tissues to better adapt and repair. This alteration of the mandibular position is not permanent, with adaptation, the device is then eliminated, allowing the condyle to assume a stable musculoskeletal position. This plate has well-defined indentations, which serve to guide the jaw to a more protruded position. Like the stabilizer plates, the repositioners can also be made for both arches, however, the jaw plates have greater retention and stability, in addition to being easier to make. (ANDRÉ AND BIGLIAZZI ET AL., 2011; SAAVEDRA AND BALAREZO ET AL., 2012; LIMA, 2015)

1.3. PREVIOUS BITE PLATE:

Also known as “Front-Plateau” is a self-curing colorless acrylic device, which covers the incisors of the upper anterior teeth and only contacts the lower anterior teeth. It also has anterior guide for protrusive movements and cannios guide for laterality movements. One of the indications of the anterior bite plate is for patients who have occlusal interference and / or premature contacts, which may be impairing the normal function of the masticatory system. Its use is recommended for a maximum of 7 days, as the prolonged use without the accompaniment of the dentist, would promote the extrusion

of the posterior teeth and an anterior open bite after its removal. (SAAVEDRA AND BALAREZO ET AL., 2012; DEKON AND ZAVANELLI ET AL., 2007)

1.4. BACK BITE PLATE:

The posterior bite plate is generally made for the lower arch and consists of two areas of rigid acrylic located on the posterior teeth and connected by a metallic lingual bar. This device is indicated in cases of severe loss of vertical dimension or when there is a need for greater changes in the anterior position of the mandible. The biggest concern regarding the use of this device is the fact that it provides contact only with the posterior teeth and thus has the potential to allow extrusion of the anterior teeth or even promote intrusion of the posterior teeth, so its use should be temporary (maximum 7 days). (OKESON, 2013; ANDRÉ AND BIGLIAZZI ET AL., 2011)

1.5. PLACA RESILIENTE:

The resilient occlusal plate is used for emergency situations or while the myorelaxative acrylic occlusal plate is being manufactured by the laboratory. The use of both resilient plaque and myorelaxative plaque has been successful in reducing the clinical symptoms of patients with bruxism. However, the selection of plates made with rigid material should be preferred, as these are more effective, reducing the activity of the masseter and temporal muscles more quickly than those made with resilient material. (BATAGLION AND PALINKAS ET AL., 2012; OKESON, 2013)

2. TYPES OF MATERIALS

2.1. SELF-POLYMERIZABLE RESINS:

This material has a high rate of intoxication due to the presence of residual monomers, which can cause hypersensitivity in patients and professionals, and is also a material with a high flammability potential. It is a material that demands more time in its processing, because the model is placed in a polymerization machine at high pressure and this process can damage the plate, therefore, it is necessary to duplicate the model. (LIRA, 2016)

2.2. PHOTOPOLIMERIZABLE RESINS:

(LEIB, 2001; LIRA, 2016)

2.3. RESINAS TERMOPOLIMERIZÁVEIS:

Light-curing polymers allow the dental surgeon or prosthetic technician to more precisely shape the plaque and have a longer working time. The advantages of photopolymerizable resins are adequate hardness, less residual monomer amount than in traditional polymers, good chemical stability, shorter protocol compared to that carried out on thermopolymerizable resins, they are easy to handle and have no unpleasant taste. Regarding shrinkage values, photopolymerizable resins have significantly lower values than self-curing resins. From the patients' point of view, they prefer light-curing plates to heat-curing plates. This choice is due to the feeling of comfort reported by the patients, which can be explained due to its properties similar to those of the teeth, especially its degree of hardness and resonance. A disadvantage of photopolymerizable resins is related to the translucency of the composite, which leaves something to be desired, for example, in relation to transparent acrylic. (LEIB, 2001; WIECKIEWICZ AND KLAUS, 2015)

2.4. VINYL ACETATE (EVA):

Vinyl acetate (EVA) has excellent mechanical behavior; ease of acquisition and handling; and low cost. In a test simulating oral environment conditions, EVA showed good results in dissipating forces, increasing ductibility, thus showing improvement in its mechanical response. This material has been chosen for the manufacture of occlusal plates by computation, it was observed that the material did not present deformation or occlusal wear after months of use, although long-term durability has yet to be evaluated. Making the plates by computer has many advantages over more traditional methods, such as faster adjustments and greater precision. (COTO AND DIAS ET AL., 2007; WARUNEK AND LAUREN, 2008)

CONCLUSIONS:

The occlusal plaque is considered a conservative and reversible method and has stood out for its low cost and high success rate. Stabilizer plates proved to be the most

common in the treatment of TMDs. The most advantageous material for the manufacture of the plates was the photopolymerizable resin, presenting a low amount of residual monomer, longer working time, adequate hardness and chemical stability and did not present an unpleasant taste. However, the dentist must be attentive to a correct diagnosis, selection and indication, preparation and adjustment materials, in addition to the patient's cooperation in order to provide the patient with the appropriate treatment.

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