

BRUXISM IN CHILDHOOD: A CHALLENGE FOR DENTISTRY

BRUXISMO NA INFÂNCIA: UM DESAFIO PARA A ODONTOLOGIA

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ABSTRACT

Bruxism is a parafunction of the masticatory system that occurs due to involuntary and rhythmic activity of the musculature of the stomatognathic system. Its origin is multifactorial, and the main causes are local, systemic, psychological, occupational, and hereditary factors. This functional disorder can occur during day or night and the most common clinical sign is wearing on the incisal surfaces of the anterior teeth and the occlusal surfaces of the posterior teeth, in addition to increased sensitivity and damage to the supporting tissues. Thus, treatment is challenging, requiring multidisciplinary and multiprofessional approaches (dentistry, psychology, and medicine). The prevalence of childhood bruxism varies between 5.9 and 55.3%, being more common in the preschool age group. Treatments may vary depending on the etiology, patient age and severity of each case. Among the main ones, there is the making of bite plates, massage, and the use of moist heat and allopathic or homeopathic medicines. Therefore, the aim of this literature review was to discuss the etiological factors and treatments of bruxism in children. The bibliographic search was carried out in Google Academic and PubMed databases using the descriptors “bruxism”, “child”, “children”, “etiology” and “treatment” in Portuguese and English, with no restriction on language or year of publication. Researches on bruxism in childhood and that addressed its etiology and/or treatment were included.

Keywords: Bruxism. Child. Etiology. Therapeutics.

RESUMO

O bruxismo é uma parafunção do sistema mastigatório que ocorre devido a atividade involuntária e rítmica da musculatura do sistema estomatognático. Sua origem é multifatorial, sendo as principais causas fatores locais, sistêmicos, psicológicos, ocupacionais e a hereditários. Essa desordem funcional pode ser diurna ou noturna e o sinal clínico mais comum é o desgaste das faces incisais dos dentes anteriores e oclusais dos posteriores, além do aumento da sensibilidade e danos aos tecidos de suporte. Dessa forma, o tratamento é desafiador, sendo necessárias abordagens multidisciplinares e multiprofissionais (odontologia, psicologia e medicina). A prevalência do bruxismo infantil varia entre 5,9 e 55,3%, sendo mais comum na faixa etária pré-escolar. Os tratamentos podem variar de acordo com a etiologia, idade do paciente e gravidade de cada caso. Dentre os principais, há a confecção de placas de mordida, massagem e uso de calor úmido e de medicamentos de alopatia ou homeopatia. Assim sendo, o objetivo desta revisão de literatura foi discutir os fatores etiológicos e os tratamentos do bruxismo em crianças. A busca bibliográfica foi realizada nas bases de dados Google Acadêmico e PubMed usando os descritores “bruxismo”, “criança”, “crianças”, “etiologia” e “tratamento” em português e inglês, sem nenhuma restrição de idioma nem ano de publicação. Foram incluídos os trabalhos sobre bruxismo na infância e que abordassem sua etiologia e/ou tratamento.

Palavras-chave: Bruxismo. Criança. Etiologia. Terapêutica.

INTRODUCTION

Bruxism is characterized by a parafunctional activity of the masticatory system, of multifactorial origin, and its main causes are local, systemic, psychological, occupational factors and heredity (PIZZOL *et al.*, 2013). According to the American Academy of Sleep Medicine, bruxism must be diagnosed through a report of grinding or clenching teeth in association with at least one of the clinical features: abnormal dental wear, sounds associated with bruxism and muscle discomfort in the mandibular region (AMERICAN ACADEMY OF SLEEP MEDICINE, 2005). The diagnosis of this parafunction in childhood becomes a little more complex due to the countless possibilities of causes, the difficulty in obtaining reliable information from children and guardians, and the absence of conclusive exams. However, some signs and symptoms, such as wear of the dental cusps, changes in normal occlusion, dysfunction and pain in the temporomandibular joint and headache, can help the professional to complete the diagnosis (KATO *et al.*, 2001; NAHÁS-SCOCATE *et al.*, 2012).

Known to be an involuntary, parafunctional and rhythmic activity, bruxism is caused by repeated and continuous spasms of the musculature of the stomatognathic system. Such spasms are caused by rhythmic or tonic contractions of the masseter and other mandibular muscles, being characterized by the act of squeezing or grinding the teeth during the day and/or night. The act of creaking presents a considerable noise, being observed more frequently during sleep and in periods of worry and excitement. On the other hand, clenching normally does not present noise, being more observed in the daytime (BADER; LAVIGNE, 2000; DINIZ; SILVA; ZUANON, 2009).

Sleep bruxism is commonly observed during childhood and adolescence, presenting, in general, a prevalence between 5.9% and 55.3%, varying according to the analysis methods used (SIMÕES-ZENARI; BITAR, 2010; LAM *et al.*, 2011). Studies indicate that between 35% and 90% of patients who have this disorder in childhood also have symptoms in adulthood (ALÓE *et al.* 2003; LOBBEZOO *et al.*, 2008).

Due to its diverse etiology, bruxism must be treated in a multidisciplinary way (DINIZ; SILVA; ZUANON, 2009; PIZZOL *et al.*, 2013). In addition, it is essential that the guardians are oriented about behavioral reactions, the need for dental and psychological monitoring and the possibility of using medications (ALÓE *et al.*, 2003; PIZZOL *et al.*, 2013). Dentistry usually works with restorative procedures, orthodontic treatment and bite plate making; depending on the case, there may be a need for treatment with medication and psychological support to help control anxiety (LOBBEZOO *et al.*, 2008; SIMÕES-ZENARI; BITAR, 2010).

The presentation of this parafunctional disorder in children has caused concern in professionals who identify and treat this problem, since this change reduces the quality of life and is considered to be a risk factor for the development of temporomandibular disorders (SIMÕES-ZENARI; BITAR, 2010). In addition, the importance of early diagnosis of this condition is highlighted, especially due to the high frequency of bruxism in pediatric patients. Therefore, the aim of this article was to present, through a literature review, the etiological factors and the main treatments of bruxism in childhood.

METHODOLOGY

To carry out this literature review, a bibliographic search was performed in the Google Scholar and PubMed databases. The descriptors “bruxism”, “child”, “children”, “etiology”, “treatment” were used, connected by the Boolean operators “AND” and “OR” in Portuguese and English. No language and year restrictions were used. The inclusion criteria were works that addressed the topic of study (bruxism in childhood) and that dealt with its etiology and/or treatment.

DEVELOPMENT

In children, episodes of clenching or grinding the teeth, which characterize bruxism, are reported by parents, mostly, at night, during sleep, being classified as sleep bruxism. This disorder is believed to occur during the REM phase, which occurs every 1 hour and 30 minutes on average during the night, and lasts for 5 to 20 minutes. This phase is related to dreams and memories of unpleasant moments and events (CLARKE; TOWNSEND, 1984). The act of squeezing the teeth, characterized as clenching, is more frequent during the day and, despite not having noises, it is considered more harmful, as the forces are more continuous and more harmful to the supporting tissues of the dental elements (SHINKAI *et al.*, 1998; DINIZ; SILVA; ZUANON, 2009). One study evaluated that children with the habit of sucking a pacifier had a seven-fold increased risk of developing bruxism (SIMÕES-ZENARI; BITAR, 2010). However, other studies have not identified this relation (DIFRANCESCO *et al.*, 2004; GRECHI *et al.*, 2008). This same study also found a relationship between bruxism and oral habits such as biting objects (50%), onychophagia (45%), biting lips (31%), bottle-feeding (17%) and thumb-sucking (15%) (SIMÕES-ZENARI; BITAR, 2010).

Although bruxism is a condition considered to occur frequently, with a high degree of incidence in adults and children of both genders, the appearance of this disorder in childhood is still a major challenge for dentistry. Due to its multifactorial etiology and its highly variable clinical characteristics, the technical-scientific improvement of health professionals is necessary, so that they can offer increasingly resolute interprofessional care (CARIOLA, 2006).

The prevalence of bruxism varies between studies and has become more significant over the years. Comparing the results found between 1998 and 2015, there was a significant increase in the incidence of childhood bruxism, but the comparison is difficult because the age group included in some studies is broader than in others. Furthermore, it cannot be said whether pediatric patients are being more affected by this disease or whether the growth of research in this area has made it possible to identify cases that were previously underreported.

Another factor that hinders the association between the prevalence of bruxism and the age of patients is the intense variability of studies in this area. Children aged between 2 and 11 years have a prevalence of nocturnal eccentric bruxism of 28.64% (SHINKAI *et al.*, 1998); being 22.6% among girls and 21.4% among males (HUBLIN *et al.*, 1998). On the other hand, more recent studies in different regions, carried out with children between 4 and 6 years of age and using similar methodologies, found discrepant results regarding the prevalence of bruxism, ranging from 13.6% (TORUNSKY; LOPES, 2012); 32.6% (SAULUE *et al.*, 2015); and up to 55.3% of affected participants (SIMÕES-ZENARI; BITAR, 2010). It is believed that this difference between the results was due to the region in which each study was carried out and the use of different assessment methods.

The method of diagnosis is a factor that promotes confusion between studies, as it is considered through subjective assessments. Signs and symptoms and information collected from parents are observed during the anamnesis (SHINKAI *et al.*, 1998; SIMÕES-ZENARI; BITAR, 2010). However, guardians are not always present at bedtime or in everyday life and sometimes they end up not knowing how to answer some questions, generating inaccurate results. In addition, not all patients have the most common sign, wear on the occlusal surface of the teeth, which ends up making the diagnosis more complex.

The association of emotional factors with the development of bruxism in children has been increasingly strong. Some authors believe that strong emotional tensions, such as fear, anxiety, family problems, school tests or even the practice of competitive sports, can lead to this disorder (SIMÕES-ZENARI; BITAR, 2010; SERRA-NEGRA *et al.*, 2013).

Other studies have shown the relationship between bruxism and some systemic factors (ALÓE *et al.*, 2003; DINIZ; SILVA; ZUANON, 2009). Breastfeeding seems to act as a protective factor, since the longer the duration of breastfeeding, the lower the risk of developing the disorder (FERREIRA; TOLEDO, 1997). On the other hand, the presence of respiratory disorders has a positive correlation with the occurrence of sleep bruxism (DIFRANCESCO *et al.*, 2004). Performing surgeries

such as the removal of adenoids and tonsils in patients who have breathing difficulties due to tonsillar hyperplasia can help patients to improve their bruxism. Likewise, the presence of allergies represents a factor associated with the occurrence of bruxism, since allergic children are up to three times more likely to develop this disorder (ALÓE *et al.*, 2003; DINIZ; SILVA; ZUANON, 2009).

In addition, bruxism can still be caused by psychological factors (stress and anxiety), occupational (competitive sport), hereditary (genetic factors), or even be related to sleep disorders and parasomies (PIZZOL *et al.*, 2013). Bruxism in some situations is seen as an escape response, that is, a consequence of situations in which children, when they cannot achieve their desires and/or goals, develop this change (WOLF, 2000; DINIZ; SILVA; ZUANON, 2009).

Because there is a foundation in the association between bruxism and psychological factors, the treatment must have the participation of a psychologist, in order to try to remove the cause of the patient's tension and anxiety, avoiding recurrences (DINIZ; SILVA; ZUANON, 2009; LAM *et al.*, 2011). Some authors also pay attention to the need to use medications such as muscle relaxants, benzodiazepines, while others claim that massage at the pain site and the use of moist heat are also effective when used (BADER; LAVIGNE, 2000; ALÓE *et al.*, 2003; DINIZ; SILVA; ZUANON, 2009).

Many studies claim that the main cause of bruxism in children is psychological, as they are increasingly assigned responsibilities and more participation in competitive activities, increasing the psychological impacts on them (ALÓE *et al.*, 2003; DINIZ; SILVA; ZUANON, 2009). The occurrence of bruxism may also be related to a form of aggression to their own body, since, for not getting something they wanted, some children start to gnash or clench their teeth (CARIOLA, 2006). However, no significant difference was found between children with and without bruxism in relation to anxiety and learning problems (TORUNSKY; LOPES, 2012).

A relationship between bruxism and parasitic infections has also been demonstrated; bruxism being an early sign of these infections, which can lead to serious complications in the future (TEHRANI; SADRI; MOWLAVI, 2013). However, this relationship is still controversial in the literature.

Pediatricians can recognize the presence of bruxism in patients who complain of muscle and jaw pain and atypical headache during an appointment, but a follow-up by a pediatric dentist is necessary to confirm the diagnosis, in order to establish a correct interception as early as possible. Painful symptoms depend on some factors such as patient age, intensity and frequency and duration of the habit (NAHÁS-SCOCATE *et al.*, 2012; PIZZOL *et al.*, 2013).

In the literature, the main sequelae reported in relation to bruxism are tooth wear, headache and TMJ pain (ALÓE *et al.*, 2003). However, studies still show controversial results, especially in relation to the occurrence of headaches in children. While one study by Simões-Zenari and Bitar (2010) observed a high number of children with headache (77%) both in the groups with and without bruxism. In another, most patients with bruxism (78.3%) reported not experiencing headache frequently (NAHÁS-SCOCATE *et al.*, 2012).

The main signs and symptoms are abnormal dental wear. The wear surfaces to be observed can be smooth (if the patient has the habit of grinding the teeth), or rough (if the patient makes the tightening), with well-defined edges in the initial phase, affecting more frequently anterior teeth, of preferably canines, both deciduous and permanent. In addition, TMJ cracking or pain, facial muscle hypertonicity, muscle and joint discomfort and headache may also be found (BADER; LAVIGNE, 2000; DINIZ; SILVA; ZUANON, 2009). The most common sign reported by family members is noise at night, generating great anxiety and concern for the guardians. The child is not able to voluntarily reproduce these sounds, but is able to express local pain (chewing muscles), especially when waking up. Another sign that can be found are scars from cuts on the tongue, tooth hypersensitivity, in addition to the presence of fragmented sleep, causing drowsiness during the day (ALÓE *et al.*, 2003).

Due to the lack of conclusive exams for closing the diagnosis, it is necessary to carry out a careful anamnesis, collecting as much information as possible from the parents, in addition to a

thorough clinical examination. The discovery and early treatment of this disorder can improve the quality of life of these children (PIZZOL *et al.*, 2013).

Early diagnosis helps prevent damage to the stomatognathic system, in addition to improving the quality of life of children with this alteration (DINIZ; SILVA; ZUANON, 2009). Low negative impact on quality of life was observed in children aged between 3 and 6 years, using the Oral Health-Related Quality of Life questionnaire and clinical examination (ANTUNES *et al.*, 2016). However, when children between 11 and 14 years old were evaluated, a negative impact on the quality of life of patients with bruxism was observed, especially in the domains of functional limitation and well-being of this questionnaire (CARVALHO *et al.*, 2015). The justification for these discrepant results seems to be related to the age group assessed. Although research has shown that the prevalence of bruxism decreases with advancing age (LIU *et al.*, 2005; MANFREDINI *et al.*, 2013), older patients are better able to understand their health and are better able to make judgments about your social well-being. On the other hand, questionnaires aimed at children of preschool age are aimed at the perception of the guardians and are not able to collect information about the child's own opinion.

Once diagnosed, the treatment of bruxism in children should involve pediatric dentists, physicians, psychologists and otolaryngologists, as it presents as a disorder of complex and multifactorial etiology (PIZZOL *et al.*, 2013). Treatment becomes even more complex due to the lack of information and guidance from parents. Parents/guardians have a great lack of knowledge about bruxism and do not know what can cause the disease, leading to a lack of professional help (SILVA *et al.*, 2017). Although most parents/guardians report knowing what bruxism is and claiming that the pathology involves dental problems and chewing muscles, only 19.1% seek help from a dentist to treat this condition (SERRA-NEGRA *et al.*, 2013). This information shows that there is a great lack of preventive and informative action aimed at the general population on this subject.

Pediatric dentist intervention is necessary in order to indicate conservative treatments so that esthetics and function are preserved and/or recovered. However, there is currently no single effective treatment that cures bruxism permanently. The solutions are aimed at preserving teeth as well as preserving existing restorations, reducing bruxism activity and pain relief (YAP; CHUA, 2016). Thus, the bite plate is considered an essential step in the treatment, as it can reduce parafunctional activity, deprogram and induce muscle relaxation (GAMA *et al.*, 2013). The use of the bite plate has the function of reducing wear on the dental surfaces, but despite its great effectiveness it has a temporary effect (PIZZOL *et al.*, 2013). However, despite the possible benefits of its use to reduce tooth wear, a systematic review of the literature showed that the evidence so far is insufficient to affirm that the occlusal splint is effective in treating sleep bruxism (MACEDO *et al.*, 2010). Therefore, this apparatus acts in a complementary and temporary way, as it does not address the causes of the problem. Despite this, this is usually the only treatment presented to patients. However, for an effective intervention, the bite plate should not be used as a single modality, but in conjunction with other treatments.

The literature also reports the use of muscle relaxants, homeopathy, in addition to massage in the affected musculature region and especially psychological follow-up, thus treating not only the sequelae, but also the possible causes (NAHÁS-SCOCATE *et al.*, 2012). The use of clonazepam has significantly reduced sleep bruxism when evaluated in controlled clinical trials. However, the risk of dependence and some psychological side effects limit its long-term use (YAP; CHUA, 2016).

Contingent electrical stimulation (CES) can be used as a treatment option in an attempt to reduce masticatory muscle activity associated with sleep bruxism. In a study using this method it was found that there were no episodes of bruxism during its use, but there were no changes in pain and muscle tension (GUAITA; HÖGL, 2016).

For local use, botulinum toxin has been shown to be effective as a form of treatment in adult patients, but its use in children was not found in this literature review. The use of the toxin reduced the number of bruxism episodes and their intensity in clinical studies. Possible local side effects of injections include chewing difficulty, speech disorder, muscle pain, prominent zygoma, and facial asymmetry secondary to reduced muscle size due to masseter atrophy (LEE *et al.*, 2010).

Furthermore, a recent systematic review that assessed the use of botulinum toxin in the treatment of bruxism showed sufficient evidence to justify further research in this area. However, due to side effects, primary conservative treatment options should always be considered before considering botulinum toxin application (PATEL; CARDOSO; MEHTA, 2019).

Bruxism is increasingly being observed in children and this fact highlights the importance of early diagnosis, in addition to the guidance and commitment of parents and/or guardians with the proposed treatment, in order to effectively treat this change that can negatively affect the quality of life for children and their families. Likewise, it is important to emphasize that children with sleep apnea wake up several times during the night, which increases parafunctional activity and can cause bruxism, since this is related to fragmented sleep (DIFRANCESCO *et al.*, 2004).

CONCLUSION

Bruxism is a disorder of multifactorial etiology that causes damage to dental structures and the stomatognathic system. In children, diagnosis and treatment are considered complex, and must involve several specialties in order to guarantee a better quality of life for patients with this disorder and their families.

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