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Major predictors of bruxism in pediatric dentistry: a systematic review

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Abstract

Introduction: There is difficulty in determining the prevalence of the habit of bruxism and therefore are important evaluation method, since only 5-20 % of the carrier population of habit are aware that perform the habit. **Objective:** This study aimed to conduct a quantitative and qualitative overview of the literature findings on the treatment of bruxism in pediatric dentistry. **Methods:** The PRISMA Platform systematic review rules were followed. The search was carried out from November 2024 to January 2025 in the Scopus, PubMed, Science Direct, Scielo, and Google Scholar databases. The quality of the studies was based on the GRADE instrument and the risk of bias was analyzed according to the Cochrane instrument. **Results and Conclusion:** 112 articles were found, 42 articles were evaluated in full and 33 were included and developed in the present systematic review study. Considering the Cochrane tool for risk of bias, the overall assessment resulted in 20 studies with a high risk of bias and 32 studies that did not meet GRADE. Most studies did not show homogeneity in their results, with X^2=94.8%>50%. Some authors concluded that in children, there are several etiological factors of bruxism, such as psychological, local factors, occupational activities, and systemic conditions, factors such as stress and anxiety little considered the influence of allergic phenomena in this dysfunction. According to the author, in the allergic factor, nocturnal bruxism is from a reflex initiated by the increase in negative pressure in the tympanic cavities when there are successive allergic edemas in the mucosa in the Eustachian tubes. It is concluded that there are a large number of jobs in pediatric dentistry using muscle relaxant boards as a treatment for bruxism and temporomandibular disorder and according to the results obtained with a critical significance level, the vast majority of authors have confirmed the benefits of using the plates. It was concluded that bruxism has a multifactorial etiology because there is ample evidence that emotional stress is a major trigger, while occlusal interference is a predisposing factor. But some theories admit that occlusal disharmony is as etiological factor of bruxism.

Keywords: Bruxism. Children. Pediatric Dentistry. Predictors.

Introduction

There is a difficulty in determining the prevalence of bruxism habit and therefore are essential methods of assessment, since only 5-20 % of the carrier's habit population are aware that hold the habit. Most of the time the individual becomes aware of his condition after someone has warned that heard the creaking noise of teeth [1-3].

Using electromyographic measurements examined relations between nocturnal bruxism, stress, and individual personality and their interrelationships ie stress, bruxism, and individual personality. 100 bruxism patients underwent a battery of tests on their personality indicating when there was a stress relationship and was present bruxism present in dental evaluation. Frequency electromyographic measures and duration of bruxism were recorded for 50 consecutive nights. In the first 24 hours, there was a low level of stress, obtaining statistically significant data in 8 patients. However patients with high levels of stress

reported more anxiety, irritability, and depression consequently bruxism [1].

Also, bruxism can entail several changes in the elements of the stomatognathic system, causing the imbalance. Currently, there is a great concern directed at the dysfunctions of the stomatognathic system. It was observed numbers were ever higher for children with teeth wear on occlusal and incisal surfaces [4,5].

These changes in the incisal or occlusal cervical dimension, which can occur either in the primary dentition and in permanent, stem from the ranger act or tighten and lock the best known with bruxism teeth. Numerous works have been published on etiological factors and nomenclature adopted by their classification. The etiology is triggered by local factors, systemic, psychological, occupational and hereditary [6,7].

Given this, the aim of this study was a quantitative and qualitative synthesis of the literature findings on the treatment of bruxism in pediatric dentistry.

Methods

Study Design

This study followed the international systematic review model, following the PRISMA (preferred reporting items for systematic reviews and meta-analysis) rules. Available at: http://www.prisma-statement.org/?AspxAutoDetectCookieSupport=1. It was accessed on: 01/20/2025. The AMSTAR-2 (Assessing the methodological quality of systematic reviews) methodological quality standards were also followed. Available at: https://amstar.ca/. It was accessed on: 01/20/2025.

Data sources and research strategy

The literature search process was carried out from November 2024 to January 2025 and developed based on Web of Science, Scopus, PubMed, Lilacs, Ebsco, Scielo, and Google Scholar, covering scientific articles from various periods to the present day. The descriptors (DeCS / MeSH Terms. Available on: https://decs.bvsalud.org/) were used: *Bruxism. Children. Pediatric Dentistry. Predictors*, and using the Boolean "and" between MeSH terms and "or" between historical findings.

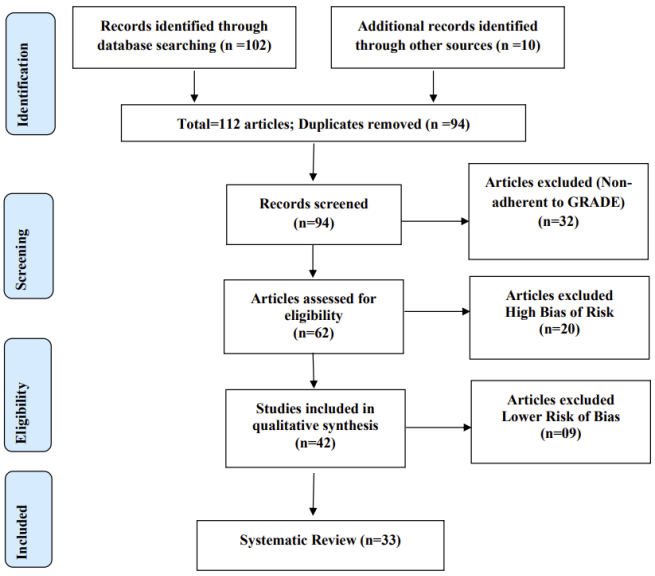
Study Quality and Bias Risk

The quality was classified as high, moderate, low, or very low regarding the risk of bias, clarity of comparisons, precision, and consistency of analyses. The most evident emphasis was on systematic review articles or meta-analysis of randomized clinical trials, followed by randomized clinical trials. Low quality of evidence was attributed to case reports, editorials, and brief communications, according to the GRADE instrument. The risk of bias was analyzed according to the Cochrane instrument by analyzing the Funnel Plot graph (Sample size versus Effect size), using Cohen's d test.

Results and Discussion

A total of 112 articles were found. Initially, duplicate articles were excluded. After this process, the abstracts were evaluated and a new exclusion was performed, removing the articles that did not include the theme of this article, resulting in 62 articles. A total of 42 articles were evaluated in full and included in this study, and 33 were developed in the systematic review item (Figure 1). Considering the Cochrane tool for risk of bias, the overall evaluation resulted in 20 studies with a high risk of bias and 32 studies that did not meet GRADE. According to the GRADE instrument, the 14 studies that composed the systematic review presented homogeneity in their results, with X^2= 94.8% >50%, with p<0.05.

Figure 1. Study Eligibility (Systematic Review).

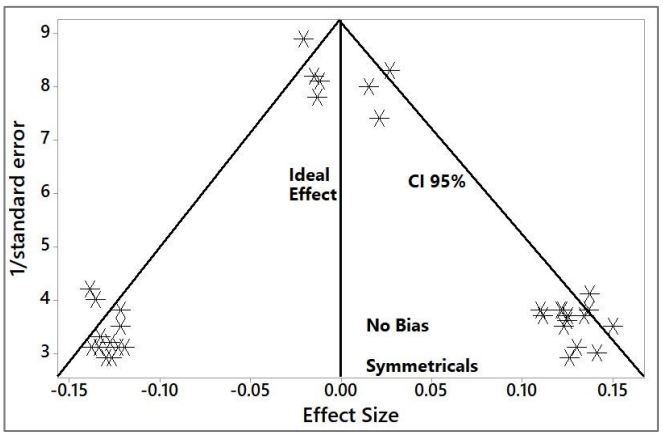


Source: Own Authorship.

Figure 2 presents the results of the risk of bias in the studies using the Funnel Plot, through the calculation of the Effect Size (Cohen's Test). The sample size was determined indirectly by the inverse of the standard error. The number of studies evaluated was n=33. The graph showed symmetric behavior, not suggesting a significant risk of bias in studies with small sample sizes, which are shown at the bottom of the graph.

Figure 2. The symmetric funnel plot does not suggest a risk of bias between the small sample size studies that

are shown at the bottom of the graph. N=33 studies.



Source: Own Authorship.

Literature Review – Major Clinical Results

Some authors concluded that in children, there are several etiologic factors of bruxism, such as psychological factors, local, occupational, and systemic conditions, and factors such as stress and anxiety little is considered the influence of allergic phenomena in this dysfunction [1-3]. According to him, the allergic factor of nocturnal bruxism is from a reflex triggered by increasing the negative pressure in the tympanic cavity when there is successive allergic edema of the mucosa in the Eustachian tubes [8-15].

Thus, allergic children have smaller amount of saliva, the need for swallowing and decreases the incidence of bruxism due to the auditory tubes [16-19]. It showed that there was an occurrence of bruxism three times in allergic patients compared to normal subjects and that the critical period is the period comprised between 0 and 7 years of age [20].

Authors conducted a review of the literature on bruxism and found the following etiological agents: local factors, combinations of factors, conscious or unconscious anxiety, frustration, repressed aggression, and obsession. The parafunctional habit can be a non-adaptive response to insoluble problems, even if the individual is reactive, or reflects the individual's inability to certain emotions [21-24]. In his article, he found that bruxism increases with age during the period of mixed dentition and then decreases from bruxism but mild cases can be treated with periodic observation. Occupational factors, genetic, systemic (deficiency in magnesium intestinal absorption, gastrointestinal disorders, enzyme imbalance and nutritional and vitamin deficiencies) have also been suggested as etiological [25].

The identification of a stress situation suggests referral to a psychotherapist, which can provide the patient with awareness, motivation, and transformation of their relationship with reality, hence the decrease in the state of anxiety and tension [22]. The bruxism is unconscious, destructive, characterized by clenching of the teeth of both jaws during sleep or awake, the etiology of which is not yet sufficiently clarified. He also states that there are no differences in gender preference and can occur at any age and that the frequency and severity of bruxism is associated with physical and emotional stress [4-7].

Added to this, authors associated the etiology of bruxism with dysfunction of the temporomandibular joint (TMD), occlusal problems, emotional or psychological problems, and neurological disorders, the most common cause of emotional problems. There are two types of bruxism: dental creak and teeth clenching. They believe that the etiology of bruxism is not yet fully understood, knowing that it is multifactorial, where the psychological factor is. She reports that the onset of bruxism can occur with the eruption of the first primary tooth during the mixed dentition [26-29].

Also, authors founded that 60 % of children between 3 and 5 years have bruxism in this study he compared two groups of children. One group did not submit to use a night card, and the second group had to use a plate overnight. For 8 months were made of plaster models to assess the wear facets during the study. This resulted in four children in the control group with facets during the study period, and five of the children from the other group used the plate to bite during the night, there was no increase in facets, even after the removal of plaque. They concluded that a nocturnal bruxism plate is effective in tracking children 3 to 5 years of age [30].

These factors are considered by some researchers as the most common cause of bruxism [1,2]. Emotional stress can express itself through various nervous habits, one of which can be bruxism. Usually, when an individual is under severe emotional stress, family problems, conflicts at work, existential crises, or various other emotions that he is unable to express these remain hidden in the subconscious, and therefore having the gnashing of teeth act [23].

Bruxism occurs in the masticatory muscles, which should receive psychological tension. The first reaction to psychological stress is the increase in tonicity. Increased tone leads the individual to join the teeth of statically or dynamically [2-4]. For bruxism to happen, there must be at least two teeth in occlusal contact. Teeth may be artificial and not necessarily in occlusion. In children, this habit is often associated with the transition from primary teeth to permanent, due to the child's unconscious attempt to position individual dental plans so that the muscles stay at rest. They may even tear the gums, in the absence of antagonists [1-3].

In addition, child bruxism is growing in modern society, and its development has occurred by

psychological factors such as emotional stress, and anxiety [1]. Bruxism has its difficult diagnosis and optimal treatment is the multidisciplinary therapy, the pediatrician has a very important role in the diagnosis to be the first professional to have contact with the child, having an important role in referring to other professionals such as psychologists and pediatric dentists [3].

So, one should make tooth protection, to reduce the gnashing of teeth, combine the temporal and facial pain, improve sleep, and strategic tooth shape, psycho-behavioral and pharmacological. And advocates the use of bite plates for inducing muscle relaxation, to be a reversible treatment, the material of choice should be based on silicone, with a thickness of 3mm to avoid puncture and increase impact resistance [1-3]. In certain situations, there may be a need for systemic treatment using medications, psychological counseling, and medical treatment. If diagnosed that is psychological, going for treatment. There must be interaction between the professionals of both specialists, to monitor the development and growth, and to promote health. [17,31,32].

Besides, bruxism can occur during the daytime and nighttime periods, and is multifactorial and it occurs in both children and adults their research found in 22 children aged 7 to 12 years and 11 months old through emotional indicators Koppitx and drawing the human figure to analyze the personality of children with bruxism. The results indicated that most of the children had emotional problems, it concludes that in most cases of childhood bruxism, is due to emotional problems and stress [33].

Rodrigues et al (2006) [27] concluded that bruxism has its own characteristics and varies for each person, should therapy be conservative, non-invasive and reversible. You should make a good history, to recognize the symptoms of bruxism, and indicate a multidisciplinary approach associating the use of occlusal splints, physical therapy, speech therapy, psychology and dentistry.

Ghanizadeh (2013) [28] did a study with three children whose parents reported having nocturnal bruxism with hydroxyzine administration to be an effective therapeutic approach for the treatment of bruxism in the short term and has no contraindication for children, the anamnesis made with parents, but use was 10-25 mg per night for all three patients were followed for two months. After the use of hydroxyzine, the results that parents reported were significantly reduced after taking hydroxyzine for a month and no adverse reaction was reported. And Ghanizadeh's reports suggest that hydroxyzine may be effective for treating bruxism in children.

Castelo (2010) [29] surveyed children of both sexes aged 6 to 8 years of these children 69 had no signs or symptoms of nocturnal bruxism, and 25 had signs, and its purpose was to evaluate the quality of life of a child. The collected data through interviews with parents and clinical examination, through these data, made an association between sleep bruxism and age, body mass index, maternal use of alcohol/tobacco/drug during pregnancy, parental education, maternal age birth presence of sucking habits, number of children, nail-biting, the occurrence of death divorce/father, older children (first child). The results show that 94 of the 25 children had symptoms of bruxism, nail-biting was the most frequent habit 43.61 % and 29.79 % had at least one type of sucking habit, children who had bruxism had the same quality of life as those without parafunction and children of younger mothers were more likely to present bruxism.

According to Fonseca et al. (2011) [30] child bruxism may be related to headaches and cause damage to deciduous teeth. Thus, they conducted a study with 170 children aged 3 to 6 years, assessing the incidence of bruxism in children Itanhandu, Mg, and 88 girls. It found that there were wear facets on the teeth using clinical examination and questioning the parents about the behavior and habits of their children. A total of 15.29 % had been diagnosed that had bruxism 46.47% had restless behavior and 10% used medication. There was a large positive correlation between patients who had bruxism and those who had restless behavior, as 73 % of patients who were bruxists exhibited restless behavior, but no correlation was found between bruxism and medication or duration of breastfeeding.

According to Vanderas, Papagiannoulis (2002) [31], There are different types of mallocclusion and parafunction as bruxism, jaw trauma or TMD and stress are etiological factors for craniomandibular dysfunction. E conducted a study with 314 children aged 6 to 8 years, who were examined clinically with signs of dysfunction mandibular skull and malocclusion. Stress was measured by urinary catecholamines and a questionnaire was distributed to parents to collect information history of dentofacial and socioeconomic factors injury. It concluded that Parafunctional, structural, and psychological factors can increase the likelihood of the child developing the signs and symptoms of TMD.

Tosato et al. (2008) [32] did a prevalence of bruxism in children aged 3 to 7 years and related to the symptoms of TMD and delivered a questionnaire to the mothers of 90 children (41 boys and 49 girls), asking if the children had TMD pain, fatigue or difficulty

to chew and range or tighten the teeth, had a headache often heard, it creaked and shook his teeth. It concludes that 27.77% were bruxômeras, 48 % girls and 52 % boys. The prevalence of TMD symptoms was higher than in children who had no bruxism.

According to DiFrancesco et al., (2004) [33] Children who have sleep apnea awaken frequently, thereby increasing the parafunctional activity, and this can lead to bruxism, which may be associated with interrupted sleep. Furthermore, children who have airway obstruction tend to throw the opposite jaw thereby improving airflow and can thus stimulate the receptors of the upper airways, thereby increasing the tone of these pathways, which can lead to bruxism.

Bruxism has a broad etiology, for which there is no specific treatment, each individual must be monitored and treated individually. The most effective treatment is multidisciplinary, involving such diverse fields as pharmacology, psychology, dentistry, physiotherapy, speech therapy. Thus they must not use a single occlusal splints as a treatment modality in conjunction with most other specialties [1-3].

In the field of dentistry the use of muscle relaxant plates is reversible, non-invasive, relatively simple to perform, and has low cost, moreover, also assists in determining the differential diagnosis of temporomandibular disorders [1]. There was an improvement in pain after use of the plate in 70% of patients who were carriers of the problem in less than 6 months. As the patient's problem for over two years (chronic), there have been no major improvements. Therefore, therapy with muscle relaxant plates is more effective at the beginning of pain in the TMD frame [2].

Also, a case in which the patient reports pain in the masseter muscle region and the temporomandibular joint. In clinical and radiographic examination, wear dental and occlusal changes [3]. Therapy with an occlusal splint has been established. After follow-ups and necessary adjustments within one month of treatment, improvement in pain symptoms was reported by the patient. The plates have the function of protecting the teeth of parafunctional habit, preventing wear, periodontal problems, and even loss of the element, and reducing pain in the muscles of mastication and TMD [3,4].

The etiology of bruxism is still not fully understood and it is known that there are several etiological bruxism factors in child patients, such as the local order, systemic, psychological, and occupational, but in most cases is of psychological origin [3,4]. The best treatment depends on the etiological factor, always analyzing the signs and symptoms because this knowledge of the conditions that cause bruxism is of utmost importance for treatment. Do a good clinical diagnosis, and assess the psychological signs of the patient, it is essential for a good history. Some authors also indicate the occlusal interference with the use of bite plates but must be used together, preferably in a multidisciplinary way, involving pediatricians, dentists, psychologists, and otolaryngologists [5-8].

Conclusion

It was concluded that bruxism has a multifactorial etiology, because there is ample evidence that emotional stress is a major trigger, while the occlusal interference is a predisposing factor. But some theories admit the occlusal disharmony as etiological factor of bruxism.

CRediT

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Informed Consent

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No additional data are available.

Conflict of Interest

The authors declare no conflict of interest.

Similarity Check

It was applied by Ithenticate@.

Peer Review Process

It was performed.

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