

Bruxism in Children and Adolescents and its Association with Some Possible Aetiological Factors

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ABSTRACT: Bruxism is a nocturnal parafunctional activity represented by grinding and clenching of the teeth. Bruxism is considered to be the most harmful of the parafunctional activities of the stomatognathic system, being responsible for tooth wear, periodontal lesions and joint and/or muscle lesions. This study consists of a group of 189 children (111 male and 78 female) that responded correctly and completely to a questionnaire that contained nine items assessing sleep bruxism. According to our research, there was a statistically significant association between bruxism and headache ($p < 0.0001$), tooth/gingival sensitivity ($p < 0.0001$), muscle stiffness, presence of stress ($p < 0.0001$), and vicious habits. Within the limits of this study, parafunctional phenomena such as nocturnal bruxism interest an important percentage, over 60%, involving children of both genders in relatively equal proportions.

KEYWORDS: *Bruxism, children, adolescents, oral parafunction.*

Introduction

The literature describes various methods of evaluating parafunctional activities such as bruxism.

The most used evaluation method is the use of a questionnaire.

Their primary advantage is that they can be applied to a large population, although information about bruxism is subjective [1].

Using patient self-report or relative-reported information regarding bruxism signs/symptoms to assess the presence or absence of bruxism is much more convenient for clinicians and researchers, especially in epidemiological studies.

About 80% of bruxism episodes, such as teeth grinding, are not accompanied by noise [2].

Also, a large percentage of adults and children are not aware of the typical bruxism activity.

Therefore, they will not identify themselves as having bruxism.

Furthermore, self-report of bruxism-related signs and symptoms, as well as awareness of bruxism, has been found to fluctuate substantially over time [3,4], and under- or overestimation of the prevalence of sleep bruxism has been reported [5].

The aetiology of bruxism is still incompletely clarified.

For a long time, it was considered that bruxism occurs due to some local triggers, such as occlusal factors and occlusal interferences.

Over the years, bruxism was also considered a manifestation of a temporomandibular disorder, a sleep disorder, or a behavior disorder frequently associated with stress [6].

The golden standard for assessing muscle activity in nocturnal bruxism is polysomnographic recordings.

However, this investigation cannot currently be used in healthy individuals [7], only applicable to research projects [8].

The **objectives** of this study are:

Determining the prevalence of signs and symptoms specific to nocturnal bruxism, as well as the correlation of stress factors with the appearance of signs and symptoms of bruxism;

The study's null hypothesis assumes that there is no statistically significant association between bruxism and stress, headache, tooth/gingival sensitivity, muscle stiffness, drug treatment, presence of stress, vicious habits, patient gender and age.

Material and Method

We used a self-designed questionnaire following similar studies in the literature, to which the child or his parent/legal guardian answered.

The questionnaire consists of 7 closed questions, and two open questions concerning

specific signs and symptoms of nocturnal bruxism, the presence of vicious habits, as well as life events that can have an emotional impact on the child's life that can generate stress.

The patient assessed the severity of pain by selecting an image from the visual analogue pain scale (Figure 1).

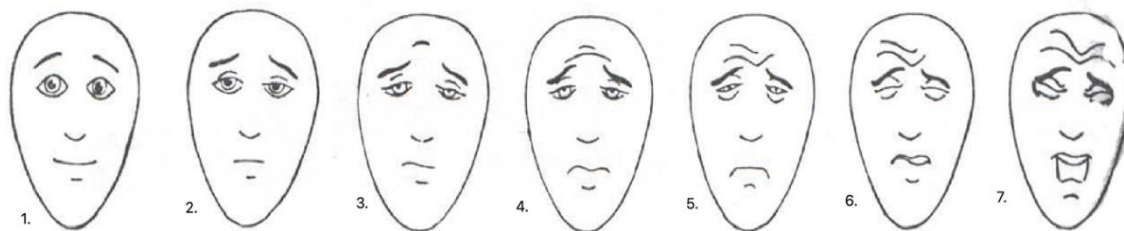


Figure 1. Analog visual scale of pain: According to the description in the literature: 1.1 represents the absence of pain, 1.2 represents mild pain, 1.3 moderate pain, 1.4 moderate pain, 1.5 severe pain, 1.6 very severe pain and 1.7 represents the strongest pain sensation possible.

We performed an intraoral and extraoral clinical examination of those involved in the study to observe if there were any characteristic signs of parafunction, such as tooth abrasion, tooth sensitivity, periodontal lesions, and joint and muscle lesions.

The Research Ethics Commission of the University of Medicine, Pharmacy, Science and Technology "George Emil Palade" approved study No. 1639 of 03.03.2022.

Informed consent for participation in the study was requested from each participant and was returned signed by the parent or patient along with the completed questionnaire.

The questionnaires were distributed to a number of 210 children (87 females and 123 males) aged between 5 and 18 years, who presented themselves in the dental office either for a routine check-up or for the treatment of an emerging condition.

The children were given explanations of the nature of the study on their terms and also to the relatives in the case of patients under 18 years old.

We asked them to return the completed questionnaire and the signed informed consent form on the day of the dental examination.

Of the total number of questionnaires, 189 were correct and wholly produced, and only these children and adolescents participated in the study (Table 1).

Table 1. Age and gender of patients participating in the study.

Age	Male	Female	Total
5-9	60	33	93
10-15	42	33	75
16-18	9	12	21
Total	111	78	189

The clinical examination consists of an extraoral and an intra-oral examination.

During the extraoral examination, palpation and auscultation of the temporomandibular joint, palpation and inspection of the mandibular muscles were carried out, especially looking for the presence or absence of muscle hypertrophy.

To detect possible muscle pain, we performed a palpatory examination performed at the level of the masseter and temporal muscles.

The force and symmetry of the contraction were also investigated, as well as a possible sensation of sensitivity or pain.

The intra-oral examination consists in checking the following aspects: the presence of dental wear and abrasion not being consistent with the patient's age, as well as the presence of possible dental fractures and the presence/absence of lesions at the level of the intra-oral soft parts.

For statistical interpretation of the data descriptively and analytically we used GraphPad Prism 9 for Mac version 9.3.1.

The statistical analysis tests Chi-square and Fisher exact test, at a significance level of $p < 0.05$ were applied to evaluate the association between bruxism and the estimated parameters.

Results

Of the total number of questionnaires used, 189 were filled in correctly and completely (response rate of 90%), the gender distribution of the respondents being 78 females (41.2%) and 111 males (58.7%), the mean age of the batch being 11.87 ± 4.056 .

Among them, according to the evaluation of the answers, 120 children (63.4%), of which

54 females (28.5%) and 66 males (34.9%), have bruxism.

The descriptive statistics elements related to the evaluated parameters can be found in the graphs in Figures 2-8.

Following the application of the Chi-square test with a $p=0.2279$ (Odd Ratio=1.438; 95% Interval of Confidence 0.7963 to 2.612), it was proved that there is a statistically insignificant positive association (Odd Ratio>1, lower limit Interval of Confidence $95%<1$) ($p<0.05$) between bruxism and stress (Figure 2).

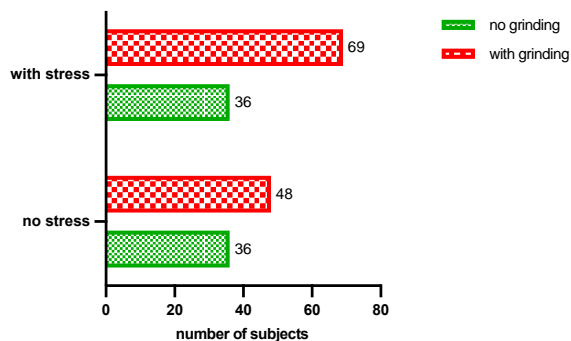


Figure 2. The relationship between bruxism and stress.

To highlight the association between bruxism and the presence of dental/gingival sensitivity, the Fisher exact test was applied, between these two elements being an extremely statistically significant association ($p<0.0001$) (Figure 3).

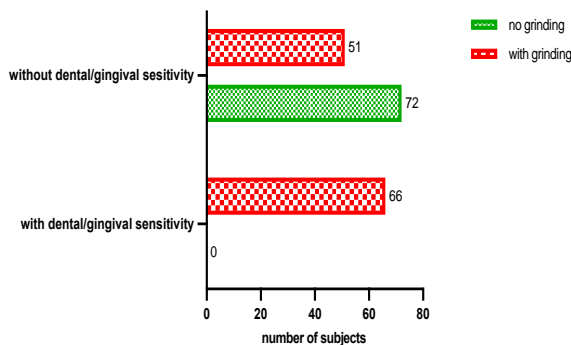


Figure 3. Bruxism-tooth/gingival sensitivity relationship.

There is a highly statistically significant association between bruxism and morning headaches using the Chi-square test with a $p<0.0001$ (Figure 4).

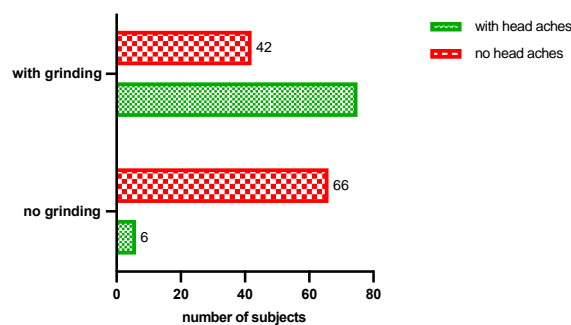


Figure 4. Bruxism-headache relationship.

With a $p<0.0001$, calculated following the application of Fisher's exact association test, it was demonstrated that there is an extremely statistically significant association between bruxism and muscle stiffness felt in the morning, thus disproving the null hypothesis (Figure 5).

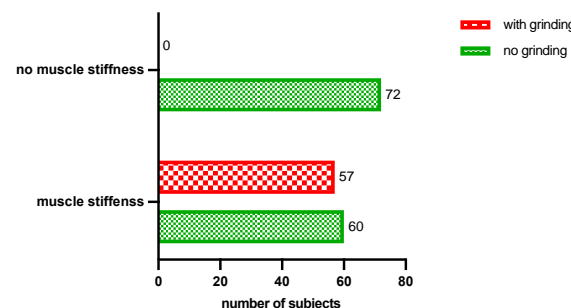


Figure 5. Bruxism-muscle stiffness relationship.

No statistically significant association was found (Fisher exact test, $p=0.0842$) between bruxism and following drug treatment.

The null hypothesis is confirmed (Figure 6).

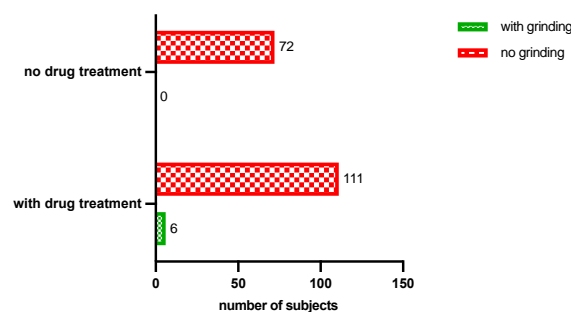


Figure 6. The relationship between bruxism and drug treatment.

By using the Chi-square test with a $p=0.0474$, we demonstrated that there is a statistical association between bruxism and difficulty falling asleep, thus disproving the null hypothesis.

We used the Chi-square test to observe whether the presence of stress factors in the

patients' lives can cause the appearance of bruxism.

With a $p < 0.0001$, it was demonstrated that there is an extremely statistically significant association.

The association between bruxism and the presence of vicious habits was demonstrated by applying the Chi-square test. With a $p < 0.0001$, it

was shown that there is an extremely statistically significant association, thus disproving the formulated null hypothesis (Figure 7-A).

Applying the same test with a $p = 0.0014$ demonstrated a statistically very significant association between the number of vicious habits present and bruxism (Figure 7-B).

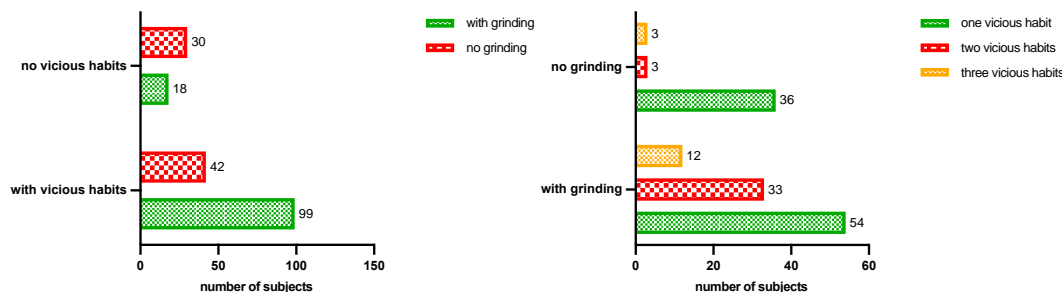


Figure 7. A. Bruxism-vicious habit relationship; B. Relationship bruxism-number of vicious habits.

We applied the Chi-square test to observe the association between bruxism and the pain intensity felt by patients upon waking up, demonstrating a statistically significant association between these two studied parameters ($p = 0.0047$) (Figure 8).

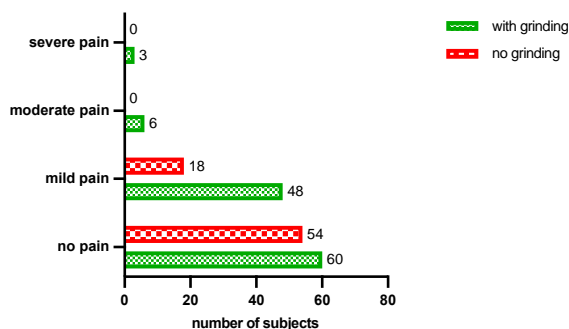


Figure 8. The relationship between bruxism and pain perception.

The Chi-square test was applied to observe the association between bruxism and the gender of the patients, with a $p = 0.0821$, Odd ration= 1.714 , minimum Interval of Confidence of 95% value of 0.9307 and maximum value of 3.150 .

We demonstrated that there is a statistically positive association insignificant.

To observe if the age of the patients influences the appearance of bruxism, two age groups were created, children aged between 5-12 years and adolescents aged between 13-18.

Following the Chi-square test, it was demonstrated that there is no statistically significant association between the studied parameters ($p = 0.9307$).

Discussions

The prevalence of nocturnal bruxism in children varies between different studies.

Its prevalence in children has been reported in the literature to vary between 7% and 88% [9,10].

Similar to the prevalence results of nocturnal bruxism, which have a wide range, the prevalence was found to be 61% in the present study.

Compared to our study, Diana Vlăduțu et al. recorded a bruxism prevalence of 31.8% [6].

The studies of Farsi et al. [11] and those of List et al. [12] regarding temporomandibular joint and oral parafunction among children include both a questionnaire and a clinical examination.

The questionnaire included in these studies is specifically addressed to parents who asked about the determined factors to which the child was exposed, his oral habits, the relevant signs that the parent knows and has noticed, the symptoms that the child complains about and a clinical examination [11,12].

In addition to the diagnostic criteria for bruxism of the International Classification of Sleep Disorders [13], it has been reported that there are differences in the data collection methods used to assess nocturnal bruxism in children, based on the use of optical readings, dental casts analysis, polysomnography, evaluation of muscle contraction force by tape electrodes or self/parent reports.

However, the researchers also stated that none of these methods is preferred over another.

Parents have been reported to play an essential role in the diagnosis of nocturnal bruxism in

children, as they are able to recognize the sounds of teeth grinding [14].

Determining the presence of bruxism has the role of showing the presence or absence of masticatory activity.

It is essential to determine whether the present muscle activity could become a risk factor leading to the oral health disorder [6].

In one study, it was reported that 61.9% of parents did not know about bruxism and did not know what led to it [15].

Therefore, it was shown that parents have limited knowledge about bruxism, which the doctor should clarify.

In a study that evaluates the relationship between gender and nocturnal bruxism, it was found that bruxism is more common in males [16].

In contrast, another study reported that in the case of females, there is a more significant association with parafunctional habits [17].

In another study, no significant relationship was established between nocturnal bruxism and the gender of the subjects [6,18].

In our study, according to the evaluation of the obtained data, we found that nocturnal bruxism was statistically significantly higher in females.

According to the studies carried out by Gomes et al., psychosocial factors such as stress and anxiety may also affect the aetiology of nocturnal bruxism [19].

In the present study, we observed that the birth of a brother/sister, change of residence, change of school, divorce in the family, death of a close family member or exams affect the occurrence of nocturnal bruxism because all these events in the patient's life can increase the stress and anxiety of the family.

In the present study, other oral parafunctional habits such as finger sucking, nail biting, object biting, etc., were common in children with nocturnal bruxism.

In support of this correlation, researchers have stated that there is a significant relationship between nocturnal bruxism and parafunctional habits [20].

These parafunctional habits have been reported to be a common way to relieve emotional stress [21], so parents and dentists should be aware of them to provide psychological therapy to children and prevent esthetic and functional problems that may result from these harmful habits and bruxism, respectively.

Bruxism assessment can be non-instrumental or instrumental. The non-instrumental evaluation is based on a questionnaire [7].

Methodologically, it should be noted that this study was specifically designed to measure the correlation between self-reported bruxism and a bruxism diagnosis based on a clinical assessment.

There was no intention to assess the absolute validity of each approach, particularly concerning the presence of true bruxism, which should be tested against reference standards, as was done in a sample polysomnographic study large number of patients suggesting that the prevalence of sleep bruxism varies between 5.5% and 12.5% based on the diagnostic strategy (i.e., polysomnography only, questionnaires only, or both methods) [22].

Conclusions

Within the limits of this study, parafunctional phenomena such as nocturnal bruxism interest an essential percentage, over 60%, involving children of both genders in relatively equal proportions;

The results of the study on the investigated group show no association of bruxism with drug treatments, age or gender of the patients.

Still, bruxism episodes are associated with other evaluated factors such as headache in the morning when waking up, muscle stiffness, dental/gingival sensitivity, difficulty falling asleep, and other vicious habits.

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Conflict of interests

None to declare

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