

Frequency of sleep bruxism in children aged 3-7 years, characteristics of some risk factors, and features of sleep

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Честота на нощен бруксизъм при деца 3-7 години, характеристики на някои рискови фактори и особености на съня

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Abstract

Introduction: *Bruxism is a parafunction characterized by squeezing, grinding, and/or putting pressure on the teeth. It can be awake or sleep bruxism and occurs in both adults and children, and is associated with a wide variety of risk factors. Nocturnal bruxism is more common and is the subject of this study with examining the risk factors associated with the general health of children and their sleep.*

Aim: *To study the frequency of sleep bruxism in a group of children aged 3-7 years and the related risk factors.*

Materials and methods: *The object of study are 162 children aged 3-7 years. Their parents were provided with a survey of 31 questions examining the presence and type of bruxism and related risk factors.*

Results: *1/3 of the children aged 3-7 suffer from nocturnal bruxism, with its beginning around 3 years of age. No common diseases have been demonstrated as a risk factor. Sleep disorders are observed in 25.5% of children with bruxism compared to only 12.2% in children without bruxism, and in about 1/3 of the children with bruxism, the parent reports the presence of morning discomforts, while in children without bruxism such are present only in 18.3%.*

Conclusions: *Bruxism occurs in 29% of the studied children and is associated with more frequent sleep interruptions and morning discomforts in the affected children. At the age of 3-7 years, it is not associated with the presence of the studied common diseases.*

Key words: *nocturnal bruxism, childhood, sleep, parafunction*

Резюме

Въведение: *Бруксизмът е парафункция, характеризираща се със стискане, скърцане и/или натиск на зъбите. Той може да бъде дневен или нощен и се среща както при възрастни, така и при деца, като се свързва с множество разнообразни рискови фактори. Нощният бруксизъм се среща по-често и е обект на настоящото изследване, като се проучват рисковите фактори, свързани с общото състояние на децата и съня им.*

Цел: *Проучване на честотата на нощен бруксизъм в група деца от 3-7 години и свързаните с него рискови фактори.*

Материали и методи: *Обект на изследване са 162 деца, на възраст от 3-7 години. На техните родители е предоставена анкета от 31 въпроса, проучващи наличието и вида на бруксизъм и свързаните с него рискови фактори.*

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Резултати: 1/3 от децата на 3-7 г. страдат от нощен бруксизъм, с начало около 3-годишна възраст. Не бяха доказани общи заболявания, като рисков фактор. При 25.5% от децата с бруксизъм се наблюдават нарушения на съня в сравнение с едва 12.2% от децата без бруксизъм, а при около 1/3 от децата с бруксизъм, родителят съобщава за наличие на сутрешни неразположения, докато при децата без бруксизъм са налични едва при 18.3%.

Изводи: Бруксизмът се среща в 29% от изследваните деца и се свързва с по-чести прекъсвания на съня и сутрешни неразположения при засегнатите деца. Във възрастта от 3-7 години той не се свързва с наличието на общи заболявания.

Ключови думи: нощен бруксизъм, детска възраст, сън, парафункция

Introduction

Sleep bruxism is a parafunction that occurs in both adults and children and is characterized by clenching, grinding, and/or putting pressure on the teeth. It can also be observed during the day and then it is called awake bruxism [1].

The onset of this parafunction is established in early childhood, with data showing occurrence even in 2-year-olds [2], but most often it is between 4-8 years [3-5]. Common risk factors for bruxism are rhinitis and sinusitis, as well as upper respiratory tract diseases, which we define as frequent intercurrent infections [6, 7]. Another common disease that is cited as a risk factor is gastro-oesophageal reflux [8]. Allergies, which are often associated with difficulty breathing (allergic rhinitis, asthma attacks), can also cause an increase in episodes of bruxism [9, 10].

Nocturnal bruxism occurs during sleep, which is the reason, the characteristics of sleep and the conditions under which it happens are a subject of research. One of the factors associated with a higher incidence of bruxism is the child's place of sleep – whether it is in the parent's room or near it [11]. Risk factors for nocturnal bruxism may be restless sleep or insufficient sleep, which may include snoring and difficulty breathing, talking during sleep [6, 12, 13, 14]. On the other hand, because of sleep bruxism and its occurrence during sleep, we can observe some morning discomforts, like bad mood, difficult awakening, fatigue, etc. [15].

The frequency of nocturnal bruxism, as well as the many risk factors that may be associated with it, require a thorough study of its prevalence among

children in Bulgaria, as well as identifying the most common causes of its occurrence so that adequate treatment and prophylactic measures can be taken to reduce the consequences for the growing organism.

Aim

To study the frequency of nocturnal bruxism in a group of children aged 3-7 years and the related risk factors.

Materials

In the present study, 162 children aged 3-7 years, attending 14 and 189 kindergartens, in the city of Sofia were studied. After filling in a written informed consent, approved by KENIMUS, the parents were provided with a questionnaire.

Methods

Survey method: by a questionnaire, containing 31 questions, we examined risk factors for sleep bruxism, some of which are the subject of this article. The questionnaire is filled in by the parents and includes questions about:

- personal data of the child and the parent;
- general condition and diseases of the child (frequent intercurrent infections, gastro-oesophageal reflux);
- oral hygiene and eating habits;
- bruxism – sleep and/or awake, onset, frequency of grinding, heredity;
- sleep habits – the place to sleep, time to fall asleep and wake up, sleep interruptions (restless sleep, talking, snoring, difficulty breathing during sleep, etc.);

– morning discomforts (poor sleep, fatigue, headache, pain in the masticatory muscles, etc.);

Statistical methods: IBM® SPSS® Statistics 19 was used for statistical processing of the results. A 95% confidence interval ($p < 0.05$) was chosen for the significance level at which the null hypothesis was rejected. Descriptive analysis, alternative analysis, T-criterion were used to compare relative proportions.

Results

Frequency of children with bruxism

The prevalence of bruxism in children aged 3-7 years was studied based on a survey of parents of 162 children (Table 1).

The data in the table show that over 1/3 of the parents of surveyed children reported bruxism. On the other hand, those with only sleep bruxism predominate (26.5%). 4.3% of children showed only awake bruxism, and the remaining 2.5% showed the presence of both conditions. A higher prevalence of nocturnal bruxism was observed, supported by statistical significance ($p < 0.05$).

In the present study, the focus is sleep bruxism, which was found in 47 of the studied children (occurring alone or in combination with awake bruxism). The least of these children have bruxism at

the age of 3 – only 4.3%. The other age groups are distributed relatively evenly, with a predominance of 6-year-old children (29.8%).

Regarding the distribution by sex, we found that 28 of the children with bruxism were boys (59.6%) and 19 (40.4%) were girls, which shows a predominance of males ($p < 0.05$).

The onset of bruxism and frequency of occurrence

The survey examined information about the onset of the teeth grinding according to data from parents. The distribution of children with bruxism by the beginning of the manifestation of the condition is presented in figure 1.

The figure shows that 1/3 of the parents indicated 3 years or earlier for the onset of teeth grinding of their children, followed by the group of 4-5 years of age, in which 25.6% of children with bruxism reported onset of the parafunction.

The frequency of teeth grinding was also examined according to data from parents. The results are presented in the following figure 2.

The results show that almost 1/2 of them grind their teeth less than once a week. However, in 1/4 children, episodes of bruxism were reported 3-5 nights per week.

Table 1. Frequency and type of bruxism in the studied children

Type of bruxism	n	% ± SP	T-criterion	
Without bruxism ¹	108	66.7 ± 3.7	$t_{1,2} = 7.91$	$p < 0.05$
Children with only sleep bruxism ²	43	26.5 ± 3.5	$t_{1,3} = 15.5$	$p < 0.05$
Children with only awake bruxism ³	7	4.3 ± 1.6	$t_{1,4} = 16.5$	$p < 0.05$
Children with sleep and awake bruxism ⁴	4	2.5 ± 1.2	$t_{2,3} = 5.8$	$p < 0.05$
Total	162	100%	$t_{2,4} = 6.5$	$p < 0.05$
			$t_{3,4} = 0.9$	$p > 0.05$

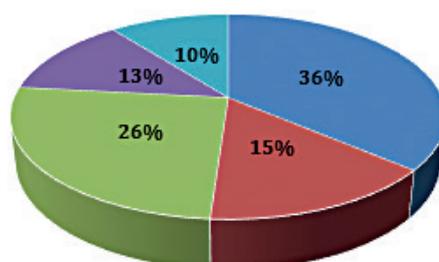


Fig. 1. Distribution of children according to the beginning of bruxism

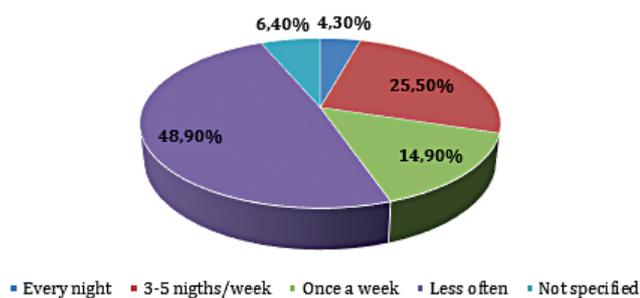


Fig. 2. Frequency of grinding in the studied children with bruxism

General diseases and bruxism

Nearly 60% of children with bruxism had a common disease, compared with 46% of children without bruxism ($p > 0.05$).

The types of common diseases in children with bruxism are presented in figure 3.

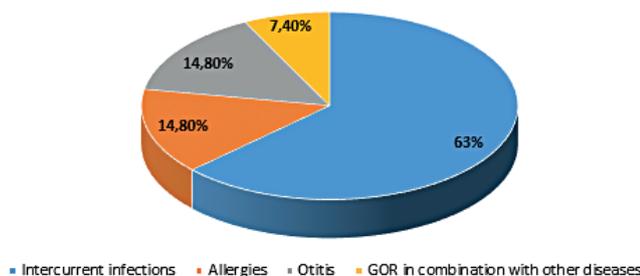


Fig. 3. General diseases in children with bruxism

The data in the figure shows that frequent intercurrent infections, alone, occur in 17 (63%) of children with bruxism. Children with allergies and those with otitis are 4 (14.8%). Children with gastro-oesophageal reflux (GOR) are rarely observed – 2 (7.4%). In some of the children, these diseases also occur in combination – otitis and/or allergy with intercurrent infections, GOR, and others.

Sleep features of the studied children with bruxism

Nocturnal bruxism is associated with the conditions of sleep and its characteristics, which are the subject of this study. The data we received for the presence of bruxism is based on observation from the parent. When studying the relationship between sleep and grinding teeth, we found that children with bruxism most often sleep in their parent's room (59.6%), and

in other cases with a sibling (17%), alone in a room (17%) or not specified (6.4%). The anamnestic data for grinding which were obtained from the parents who hear their child bruxing at night, would explain the higher percentage of children with bruxism sleeping in the parent's room ($p < 0.05$).

The survey included a question about the time the children go to bed and the time they wake up. The results of the analysis of the answers showed that the bedtime for children with bruxism is mainly between 21.00 and 23.00. In the examined children without bruxism, go to bed later – after 22.00 ($p < 0.05$). When studying the time of awakening, it was found that for the most part, children wake up or are awakened in the period 7:00-7:59, with a predominance of children with bruxism – 39 (83%) compared to those – without – 79 (68.7%) ($p < 0.05$).

We used the previous data to look for a link between bruxism and sleep duration. We found that the studied children slept mainly between 9 and 10 hours per night, but no relationship was found between bruxism and sleep duration in the studied children ($p > 0.05$).

Characteristics of sleep in children with nocturnal bruxism

We also studied the relationship of bruxism with sleep interruptions, such as crying at night, waking up suddenly with crying and difficulty calming down, waking up easily, waking up more than once at night. We found that 12 (25.5%) of the children with bruxism had sleep interruptions compared to only 14 (12.2%) of the children without bruxism ($p < 0.05$).

According to the literature, bruxism in children is associated with some behavioral phenomena regarding restless sleep, such as intense movements, talking during sleep, sudden awakening, nocturnal enuresis, night sweats, mouth breathing, snoring, somnambulism and others. These factors were investigated by a survey method, based on which we found that in 1/2 of the studied children the described specific behavioral phenomena were registered, and no significant

difference was observed between children with and without bruxism ($p > 0.05$).

The distribution of the various manifestations of restless sleep in children with bruxism are presented in the following figure:

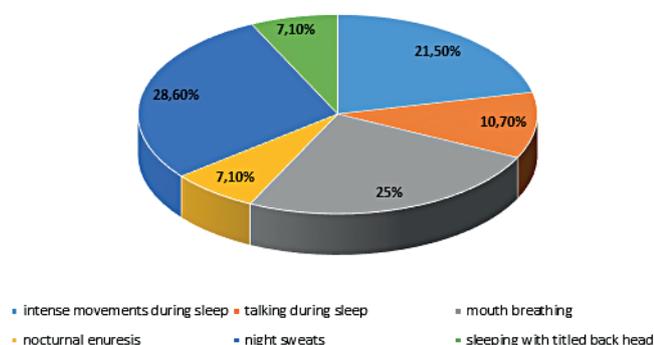


Fig. 4. Frequency of the observed manifestations of specific behavior during sleep in children with bruxism

It was found that sweating during sleep is most common – in 8 (28.6%) of children with bruxism. The next most common feature is mouth breathing and/or snoring – in 7 (25%) of them. The third most frequent is intense movement during sleep – in 6 (21.5%) of the children. Speaking during sleep occurs in only 3 (10.7%) children, and enuresis and sleeping with a tilted back head – each in 2 children (7.1%).

Morning discomforts

The survey that was given to the parents had questions, which examined the presence of morning discomforts, as bruxism is often associated with restless and poor sleep. The studied ones were bad mood upon awakening, difficulty waking up, and fatigue. Their distribution in the respective groups is shown in Table 2.

In about 1/3 of the children with bruxism, the parent-reported the presence of morning discomforts, while in children without bruxism they were present in only 18.3% of them ($p < 0.05$).

Discussion

In the study of 162 children aged 3 to 7 years, we found that 33.3% of them had bruxism, with 29% of all children surveyed reporting sleep bruxism (table 1). Clementino et al. found a prevalence of nocturnal bruxism among children aged 3 to 12 years of 32.4% [16]. Regarding the incidence of sleep bruxism by sex, 59.6% of children with this parafunction in our study were boys. Soares et al. also found a predominance of boys with bruxism [17], and in the study by Clementino et al. girls with bruxism were more [16].

We found that at the age of 3-7 years, most often the onset of teeth grinding is under or at 3 years (36.2%), and next in frequency is the group of 4-5-year-olds (25.6%) (fig.1). A meta-analysis from 2021 indicates the onset of bruxism at the age of 2 [2]. Parents most often report grinding at night less than once a week (48.9%), as well as bruxism 3-5 nights a week (25.5%), and these claims are very subjective, as children are not under constant observation during sleep every night (fig. 2).

When examining the relationship of common diseases with bruxism, no statistically significant difference was found between children with (57.5%) and those without bruxism (46.1%). According to the results we obtained, we could not connect any of these diseases as a risk fac-

Table 2. Frequency of morning discomforts in the examined children

Factor	With morning discomforts		Without morning discomforts		Total	
	n	% ± SP	n	% ± SP	n	%
With bruxism	15	31.9 ± 6.8	32	68.1 ± 6.8	47	100
Without bruxism	21	18.3 ± 3.6	94	81.7 ± 3.6	115	100
T-criterion	$t_{a,b} = 1.77 \quad p < 0.05$					

tor for bruxism ($p > 0.05$). Other studies have linked bruxism to certain common diseases such as rhinitis, sinusitis, tonsillitis, allergies, and/or upper respiratory infections [6, 7, 9, 18]. GOR was poorly represented as in the group of children we studied and we did not find a correlation with bruxism, similarly to a study from 2006, which also did not establish a link between it and bruxism [19].

Data on the presence of bruxism in the present study were obtained from the parents, and when examining the place of sleep of children, it was found that children with bruxism most often sleep in the room with a parent, which allows him to hear if the child grinds his teeth. Another factor we studied was the duration of sleep, finding that most commonly the studied children slept between 9-10 hours a night, fell asleep between 22:00-22:59, and woke up between 7:00-7:59. Sleep hours are not a risk factor for bruxism, according to other authors as well [14, 16].

The analysis of the results of the sleep characteristics, which the parents indicated in the survey, aimed at differentiating specific ones in children with bruxism. A statistically significant difference was found in the frequency of sleep interruptions in children with bruxism ($p < 0.05$), but no such was found between the different causes of interruption (fig. 4). In the literature, we found data on the connection between bruxism and restless sleep, talking during sleep, snoring, and others. [12, 13, 14]. Also, the studied children with bruxism more often complain of morning discomforts (bad mood, difficulty waking up, and fatigue) than those without bruxism ($p < 0.05$) (table 2), which is confirmed by other studies as well [15].

Conclusions

1. Nocturnal bruxism occurs in 29% of children aged 3-7 years, with a predominance of boys, with its onset most often before or at 3 years of age.

2. Frequent intercurrent infections, allergies, and gastro-oesophageal reflux are not proved to be risk factors for bruxism in the studied children.

3. Children with bruxism are significantly more likely to suffer from sleep interruptions and morning discomforts than those without but no relationship was found between the duration of sleep and bruxism.

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