



IMPACT OF THE COVID-19 PANDEMIC ON BRUXISM AND THE DAILY LIFE OF CHILDREN AGED 7-10

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ABSTRACT

Introduction: In 2020, the global pandemic of COVID-19 significantly affected our daily lives. The youngest students were most affected due to the establishment of distance education, which is associated with social isolation and increased screen time.

Aim: To investigate the prevalence and specific risk factors for sleep bruxism associated with the COVID-19 pandemic in children aged 7-10 years, their eating habits and physical activity.

Materials and methods: The object of the study are 267 children aged 7-10 years. The examined children underwent a clinical examination, during which the following were registered: dental status and attrition, oral hygiene and orthodontic status. Anamnestic data on nocturnal bruxism, physical activity, dietary habits, and screen exposure were obtained from 241 parents via a questionnaire. The results were statistically processed with SPSS-19.

Results: The frequency of bruxism in children aged 7-10 is 21.4% ($p < 0.05$). No increase in its frequency or intensity was found during the pandemic in the studied groups. The average increase in screen exposure during the pandemic was more than 60 minutes per day ($p < 0.05$). In 1/4 of the children, physical activity during the pandemic decreased ($p < 0.05$). In 21.6% of the examined children, the intake of simple carbohydrates increased ($p < 0.05$).

Conclusions: Bruxism is a common condition in school-aged children. The restrictive measures during the COVID-19 pandemic have led to a rise in some risk factors for bruxism oral and general health of children aged 7-10 years by increasing their screen exposure, consumption of simple carbohydrates and decreasing their physical activity.

Keywords: bruxism, pandemic, physical activity, screen exposure, eating habits.

INTRODUCTION

Bruxism is defined as a recurring jaw-muscle activity characterized by clenching, grinding and/or pressure upon the teeth, as well as medialization of the lower jaw. It is divided into two different groups, depending on when it occurs: sleep (nocturnal) and awake bruxism [1]. According to the literature, sleep bruxism occurs more frequently during childhood and decreases with age without predominance in either sex. [1].

Bruxism is a commonly encountered condition in children, with a prevalence of 13.5% [2] to 33% [3]. Teeth grinding is considered to be a multifactorial parafunction with a complex and controversial etiology, which is mainly regulated by the central nervous system [4].

In 2020, the global pandemic of COVID-19 reached Bulgaria as well. With the first cases of ill people, the application of anti-epidemic measures began in our country. They included the suspension of attendance at educational institutions, even for the youngest students aged 7-10. More than 90% of the children in the world have at some point been educated in a virtual environment because of the pandemic [5]. Distance learning has led to social isolation of children and long hours spent in front of electronic devices (tablet, computer, smartphone), as well as a general change in their daily routine [6]. The most common problems in childhood due to the pandemic were anxiety, depression, and stress [7]. Research shows that restrictive measures related to COVID-19 may be considered as a stress factor associated with bruxism in children [8, 9].

During distance learning, children spend more time in front of screens, with reduced physical activity [10]. Reduced physical activity also affects children's mental health [11]. There is also evidence of an increase in their anxiety levels and the frequency of bruxism [12, 13]. Restrepo et al. found that children who consumed more added sugar and those who spent more time in front of a screen had an increased frequency of teeth grinding [14]. Data from the literature indicate that the changes that occurred during the COVID-19 pandemic had a mainly negative effect on children, both in the psycho-emotional aspect and in increasing the frequency of bruxism [9,12,13,14].

Given the significant change in children's daily habits, we felt it was important to conduct our own study on the impact of the pandemic on the manifestation of bruxism and assess the related changes in their physical activity, screen exposure and eating habits. Since the latter have been identified as risk factors for bruxism, we could thus better assess their influence on bruxism and how much they are determinants.

AIM

The aim of the present study was to investigate the prevalence of nocturnal bruxism in children aged 7-10 years during the COVID-19 pandemic and to assess the related changes in their screen time, physical activity and eating habits and their possible role of risk factors for the manifestation of this parafunction.

MATERIAL:

In the present study, we examined 267 children aged 7-10 years attending "Nikolay Petrini" and "Hristo Smirnenski" elementary schools in the territory of the city of Yambol. After completion of a KENIMUS-approved written informed consent form by a parent, children underwent a thorough examination, and parents were provided with a questionnaire to complete. Of all children, 241 returned completed questionnaires.

METHODS:

Clinical method

A clinical examination was conducted to assess the oral status and degree of tooth structure loss in the examined children. The data from it was registered on a specially developed card, based on the approved one in the Department of Pediatric Dentistry – MU, Sofia, for a complex examination of a child. Additional elements have been added to it in connection with the specific study for the registration of clinical signs of bruxism, tooth grinding and child behavior.

Questionnaire method

Using a direct survey method, we investigated nocturnal bruxism and its associated risk factors, including the COVID-19 pandemic and screen time. For this purpose, we created a special survey card, including 36 questions about: the general condition and diseases of the child; allergies; eating habits; teeth grinding (bruxism); orofacial symptoms and habits; fatigue/pain in masticatory muscles; harmful habits that could lead to tooth wear, etc.; the impact of the COVID pandemic on physical activity, nutrition, bruxism and screen time. The survey is provided to a parent to complete at home and contains both pre-prompted and free-response questions.

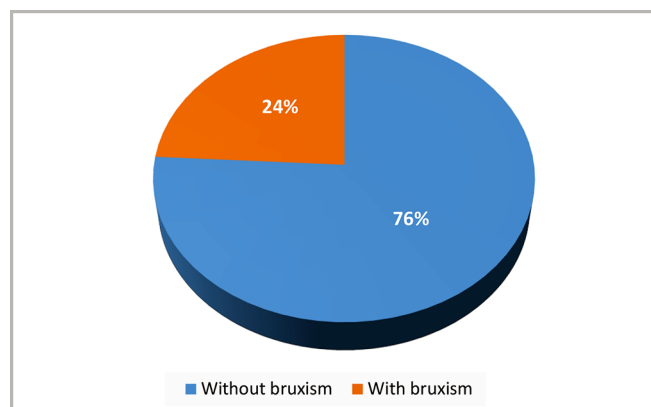
The statistical program IBM® SPSS® Statistics 19 was used to process the results. A 95% confidence interval ($p < 0.05$) was chosen for the level of significance at which the null hypothesis was rejected. Descriptive analysis and cross-tabulations were used. Descriptive analysis, cross tables and ANOVA-test were used.

RESULTS

Frequency of bruxism in children

The presence of sleep bruxism in this study was established through directed questions, as well as on the basis of anamnestic data from the child's parents about grinding/clenching during the day or night. Such data was obtained for 241 children, and the analysis revealed the following distribution.

Fig. 1. Bruxism in the examined children



We found that 58 (24.1%) of the children reported bruxism, while the remaining 183 (75.9%) did not ($p < 0.05$).

COVID-19 pandemic and bruxism

The following table presents the results of the study on the relationship between the onset of bruxism or the exacerbation of symptoms of pre-existing bruxism during the pandemic.

Table 1. Frequency of the pandemic impact on the onset or aggravation of bruxism

	N	%±SP
No influence	238	98.8±0.7
Exacerbation of existing bruxism	3	1.24±0.71
Bruxism onset	0	0
Total	241	100%.
Statistics	t = 96.5; $p < 0.05$	

According to the obtained data, the pandemic cannot be associated with the appearance of bruxism or the exacerbation of existing bruxism in the examined children. ($p < 0.05$).

COVID-19 pandemic and children's screen exposure

In the current study, we investigated screen exposure and its change during the pandemic. The average time spent in front of screens by children in different age groups at the moment and during the pandemic is presented in Table 2.

Table 2. Average values of screen time in different age groups at the moment and during the pandemic

Age	At the moment	During the pandemic
	(Mean± SD)	(Mean± SD)
7	118±57.1	171.6±83.1
8	107±46.7	160±81
9	135.7±60.9	238±93
10	128.6±61.8	191.2±102.5
Total	122.4±57.6	190.3±94.5
ANOVA test	ANOVA test: F=2.935 p = 0.034	ANOVA test: F=8.821 p = 0.000

The data from the table show that currently, the screen time of 9-year-olds is the longest, and the result is

also confirmed during the pandemic. In all age groups, there was an increase in time spent in front of digital devices during the COVID-19 pandemic, which is an expected result in view of distance education and more time spent at home ($p < 0.05$).

COVID-19 pandemic and children's physical activity

The restrictive measures, as well as distance education, forced children to stay at home mainly. In connection with these circumstances, we also studied the frequency of children actively playing sports and the impact of the pandemic on their physical activity and the relationship with bruxism. Table 3 presents the results regarding the physical activity of the examined children outside the pandemic.

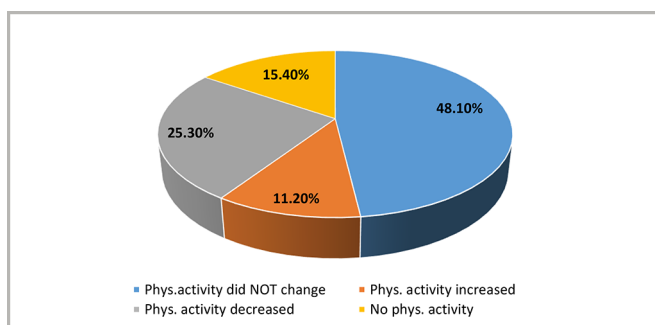
Table 3. Physical activity of the examined children and bruxism outside the pandemic

	Not actively playing sports		Actively plays sports		Total	
	n	% ± SP	n	% ± SP	n	%
Without bruxism	98	53.6%	85	46.4%	183	100%
With bruxism	22	37.9%	36	62.1%	58	100%
Total	120	49.8%	121	50.2%	241	100%
Pearson Chi-square	Pearson Chi-square: $t = 9.73$ $p = 0.002$					

The data in the table shows an even distribution between children who actively play sports and those who do not actively play sports ($p > 0.05$). Among children with bruxism, 62.1% actively play sports, while among those without bruxism - 46.4% ($p < 0.05$).

The following figure presents the percentage distribution of the answers received to the question about the impact of the COVID-19 pandemic on the physical activity of children.

Fig. 2. Distribution of the impact of the COVID-19 pandemic on the physical activity of the examined children



Almost 1/2 of parents reported no change in their child's physical activity during the pandemic. In 1/4 of the examined children, it decreased, and in 15.4%, it was absent. Parents rarely indicated that their child's physical activity increased during the pandemic (11.2%).

COVID-19 pandemic and dietary habits

In the current study, we also examined the dietary habits related to the intake of simple carbohydrates in intermediate meals (sweets, waffles, crackers, etc.) at the moment and during the pandemic. The obtained data are presented in Table 4.

Table 4. Dietary habits now and during the pandemic of the examined children

	The pandemic has NOT increased the intake of simple carbohydrates		The pandemic has increased the intake of simple carbohydrates		Total	
	n	%	n	%	n	%
No often simple carbohydrates intake at the moment	54	93.1%	4	6.9%	58	100%
Often simple carbohydrates intake at the moment	135	73.8%	48	26.2%	183	100%
Total	189	78.4%	52	21.6%	241	100%
Pearson Chi-square	Pearson Chi-square: $t = 9.73$ $p = 0.002$					

About 2/3 of children currently have a frequent intake of simple carbohydrates between meals. During the pandemic, this intake increased in about 1/5 of all examined children, mainly in those who are currently in this group ($p < 0.05$).

DISCUSSION

In the present study, we found a 24.1% prevalence of sleep bruxism in the examined children aged 7-10 years. A similar study in Brazil found an incidence of 35.3% [3]. On the other hand, a meta-analysis of 22 Brazilian studies found an overall prevalence of daytime and nocturnal bruxism of 25.8% [15]. Massignan C, et al. found a prevalence of 32.7% in mixed dentition [16], and Duarte J, et al. – 21% [17]. The prevalence of bruxism varies in a very wide range, most likely due to the subjectivity of the parents filling out the questionnaires.

When examining the impact of the restrictive measures during the COVID-19 pandemic on bruxism, we did not find an increase in the frequency of occurrence or aggravation of an already existing bruxism in the examined children. In contrast to the present one, other studies have found an increase in the likelihood of bruxism during the pandemic [8-13]. The increase is due to increased levels of stress, anxiety, reduced physical activity and increased screen time during the pandemic, which, individually and/or in combination, may be risk factors for sleep bruxism. [7-13]. Although in their research, Nazzal et al. found only 5.7% of children with bruxism, examining some of the above factors during the pandemic, found that the risk of adverse consequences for orofacial structures was increased [18].

Another aspect of change in children's daily lives during the pandemic is screen exposure due to imposed distance learning. We found that screen time averaged 190.3 minutes during the pandemic and 122.4 at the moment. It

is longest for 9-year-old children – 283 minutes during the COVID-19 pandemic and 135 minutes currently. The increase in screen exposure during the pandemic has been confirmed in other studies [10, 12], which can be related to the increasing risk of bruxism [14].

We found that more time spent at home during the pandemic was also associated with reduced physical activity (25.3%) to no physical activity at all (15.4%), as well as increased consumption of simple carbohydrates between meals in 21.6% of children ($p < 0.05$, table.4). The lower physical activity and the observed dietary changes can be the reason for complex negative effects for children on their overall and oral health and can be additional risk factors for bruxism. Similar data are confirmed in other studies [9, 10, 11, 14].

CONCLUSIONS

1. Bruxism was reported in almost 1/4 of the examined children aged 7-10 years ($p < 0.05$).
2. No increase in bruxism frequency or intensity was found during the COVID-19 pandemic in the examined children, but there was a significant change in previously noted bruxism risk factors.
3. An increase in screen exposure was found during the pandemic by more than 60 minutes per day on average for all ages 7-10.
4. Physical activity in 1/4 of children aged 7-10 years decreased during the pandemic, and in 15.4%, it was absent. 1/5 of the examined children have increased consumption of simple carbohydrates during the COVID-19 pandemic.

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