



Sleep bruxism in children and COVID-19: An integrative review of the literature

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ABSTRACT

Sleep Bruxism is a movement disorder of multifactorial etiology, characterized by grinding, tapping, or clenching of teeth associated with sleep physiology. This study aimed to raise whether there is evidence of the increase in the prevalence of bruxism in children during the period of living with COVID-19. This is an integrative review of the literature by the PRISMA method and based on the guiding question: - Is there an association between the prevalence of sleep bruxism in children and COVID-19? In this context, an exploratory search was conducted through PubMed, VHL, and SciELO, considering the health descriptors or MeSH terms: "sleep bruxism", "children", and "COVID-19" in Portuguese, English and Spanish versions and for the past five years as of the time of publication. The Boolean operators "AND" and "OR" were used to combine and "NOT" to exclude. These, are by the defined inclusion and exclusion criteria. The process of search and selection of records was carried out by two researchers, independently. From 181 records, only three studies were included. Only one study directly raised the association between BS and COVID-19, mentioning the increase in its incidence.

Keywords: Sleep bruxism, Children, COVID-19.

1 INTRODUCTION

Bruxism is a parafunctional, rhythmic, and spasmodic involuntary activity of the SE, produced by rhythmic or tonic contractions of the masseter and other mandibular muscles characterized by the act of grinding or clenching the teeth. The habit of grinding teeth occurs frequently during falling asleep, periods of worry, stress, and excitement, accompanied by a noticeable noise. On the other hand, noiseless tightening is more common during the day, adding continuous and less tolerable forces, and can be considered more destructive¹. In this context of stimulation dopamine is the main neurotransmitter².

During childhood, bruxism is more severe at preschool age, although it also appears in older children and permanent dentition. The psychological characteristics of parents, especially anxiety, may be associated with the development of sleep bruxism in their children¹.

Bruxism has a higher prevalence in children and adolescents, 17%, than in adults, 8%. When the child presents this parafunction, it can be understood as an indicator that something is happening wrong with their well-being, which should be investigated. The age group with the highest prevalence is between 5-8 years of age and decreases with advancing age³.

As the main damages are irreversible, it is of great importance that the anamnesis and clinical examination are carried out thoroughly with the collaboration of the parents⁴.

Based on the circadian cycle, bruxism can be classified into: sleep bruxism or waking bruxism; That is, it can occur when the patient is asleep (unconscious) or when he is awake, in this case, a semi-voluntary activity of the jaw, characterized by a habit or tic. respectively⁴.

As for the degree, bruxism, classified as primary, covers the simplest cases, without systemic or psychiatric involvement. Secondary bruxism is opposed to clinical, neurological, or psychiatric disorders, as well as iatrogenic factors (use or withdrawal of substances or medications) or other sleep disorders⁵.

If not detected at an early age, bruxism can unconsciously compromise the integrity of the teeth by clenching or grinding them. This act takes progressive lesion of the teeth and periodontal, damage to the oral mucosa, increased tension and hypertrophy of the masticatory muscles, chronic headaches, and neck pain, as well as abnormality of the temporomandibular joints and hearing problems⁶.

The most frequent symptoms of bruxism are headaches and muscle pain, tiredness, drowsiness, difficulty concentrating, hyperactivity, anxiety, aggressiveness, and attention deficit⁷. There is no cure for bruxism since it is a central and not peripheral disorder, but there are ways to treat it⁸.

The main attention in the clinical intervention should be focused on the protection of the tooth, reducing grinding, relieving facial and temporal pain, and promoting improvements in sleep quality, if deficient. Therefore, three types of strategies should be employed: dental, pharmacological, and psycho-behavioral⁹.

Multifactorial therapy becomes the ideal treatment involving pediatricians, pediatric dentists, and psychologists, and it is important to guide parents about behavioral aspects of the child¹⁰.

During the epidemiological phases of COVID-19; a disease caused by SARS-CoV-2, there has been a compromise in mental health, with repercussions on sleep, worldwide; particularly in the most vulnerable groups, such as children. This study aimed to analyze whether there is scientific evidence for a higher prevalence of BS in children during COVID-19.

2 METHODOLOGY

Integrative literature review based on the PRISMA model or Preferred Reporting Items for Systematic Reviews and Meta-Analyses, with the guiding question: - Is there scientific evidence about a higher prevalence of childhood bruxism in periods of coexistence with COVID-19?

The stages included: exploratory search, collection, and critical analysis of the included studies, followed by the presentation of a synthesis of the selected works and discussion of them. Following there was an exploratory search, the collection and critical analysis of the included studies, with the discussion of these

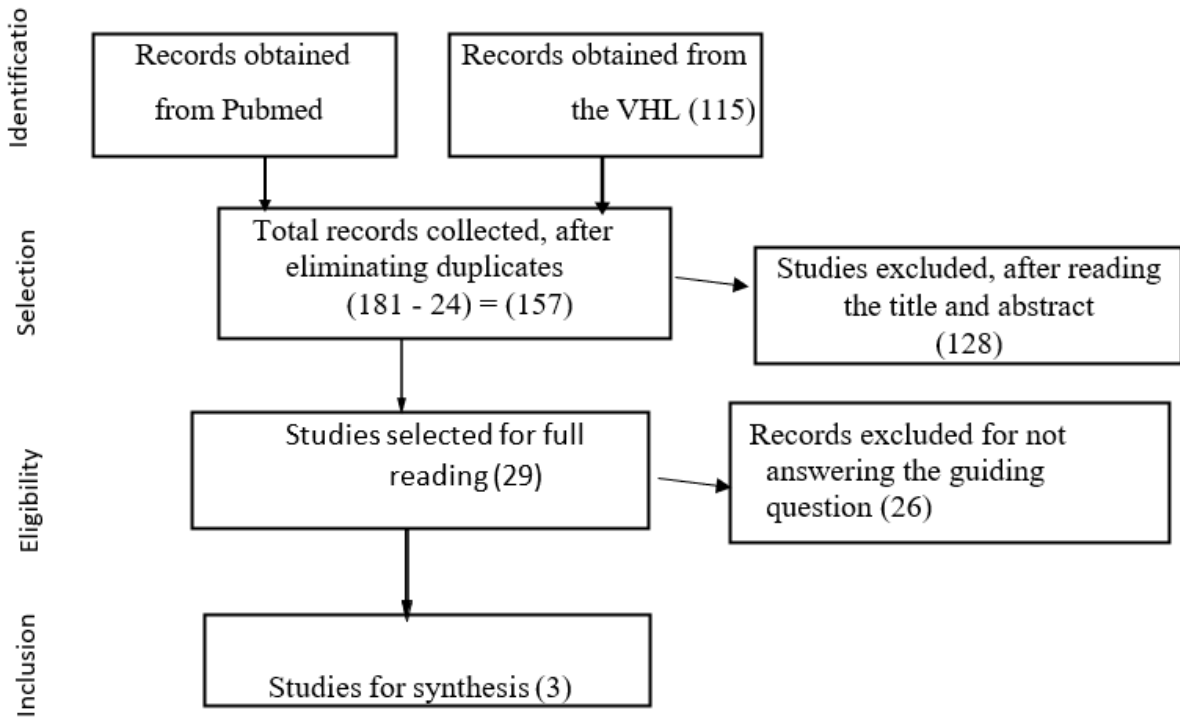
For data collection, the following virtual portals were used: PubMed (service of the National Library of Medicine of the United States) and VHL (Virtual Health Library). In Considering the databases MEDLINE (Medical Literature Analysis and Retrieval System Online) and LILACS (Latin American and Caribbean Literature in Health Sciences), in addition to SciELO (Scientific Electronic Library Online).

The descriptors in health or term MeSH Medical Subject Headings were considered: "sleep bruxism", "children" and "Covid-19", in their versions in Portuguese, Spanish, and English. Also the advanced search form and with the Boolean operators "AND", "OR" and "NOT".

As inclusion criteria, we considered all scientific articles, published between December 2017 and November 2022, that met the guiding question. Opinions, letters to the editor, or other works that were not formally characterized as scientific articles were excluded, as well as repeated studies (where only one was counted) and literature reviews.

The process of searching, collecting, and organizing the data took place between November and December 2022. Two independent evaluators selected the articles. There was the inclusion of work, from the reading of the title and the abstract of the records surveyed and, according to the inclusion and exclusion criteria adopted. In the case of repeated records, only one was included. The initial selection occurred by reading the title and abstract. Subsequently, the records were chosen for the full reading and, if included, with the summary presentation of the main information. This process can be better visualized by the flowchart (Figure 1).

Figure 1 – PRISMA Flowchart



3 RESULTS

From 181 records collected in the exploratory search, the final sample included three studies, presented in the form of a summary table (APPENDIX B). In it, you can observe data regarding the authorship, the year of publication, the country where the study was developed, the objectives, main results, or conclusions. Of these, two are available in PubMed, one exclusively in the VHL, and one in the two virtual portals. Most of the studies are in Portuguese-speaking countries (Brazil and Portugal) but with the language in English.

Figure 2. Table - Records included in the review according to authorship and year of publication, the country where it was developed and the original language, and the original language, objectives, sample, main results or conclusions

Authorship and year	Country and language	Objectives	Type of study and sample	Main results or conclusions
Lima CML et al., 2022	Brazil (English)	Establish the impact of COVID-19 on sleep quality and possible BS in children	This is a longitudinal and prospective cohort study. 105 school children with (74) or without (31) sleep disorders and their guardians.	There was an increase in the incidence of BS when comparing the percentages before and during the first wave of COVID-19 (62.9% and 70.5%, respectively), associated with sleep disorders.

		aged eight to ten		
Almeida AB <i>et al.</i> , 2022	United States (English)	To determine the prevalence of BS and its tendency with age in children.	Cross-sectional and retrospective covering 961 patients between 0 and 17 years of age assisted at the Lisbon Dental Service (and their parents) between August 2019 and December 2020	In the patients investigated, the prevalence of SB was 17.6%. The highest prevalence of SB occurs among male children, aged between zero and six years (20.7%) and tends to decrease from adolescence onwards.
Alves				These students presented a
EG, Fagundes DM, Ferreira MC, 2022	Brazil (English)	To evaluate the prevalence of SB in children and establish its relationship with clinical and sleep-associated variables.	Transverse. It comprised 239 students, from six to thirteen years of age, from public and private schools in São Luís, Maranhão.	prevalence of SB of 19.7%, with no significant association with the demographic and socioeconomic variables (age, sex, race, family income) of sleep (sleep quality, number of hours of sleep at night, sleeping during the day, with the light of the room lit or with the presence of
				noise), signs and symptoms presented (grinding of teeth, tooth attrition, pain in the TMJ region, fatigue in the muscles facial, earache, oral habits parafunctional).

4 DISCUSSION

The choice for the integrative review in this study occurred because, despite being an introductory research method, when searching, evaluating, and synthesizing findings of relevant research on a given topic, they base conduct and decision-making on the part of professionals in a critical way¹¹.

According to the search and selection of studies, the correlation between BS and COVID-19 was directly established in one study, that of Lima *et al.* (2022)¹², a study with a longitudinal or prospective cohort design, which, even considered as a primary study, provides strong scientific evidence¹³.

The first epidemiological wave of COVID-19, amid a lockdown; social isolation aimed at containing the waves of proliferation of the SARS-CoV-2 virus, as well as its variables. The atmosphere of uncertainty negatively impacted the psychological and quality of sleep, especially of children and adolescents; subjects in the phase of high cognitive, emotional, and social development. Reports of sleep disorders, stress, and habits such as bruxism, today are more directly characterized as a behavioral variable, with the increase in its incidence, leading to the suggestion of the development of new research, which analyzes the extent of this impact. BS is more common among children and tends to decrease with age, with no preference for sex 12,14.

In the context of school closures and remote learning, children presented greater difficulties in adaptation, with changes in routines, schedules, and circadian rhythm, associated with a lot of excitement, due to the increased use of screens or digital resources, such as smartphones (blue light emission). This led to an inadequate or poor-quality sleep pattern. Elevated cortisol levels were the trigger for BS. Other adverse effects would be the higher prevalence of orofacial problems such as temporomandibular disorder, correlated with anxiety and stress¹².

According to Lima et al. (2022)¹² there was an increase in the incidence of BS when comparing the percentages before and during the first wave of COVID-19. A significant contrast was seen between these periods, with the incidence of SB reaching 29.5%. The perception of children amid instability, either due to financial problems of certain families, as well as the reduced access to health services in this period, may have influenced the increase in anxiety. According to Generoso et al. (2022)¹⁴, evaluating the impact of this pandemic on psychological aspects and bruxism in the adult Brazilian population, all were feeling nervous or stressed during the period of social distancing, when 19.58% started symptoms of fatigue or pain in the muscles of the face when waking up and 21.54% started muscle fatigue and tooth discomfort upon waking.

Almeida et al. (2022)¹⁵ found a prevalence of 17.6% of BS, slightly higher in male children, establishing a prevalence with variations between 15.9% and 19.4% in pediatric patients. These percentages differ from the study by Calderan et al. (2014)¹⁶ which demonstrated a prevalence of SB in schoolchildren aged 11 to 14 years ranging from 5.9% to 49.6% and raised the influence of diagnostic criteria, geographical variation or locality and population of the study and socioeconomic conditions. The environment of greater poverty and low education of parents, particularly of the mother is associated with a higher prevalence of BS; results similar to the three studies included in the present study, but without significative associations, according to Alves, Fagundes and Ferreira (2022)¹⁷; which also agrees with the work of Schavarski¹⁸ (2021). For this author, when considering the university students of the Dentistry Course, there was no increase in the prevalence of BS or a

relationship between it and the fear of COVID-19, but variables such as age, personal and social issues, the major stressor being anxiety in entering the labor market.

For Betancourt et al (2021)¹⁹, the effects of the pandemic were observed in several dimensions, especially the psychological ones. Reactions of panic, anguish, anxiety, depression, irritability, and aggressiveness represented risk factors for the development of bruxism. And the BS brought damages to the dental structure: occlusal noise, non-functional occlusal wear, hypersensitivity, fractures, and mobility, in addition to cervical injuries. Other variables possibly associated with SB that were not explored in the included studies include facial pattern; this in adolescents from 12 to 19 years of age, according to Souza et al. (2020)²⁰.

Among these, is the facial pattern. Adolescents of mesofacial biotype were more progress to bruxism, while brachyfacial were predisposed to fatigue, pain in the temporal muscle, and dental attrition in the posterior region.

One aspect that deserves to be emphasized is the non-performance of polysomnography in the included and other studies mentioned; examination of unique relevance for the diagnosis of sleep disorders; which leads to a great subjectivity in the investigations on the subject; even considering the difficulty of this monitoring, especially at the level of public health.

Particularly during the first wave of COVID-19, when vaccines were in the testing phase and the population had to follow lockdown rules, there was a huge information gap about people's oral conditions. Several health services and research have been interrupted to focus on combating viral infection. Currently, the world is recovering from a turbulent phase and more and more studies analyze the effects left by the pandemic, which remains in another epidemiological moment, but permeates our social life.

It is believed that more studies on the subject should be developed, especially in a multidisciplinary approach and with more specific examinations and criteria for diagnosis and treatment, particularly in the earliest age groups of the human being, to avoid or at least minimize the possibilities of damage.

5 CONCLUSION

There have been gaps in scientific evidence about BS and COVID-19 in children.

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