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Risk factors related to sleep bruxism in children and adolescents. A sistematic review

Factores de riesgo del bruxismo en niños y adolescentes. Una revisión sistemática

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Abstract

Introduction: sleep bruxism in children and adolescents is a multifactorial disorder that integrates genetic, emotional, physiological and environmental factors. Aim: to systematically map available studies on risk factors associated with sleep bruxism in children and adolescents. Methodology: This scoping review included 13 observational studies to systematically map risk factors related to bruxism. Eligibility criteria were articulated to the PCC framework (population, concept, context). Results: The influence of genetic predisposition, emotional stress, physiological conditions (such as gastro-oesophageal reflux) and socio-environmental variables such as family dynamics and exposure to electronic devices are highlighted. In addition, disparities were detected in subgroups, such as children with developmental problems or those influenced by recent social transformations, such as the COVID-19 pandemic. Conclusion: Hereditary susceptibility, neurological abnormalities, emotional stress and inadequate sleep environments are among the most important determinants. Despite advances in the understanding of this disorder, significant gaps remain in the literature, in terms of longitudinal research and specific subpopulations.

KEYWORDS: risk factors, sleep bruxism, children, adolescents, review.

Resumen

Introducción: bruxismo del sueño en niños y adolescentes es un trastorno multifactorial que integra factores genéticos, emocionales, fisiológicos y ambientales. Objetivo: mapear sistemáticamente los estudios disponibles sobre los factores de riesgo asociados al bruxismo del sueño en niños y adolescentes. Metodología: Esta revisión de alcance incluyó 13 estudios observacionales para mapear sistemáticamente los factores de riesgo relacionados con el bruxismo. Los criterios de elegibilidad se articularon al marco PCC (población, concepto, contexto). Resultados: Se destaca la influencia de la predisposición genética, la tensión emocional, las condiciones fisiológicas (como el reflujo gastroesofágico) y las variables socioambientales, como la dinámica familiar y la exposición a dispositivos electrónicos.

Además, se detectaron disparidades en los subgrupos, como los niños con problemas de desarrollo o aquellos influenciados por las transformaciones sociales recientes, como la pandemia de la COVID-19. Conclusión: Entre los determinantes más importantes se encuentran la susceptibilidad hereditaria, las anomalías neurológicas, la tensión emocional y los entornos de sueño inadecuados. A pesar de los avances en la comprensión de este trastorno, sigue habiendo considerables vacíos en la literatura, en lo que respecta a las investigaciones longitudinales y a subpoblaciones específicas.
PALABRAS CLAVES: factores de riesgo, bruxismo del sueño, niños, adolescentes, revisión.

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1. Introduction

Sleep bruxism (SB), a widely studied orofacial disorder, has a significant impact on children and adolescents, with studies suggesting a higher prevalence in these age groups compared to adults, which could be attributed to neurodevelopmental and physiological factors .(1)

The disorder is characterized by involuntary jaw movements during sleep, resulting in tooth attrition, muscle discomfort and decreased quality of life; however, research has identified no significant differences in quality of life metrics between pediatric and adolescent populations with and without bruxism(2). In addition, genetic factors have been implicated in the etiology of bruxism, indicating a genetic predisposition to its development; stress and psychological disorders are also recognized as crucial contributing factors, highlighting the complex interplay of psychological and physiological components in the manifestation of the disorder .(3)

Therefore, the impact of sleep bruxism goes beyond dental health, because it is associated with elevated frequencies of arousal during sleep, which can correlate with attention and behavioral problems in children(1). In addition, sleep bruxism has been associated with cardiovascular complications and headache, underscoring its potential systemic implications(4) . Therefore, early identification of risk factors is imperative to avoid serious repercussions for oral and general health .(5)

Identification of risk factors for sleep bruxism in children and adolescents is critical due to the different physiological and psychological characteristics of these age groups compared to adults. In this regard, research indicates that central nervous system hyperactivity is a significant factor, with studies showing that children with high levels of

DOI: https://doi.org/10.58995/redlic.rmic.v3.n2.a117

stress and certain personality traits, such as a high sense of responsibility, are more likely to develop sleep bruxism . (6)

Additionally, environmental and social factors, such as family dynamics and exposure to stress, have been identified as influential, with children who experience more stress in their environments being at greater risk(7) . In addition, sleep bruxism in children is associated with increased arousal during sleep, which can lead to attention and behavioral problems during the day, highlighting the impact of the disorder on cognitive and behavioral functioning(1) . Anamnestic information, such as the presence of ENT and respiratory disorders, as well as oral habits such as pacifier use, also play a role in predicting sleep bruxism, suggesting that clinicians should consider these factors during evaluations(8) . In addition, altered sleep patterns, such as late bedtime and sleep debt, are associated with increased levels of inflammatory biomarkers, indicating that poor sleep hygiene may exacerbate systemic inflammation and potentially contribute to the development of sleep bruxism . (9)

Despite the progress made in sleep bruxism research, there are numerous deficiencies in the academic literature that prevent a complete understanding of the risk factors related to this disorder among child and adolescent populations. Consequently, it is imperative to examine the existing evidence to delineate the fundamental concepts and guide further research on this complex topic. Hence, the scoping review was conducted with the purpose of systematically mapping available studies on risk factors associated with sleep bruxism in children and adolescents in order to identify key concepts, patterns, and gaps in existing knowledge.

DOI: https://doi.org/10.58995/redlic.rmic.v3.n2.a117

2. Methodology

A scoping review was conducted according to the guidelines outlined in the Joanna Briggs Institute (JBI) Manual for Evidence Synthesis and PRISMA-ScR extension (Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews) . (10)

Eligibility criteria were articulated using the PCC framework (population, concept, context). The population considered comprised children and adolescents aged 0-18 years. The concept encompassed risk factors related to sleep bruxism, including physiological, genetic, psychological, social, and environmental determinants. The context encompassed studies conducted in a variety of clinical, community, or population settings, with no geographic or language restrictions. Therefore, the resulting research question was: What is known in the scientific literature about risk factors (concept) related to sleep bruxism (context) in children and adolescents (population)?

A systematic search of PubMed, Scopus and Web of Science electronic databases was carried out, complemented by manual searches of gray literature and citations of relevant articles. To formulate the search strategies, which were adapted to the specifications of each database, the following keywords and MeSH/DeCS terms were used: “bruxismo del sueño”, “Sleep Bruxism”, “factores de riesgo”, “Risk Factors”, “niños”, “Child”, “adolescentes”, “Adolescent”. The resulting search equation was: ((“sleep bruxism” OR “Sleep Bruxism”) AND (“risk factors” OR “Risk Factors”) AND (“children” OR “Child” OR “adolescents” OR “Adolescent”)).

For the selection of papers, priority was given to observational studies that showed the relationship between bruxism and risk factors, regardless of language, geographical location, time, but they had to be full-access manuscripts. Studies that were literature reviews, were not conducted in children or adolescents and those in which the subject

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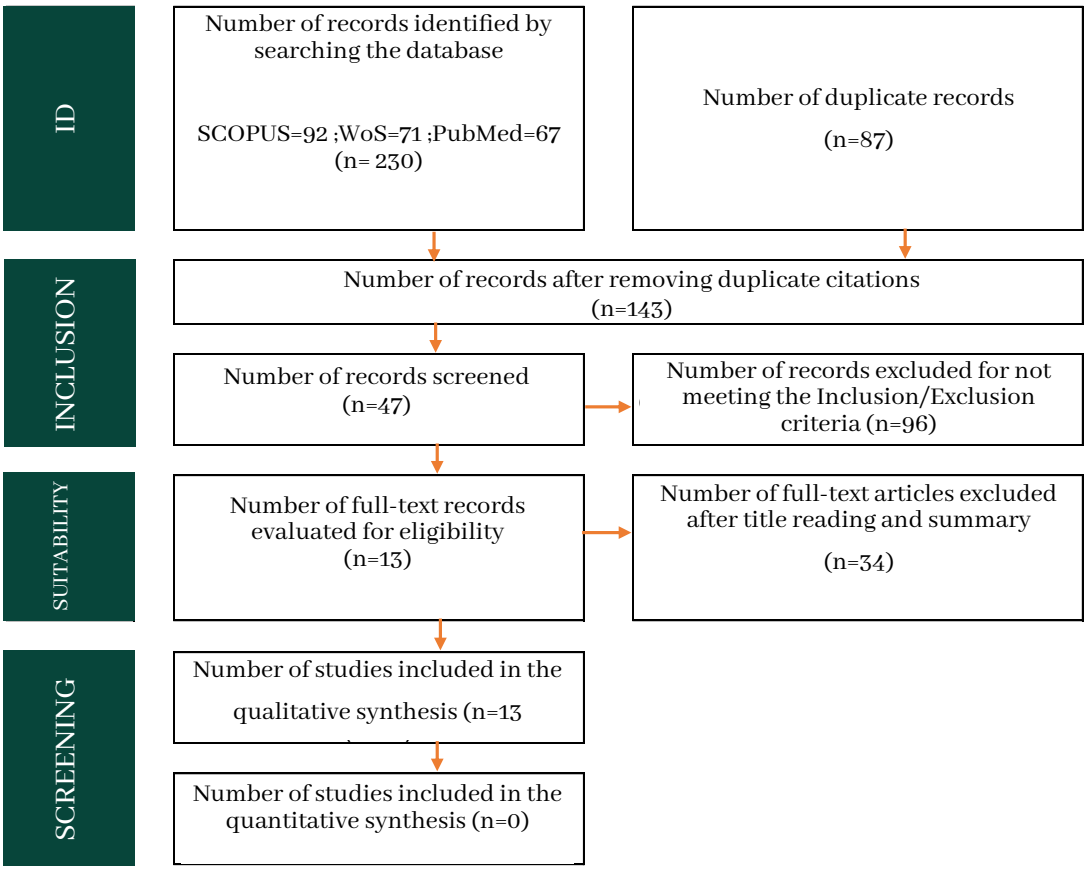
matter was not related to sleep bruxism or its risk factors were excluded. As a result, 13 articles were included in the research (See Figure 1).

The identified studies were imported into reference management software and duplicates were systematically removed. Subsequently, two independent reviewers (C.L and A.V) screened the titles and abstracts, followed by a thorough review of the full text to determine the final inclusion of articles. Any discrepancies were resolved by discussion or by consulting a third reviewer (P.O).

Figure 1.

Flow chart of the systematic search.



Note: Source: Prepared by the authors based on a systematic search.

DOI: https://doi.org/10.58995/redlic.rmic.v3.n2.a117

Relevant data were extracted using a predefined form that included information on the study design, population, risk factors assessed, methodologies for diagnosing sleep bruxism, and main results. The data were synthesized descriptively, systematically mapping the evidence according to risk factor categories and clarifying existing knowledge gaps.

The analysis incorporated a narrative synthesis to elucidate key findings, delineating patterns and trends present in the existing literature. No formal assessment of risk of bias or methodological quality was conducted, as this is not mandatory for scoping reviews. The results are presented in tables for ease of interpretation, and include comprehensive details on study characteristics and geographic distribution.

3. Results

In Table 1, it can be seen that the research included in this review demonstrates a significant prevalence of sleep bruxism among pediatric and adolescent populations, highlighting the multifaceted nature of the associated risk factors, which encompass physiological, behavioral, and environmental dimensions.

Gonçalves et al.(11) documented a prevalence rate of 43% among school-aged children, correlating this phenomenon with hereditary predispositions and respiratory complications, while Serra-Negra et al.(12) highlighted the importance of parafunctional activities, such as dental wear and lip incompetence, as key factors.

In addition, Ferreira-Bacci et al.(13) established a connection between psychological disorders and bruxism, identifying stress as a substantial factor requiring interdisciplinary intervention, particularly in children showing distinct behavioral traits. These findings accentuate the need for a more holistic clinical and psychological evaluation aimed at elucidating the etiology of sleep bruxism in the pediatric demographic.

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In contrast, factors that correlate with bruxism in at-risk populations or in individuals with specific conditions have been thoroughly examined in the literature. De Souza et al.(14) identified significant correlations between bruxism and gastroesophageal reflux as well as involuntary movements in children diagnosed with developmental disabilities(15), while Souza et al.(16) clarified that habits such as sucking and cross-biting significantly increase susceptibility to bruxism in adolescents, independent of cognitive functioning.

So too, contemporary research by Laganá et al.(17) has clarified the connections between bruxism and variables related to sleep-disordered breathing, including oral breathing and snoring. In this context, the findings underscore the need for personalized intervention strategies that respond to the unique circumstances prevailing in each population subgroup .(18)

Ultimately, longitudinal and retrospective investigations provide invaluable information on fluctuations in the prevalence of sleep bruxism, as well as its association with environmental and technological influences. Delima et al.(19) demonstrated a marked increase in bruxism cases during the COVID-19 pandemic, and attributed this increase to increased access to electronic devices and inadequate parental education, while Bahammam(20) emphasized the validation of specific questionnaires aimed at improving diagnostic accuracy among adolescents. Marceliano and Gaviã(21) illustrated the association between biological rhythm disturbances and behaviors such as nighttime teeth clenching with bruxism, while Emodi-Perlman et al.(8) emphasized the predictive importance of anamnestic factors, including oral breathing(22) , in the context of bruxism. These findings reinforce the critical importance of integrating more refined diagnostic tools and preventive measures to effectively address the multifaceted dimensions of this condition in diverse settings.

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Table 1

Characterization of the documents included in the study

Autor	Título	Año	Objetivo del estudio	Tipo de estudio	Muestra	Puntos de resultados
Gonçalves et al. (11)	Variables associated with bruxism in children and adolescents	2009	To evaluate the variables associated with bruxism and its prevalence in schoolchildren and adolescents aged 4 to 16 years	Cross-sectional and descriptive	680 schoolchildren, aged between 4 and 16 years, randomly selected from 19 public schools in Brasilia, Brazil.	Prevalence of bruxism was 43%; associated factors included heredity, respiratory problems, headaches, and restless temperament; there were no differences by gender.
Serra-Negra et al. (12)	Signs, symptoms, parafunctions, and associated factors of parent-reported sleep bruxism in children: A case-control study.	2012	To investigate the association between clinical signs and symptoms, parafunctions, and associated factors of sleep bruxism in children.	Case control	360 children, with 120 children diagnosed with sleep bruxism and 240 children without the condition, as reported by their parents. The children were 8 years old and were selected from public and private schools in Belo Horizonte, MG, Brazil.	Significant association between sleep bruxism and parafunctions such as tooth wear and teeth clenching; physical factors such as lip incompetence and muscle pain are prevalent.

DOI: https://doi.org/10.58995/redlic.rmic.v3.n2.a117

Ferreira-Bacci et al. (13)	Behavioral problems and emotional stress in children with bruxism	2012	To evaluate the behavioral profile of a group of children diagnosed with bruxism, focusing on the relationship between behavioral and emotional problems and the occurrence of this condition.	Observational, cross-sectional, and descriptive.	Eighty children aged 7 to 11 years, with a mean age of 8.8 years, seeking routine dental care at the Pediatric Dentistry Clinic of the Ribeirao Preto School of Dentistry, University of Sao Paulo, Brazil.	82.76% of children with bruxism have psychological disorders; there is a notable relationship with stress and the need for psychological evaluation.
de Souza et al. (14)	Factors associated with bruxism in children with developmental disabilities	2015	To investigate the factors associated with bruxism in children aged 1 to 13 years with developmental disabilities.	Observational, cross-sectional, and descriptive.	389 dental records of children aged 1 to 13 with developmental disabilities, specifically cerebral palsy and intellectual disability.	Factors associated with bruxism include gastroesophageal reflux, involuntary movements, and female gender; emphasizes relevance in developmental disabilities.
Meyer y Oliveira (15)	Sleep Bruxism and Orthodontic Appliance among Children and Adolescents: A Preliminary Study	2016	To evaluate the association between sleep bruxism and orthodontic treatment in children and adolescents.	Retrospective, cross-sectional, descriptive	The study included a total of 66 participants, consisting of 44 children undergoing orthodontic treatment and 22 children awaiting treatment.	27.3% of patients awaiting orthodontic treatment have sleep bruxism; interceptive orthodontics reduces the prevalence to 75%.

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Sousa et al. (16)	Prevalence and associated factors to sleep bruxism in adolescents from Teresina, Piauí	2018	To identify the prevalence and factors associated with the clinical manifestation of sleep bruxism (SB) in children with and without cognitive impairment.	Observational, descriptive study	180 individuals. These individuals were divided into three groups: Group 1 included those without cognitive impairment, Group 2 consisted of individuals with Down syndrome, and Group 3 consisted of individuals with cerebral palsy.	Prevalence of sleep bruxism of 23%; habits such as sucking and crossbite increase its likelihood.
Laganà et al. (17)	Sleep bruxism and sdb in albanian growing subjects: A cross sectional study	2021	To evaluate the correlation between sleep bruxism and risk factors for developing obstructive sleep apnea syndrome (OSAS) in a sample of growing Albanian subjects.	Observational, Cross-sectional	310 subjects, including 173 females and 137 males.	Prevalence of sleep bruxism of 41.3%; correlation with mouth breathing, snoring, and night sweats.
de Almeida et al. (18)	Prevalence of Sleep Bruxism Reported by Parents/Caregivers in a Portuguese Pediatric Dentistry Service: A Retrospective Study	2022	To determine the prevalence of sleep bruxism (SB) in a sample of pediatric patients attending the Pediatric Dentistry Service in Lisbon.	Retrospective observational	385 patients.	Prevalence of 17.6% in children; decreases with age; need for awareness among parents.

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Delima et al. (19)	Impact of the CO-VID19 pandemic on sleep quality and sleep bruxism in children eight to ten years of age	2022	To determine the impact of the COVID-19 pandemic on sleep quality and the possible occurrence of sleep bruxism (SB) in children aged eight to ten years.	Longitudinal cohort study.	105 children aged eight to ten years. The sample was derived from a previous cross-sectional study, where 739 children were initially contacted, and after attempts to locate them, 105 children participated in the longitudinal assessment.	Increase in sleep bruxism during the pandemic; associated with electronic devices and low parental educational level.
Bahammam (20)	Validation of Sleep Bruxism Ques-tionnaire Toward the Experience of Jaw Pain and Limitation of Jaw Movement in Saudi Arabian Adolescents	2022	Validate the sleep bruxism questionnaire, specifically related to the experience of jaw pain and limitation of jaw movement in Saudi adolescents aged 10 to 19 years.	Cross-sectional survey study	200 participants, including both male and female adolescents aged 10 to 19 years.	Association between bruxism and jaw pain; successful validation of the questionnaire.
Marceliano y Gaviã (21)	Possible sleep bruxism and bio-logical rhythm in school children	2023	Verify whether children with possible sleep bruxism exhibited alterations in their biological rhythm	Cross-sectional observational study.	178 parent-guardian-child.	Bruxism associated with alterations in biological rhythm and teeth clenching during wakefulness.
EmodiPerl-man et al. (8)	Sleep Bruxism in Children—What Can Be Learned from Anamnestic Information	2023	To evaluate the role of anamnestic information in predicting possible sleep bruxism in children aged 4 to 12 years.	Retrospective cross-sectional exploratory study.	521 children aged 4 to 12 years, selected from an initial group of 1911 dental records.	Factors such as mouth breathing and ENT problems increase the likelihood of bruxism; prevalence of 16%.

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Kumar et al. (22)	Systemic Condition Associated with Bruxism A Case Report	2023	Report a case of bruxism associated with asthma in a pediatric patient.	Case report	1 patient	Successful management of bruxism in an asthmatic child with a night guard; link to respiratory problems.

Note: Source: Own elaboration based on systematic search.

In Table 2, the synthesis of the scientific literature on the risk factors associated with sleep bruxism in children and adolescents identifies a multifactorial etiology that incorporates genetic, emotional, behavioral and physiological dimensions. Gonçalves et al.(11) highlight heredity as a consistent element, with a considerable prevalence of bruxism among school-age children (43%), in addition to respiratory complications, headaches and difficulties in falling asleep. Furthermore, Serra-Negra et al.(12) recognize dental wear and bruxism during wakefulness as relevant factors, which accentuates the importance of monitoring parafunctional behaviors. Ferreira Bacci et al.(13) corroborate the interconnection between bruxism and psychological disorders, such as attention deficit, anxiety and stress, proposing a profound association between emotional variables and the manifestation of this condition.

In contrast, research with specific demographic data has facilitated the identification of distinctive factors in vulnerable subpopulations. De Souza et al.(14) highlight that, in children with developmental disabilities, elements such as gastroesophageal reflux and involuntary movements are key determinants, while Meyer and Oliveira(15) document the ramifications of orthodontic intervention and hereditary influences on the prevalence of sleep bruxism. In addition, Sousa et al.(16) delineate factors pertinent to dental anomalies, such as crossbite and sucking behaviors, while Laganá et al.(17) clarify the association between bruxism and respiratory diseases, such as obstructive sleep apnea, underscoring the need to evaluate these conditions in tandem.

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Regarding psychosocial and environmental determinants, De Almeida et al.(18) and Delima et al.(19) emphasize the implications of sleep quality and the social environment. Elements such as parental stress, accessibility to electronic devices and the COVID-19 pandemic are significantly correlated with the increased prevalence of bruxism. In addition, Bahammam(20) reinforces the link between emotional determinants, such as anxiety, and sleep disorders. In contrast, Marceliano and Gaviã(21) document that dietary practices and excessive use of digital media exacerbate bruxism manifestations, while Emodi-Perlman et al.(8) emphasize the importance of anatomical factors, such as oral breathing and otorhinolaryngological conditions, in bruxism susceptibility. Ultimately, Kumar et al.(22) offer a perspective focused on respiratory problems such as asthma, correlating these conditions with neuromuscular and emotional disorders.

On the other hand, it is pertinent to point out that although Kumar et al.(22) and Bahammam(20) have been considered for the analysis of factors associated with nighttime bruxism, the research by Kumar et al.(22) yields a clinical case report of bruxism associated with asthma, which limits the extrapolation of their findings, thus attenuating their relevance for a comprehensive analysis. Similarly, Bahammam(20) focused his research on the validation of an instrument to assess bruxism, without conducting a systematic examination of risk factors, which restricts the applicability of his data in this particular context.

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Table 2

Risk Factors Associated with Sleep Bruxism

Author	Age	Diagnosis of SB	Risk factors associated with SB	Conclusions
Gonçalves et al. (11)	680 school children aged 4-16 years (mean: 8.27 years); higher prevalence in deciduous dentition.	Validated clinical examinations and questionnaires, with statistical analysis and pilot study.	Heredity, respiratory problems, headaches, difficulty falling asleep, restless temperament and talking during sleep.	High prevalence of bruxism (43%), significant impact on quality of life, need for early diagnosis and multidisciplinary studies to understand the etiology.
Serra-Negra et al. (12)	360 children (8 years), 120 with SB and 240 without SB, matched for age, gender and socioeconomic status.	Based on AASM criteria and validated parent-collected questionnaires.	Primary canine attrition (OR 2.3), object biting (OR 2.0) and waking-time bruxism (OR 2.3).	Significant association between SB and parafunctional habits; it is recommended to monitor these habits in children and to perform longitudinal studies to better understand their impact.

DOI: https://doi.org/10.58995/redlic.rmic.v3.n2.a117

FerreiraBacci et al. (13)	80 children aged 7-11 years (mean: 8.8 years); both genders represented.	Clinical and psychological evaluation using structured questionnaires and psychological scales (Rutter-A2, Child Stress Scale).	Psychological disorders (attention deficit, hyperactivity, behavioral problems), emotional stress, anxiety, hostility and depression.	Behavioral and emotional problems are significant risk factors for SB; the need for interdisciplinary approaches (dentistry and psychology) and further research on associated physiological stress factors is highlighted.
de Souza et al. (14)	389 children aged 1-13 years with developmental disabilities; no significant association was found between age and bruxism.	Based on parental reports of audible teeth grinding; binary categorization of presence/absence of bruxism.	Gastroesophageal reflux (OR 2.28), involuntary movements (OR 2.24), female gender (OR 0.44).	Significant associations between SB and neurological factors; the importance of specific approaches to the management of SB in children with developmental disabilities is emphasized.
Meyer y Oliveira (15)	66 children (7-15 years, mean: 10.6 years) at orthodontic treatment; parents were aged 18-69 years.	Based on AASM criteria, with questionnaires and clinical examinations performed by a trained dentist.	Emotional factors, genetics, relationship between SB in parents and children, and discomfort associated with orthodontic appliances.	Emotional factors, genetics, relationship between SB in parents and children, and discomfort associated with orthodontic appliances.

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Sousa et al. (16)	3-10 years and >10 years; similar prevalence between both groups (26.1% vs. 21.6%); no significant differences in prevalence by age.	Parental reports (grinding sounds at least 3 times per week); corroborated with clinical examinations to detect dental wear facets.	Sucking habits (OR 4.44), posterior crossbite (OR 3.04), dental wear facets (OR 3.32).	Prevalence of SB similar in children with and without cognitive impairment (~24%). It is recommended to monitor sucking habits and dental alterations as predictors of BS.
Laganà et al. (17)	310 niños de 6-12 años (media: 8.9 años); se incluyeron más mujeres (56%) que varones (44%).	Cuestionarios validados diseñados para evaluar SB y factores relacionados con el síndrome de apnea obstructiva del sueño (SAOS).	Herencia, sudoración nocturna, respiración oral, ronquidos, obesidad.	Correlación significativa entre SB y factores de riesgo para SAOS; falta de concienciа en padres (46.5% desinformados) resalta la necesidad de mayor educación.
de Almeida et al. (18)	1900 children aged 0-17 years; prevalence of SB decreases with age (0-6 years: 20.7%, 7-11 years: 19.4%, 12-17 years: 14.6%).	Parent/caregiver reports of dental clenching and audible grinding; no clinical confirmation or polysomnography was performed.	Anxiety, stress, aggressiveness, hyperactivity, snoring, nightmares, ADHD (higher risk in children treated with medication).	Overall prevalence of SB: 17.6%; it is recommended to include consultations on SB in pediatric dental appointments to improve parental awareness.

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Delima et al. (19)	105 children aged 8-10 years; sample selected to evaluate the impact of the COVID-19 pandemic on sleep patterns and SB.	Diagnosis based on AASM criteria and Sleep Disturbance Scale for Children (SDSC).	Low parental schooling (RR 2.67), access to electronic devices (RR 1.97), sleep disturbances during the pandemic (RR 1.74).	Significant increase in SB and sleep disturbances during pandemic; intervention and awareness strategies are needed to address these problems.
Bahammam (20)	200 adolescentes de 10-19 años (54.7% mujeres y 45.3% hombres); mayoría en el rango de 10-14 años.	Cuestionarios diseñados específicamente para evaluar dolor de mandíbula y movimiento limitado; incluyó evaluación de consistencia interna (alfa de Cronbach >0.8).	Estrés, ansiedad, depresión, alteraciones en patrones de sueño, exposición al humo de segunda mano.	Validación exitosa del cuestionario de SB; se requiere mayor conciencia en padres y más investigación en diferentes poblaciones.
Marceliano y Gaviã (21)	Children aged 6-14 years (mean: 10.14 years); assessment of sleep patterns and related behaviors.	BRIAN-K scale to assess sleep, daily activities, social behavior, and feeding; diagnosis based on parent interviews and clinical assessments.	Poor sleep quality, teeth clenching during wakefulness (OR 2.04), high sugar consumption, excessive use of digital media.	Children with SB have greater difficulty maintaining biological rhythms; the importance of good sleep in reducing the frequency of SB is highlighted.

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EmodiPerlman et al. (8)	521 niños de 4-12 años; evaluados por anamnesis (informes de padres) sobre comportamientos de SB durante el sueño.	Diagnóstico basado en informes parentales sobre apretamiento dental y ruidos relacionados con SB; no se usaron métodos instrumentales (EMG o polisomnografía).	Respiración bucal (~3 veces mayor riesgo), trastornos ENT, uso de chupetes o chuparse el dedo (~2 veces mayor riesgo).	Factores ENT y respiración bucal son predictores significativos de SB; se recomienda una evaluación clínica detallada y estudios adicionales para explorar estas asociaciones.
Kumar et al. (22)	Not specified; primary focus was management of asthma-related bruxism.	Diagnosis based on clinical examination and intraoral devices; EMG and PSG assessments included as additional options.	Anxiety, stress, asthma, respiratory disturbances, dental occlusion problems.	Bruxism related to respiratory and psychosocial factors; the importance of early intervention to prevent associated complications is emphasized.

Note: SB: Sleep Bruxism. Source: Own elaboration from systematic search.

Overall, the authors agree that the risk determinants associated with sleep bruxism in children and adolescents are multifaceted and combine genetic, emotional and physiological dimensions. While all of the research reviewed provides relevant information, there is compelling evidence for the need for interdisciplinary research integrating dentistry, psychology, and sleep medicine to comprehensively understand the elements contributing to this disorder in the child and adolescent demographic.

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4 Discussion

Sleep bruxism (SB) in children and adolescents represents a complex multifactorial disorder encompassing physiological, psychological, and environmental dimensions. The results of this exploratory review highlight a number of interrelated risk factors, ranging from genetic predispositions to sleep disorders and adverse socioeconomic circumstances. This analysis facilitates the identification of not only consistent patterns in the existing literature, but also gaps that require attention to improve understanding of this condition.

4.1. Genetic predisposition and physiological components

One of the risk factors emphasized in this study is the impact of heredity, corroborated by several previous investigations. Gonçalves et al.(11) established that familial predisposition is an important predictor of SB in children. This finding is in agreement with studies by Serra-Negra et al.(12) , who reported that children with a family history are up to 2.68 times more likely to manifest this disorder. In addition, Liu et al.(7) argue that the genetic association is related to modifications in the basal ganglia, which regulate muscle activity during sleep. This genetic perspective not only underscores the need to evaluate family history, but also to explore possible biomarkers that allow early detection.

In addition, physiological conditions such as gastroesophageal reflux and involuntary movements are also critical, de Souza et al.(14) observed a significant correlation between these conditions and SB, particularly in children with developmental disabilities. This finding is corroborated by Ommerborn et al.(3) , who emphasized that neurological disorders may also aggravate bruxing episodes, particularly in susceptible populations.

DOI: https://doi.org/10.58995/redlic.rmic.v3.n2.a117

4.2. Psychological and emotional factors

The role of stress and anxiety as catalysts of SB is widely recognized in the literature. FerreiraBacci et al.(13) identified that 82.76% of children with multiple sclerosis have psychological problems, such as anxiety, hyperactivity, and attention deficit. These findings are in agreement with those reported by Luco(3) , who highlights that children with high levels of anxiety are more predisposed to develop this disease due to increased muscle activity during sleep. In addition, Alqaderi et al.(9) documented that adverse emotions, particularly frustration, correlate with more frequent and severe episodes of SB. These data accentuate the importance of integrating emotional regulation strategies into therapeutic interventions.

In contrast, the COVID-19 pandemic provided a unique framework to assess how social isolation and alterations in sleep patterns influenced the prevalence of SB. Delima et al.(19) reported a substantial increase in cases during this period, associated with excessive use of electronic devices and decreased sleep quality. These findings are consistent with those of Alqaderi et al.(9) , who also observed a detrimental impact of prolonged screen time on emotional regulation and sleep hygiene.

4.3. Respiratory conditions and anatomical changes

Respiratory diseases, such as mouth breathing and otorhinolaryngological diseases, also emerge as important determinants. Emodi-Perlman et al.(8) demonstrated that mouth breathing triples the likelihood of bruxism, a finding corroborated by Laganá et al.(17) , who also found that 40% of pediatric patients with bruxism had oral breathing. In addition, ear, nose, and throat disorders, such as recurrent infections or the need for fluid drainage, substantially elevate the likelihood of SB, as demonstrated by Kumar et al.(22) . Therefore, these observations

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underscore the compelling need to incorporate respiratory assessments in the clinical identification of SB.

4.4. Influence of environmental and social factors.

The socioeconomic environment also plays a pivotal role in the manifestation of SB. Delima et al.(19) identified decreased parental education level and unrestricted access to electronic devices as factors that significantly increase risk. These results are consistent with the findings of Liu et al.(7) , who noted that adverse environmental circumstances, such as congestion and lack of structured routines, contribute to dysfunctional sleep patterns that aggravate SB.

In addition, high sugar intake and insufficient dietary practices have also been recognized as risk determinants in pediatric populations with SB. Marceliano and Gaviã(21) emphasized that excessive intake of saccharin-rich food substances alters dopaminergic neurotransmission, which may lead to a higher prevalence of the disorder. In other words, this revelation denotes the need to address nutritional determinants in the clinical management of SB.

4.5. wards a comprehensive understanding of sleep bruxism (SB)

Taken together, the findings of this exploratory review accentuate the multifactorial essence of SB and the need for an interdisciplinary approach to its understanding and management. The data accumulated here reinforce the relevance of evaluating genetic, psychological, physiological, and environmental factors in a holistic manner. In addition, it is imperative to develop longitudinal research to improve understanding of the interactions between these factors and their long-term implications for the oral and overall well-being of children and adolescents.

The results also underscore the importance of raising awareness among health professionals about early detection and appropriate treatment of SB. Recent research suggests that incorporating preventive

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strategies into educational and clinical settings can markedly reduce the prevalence of the disorder and improve the quality of life of affected children(2) . Finally, future research should explore specific interventions tailored to the individual characteristics of each patient, including psychological therapies, habit modification, and specific pharmacological treatments.

5. Conclusion

The comprehensive review facilitated the systematic delineation of existing research on risk determinants correlated with sleep bruxism in pediatric and adolescent populations by discerning key concepts, recurrent motifs, and gaps in knowledge. The findings indicate that sleep bruxism is a multifactorial disease in which genetic, psychological, physiological, and environmental elements merge. Among the most important determinants are hereditary susceptibility, neurological abnormalities, emotional stress and inadequate sleep environments, which are key factors in predicting the manifestation of sleep bruxism.

In addition, the scientific literature recognizes specific determinants, e.g., gastroesophageal reflux, sucking behaviors, use of electronic devices, and the implications of the COVID-19 pandemic, which have been underappreciated in academic discourse and require further scrutiny. The interrelationships between physiologic and psychosocial elements underscore the need for multidisciplinary methodologies incorporating dentistry, sleep medicine, and psychology to thoroughly address this disorder within the pediatric demographic.

Ultimately, this review also highlighted the deficiency of longitudinal research to elucidate causal connections between identified risk factors and sleep bruxism, as well as the paucity of research focused on particular groups, such as children with developmental disabilities. The importance of ongoing research to close these gaps, increase early diagnostic strategies,

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and formulate evidence-based preventive and therapeutic interventions is denoted.

6. Authors' Contribution

CCLR: Initial drafting, data collection, analysis of results, discussion, final revision of the article.

AJVF: Initial draft, data collection, analysis of results, discussion, final revision of the article.

PAOC: Analysis of results, discussion, final review of the article.

7. Ethics committee approval and consent to participate in the study

Not applicable

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