

# Level of knowledge of pediatric dentists on awake and sleep bruxism in children

Nível de conhecimento de odontopediatras sobre bruxismo em vigília e do sono em crianças

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## ABSTRACT

**Objective:** To evaluate the knowledge of pediatric dentists concerning bruxism in children and explore the subject according to the latest scientific evidence. **Material and Methods:** Four hundred and twenty-five pediatric dentists filled out an online form comprising 17 statements regarding awake and sleep bruxism in children. Data was analyzed in two distinct ways: participant's knowledge and statements knowledge. Participant's knowledge was considered acceptable when at least 10 out of 17 statements were correctly answered. Statements knowledge was considered satisfactory when correctly answered by, at least, 70% of the participants. **Results:** The average of correct answers was 9.73 ( $\pm 3.41$ ). Fifty-two percent of the participants showed acceptable knowledge and only 4 statements obtained a percentage of answers considered satisfactory. **Conclusion:** The knowledge of pediatric dentists regarding awake and sleep bruxism in children is deficient, and continuous education concerning this topic is suggested to avoid misdiagnosis and inadequate management.

## KEYWORDS

Bruxism; Education; Knowledge; Pediatric dentistry; Surveys and questionnaires.

## RESUMO

**Objetivo:** Avaliar o conhecimento dos odontopediatras sobre o bruxismo em crianças e discutir o tema de acordo com as evidências científicas atuais. **Material e Métodos:** 425 odontopediatras preencheram um formulário online composto por 17 afirmações sobre bruxismo em crianças durante a vigília e o sono. Os dados foram interpretados de duas formas distintas: conhecimento do participante e conhecimento das afirmações. O conhecimento do participante foi considerado aceitável quando pelo menos 10 das 17 afirmações foram respondidas corretamente. O conhecimento das afirmações foi considerado satisfatório quando foi respondido corretamente por, pelo menos, 70% dos participantes. **Resultados:** O número médio de respostas corretas foi de 9,73 ( $\pm 3,41$ ). Cinquenta e dois por cento dos participantes demonstraram conhecimentos aceitáveis e apenas 4 afirmações obtiveram uma percentagem de respostas consideradas satisfatórias. **Conclusão:** O conhecimento dos odontopediatras sobre o bruxismo em crianças em vigília e durante o sono é deficiente, sugerindo-se a educação continuada sobre o tema, a fim de evitar diagnósticos equivocados e condutas inadequadas.

## PALAVRAS-CHAVE

Bruxismo; Educação; Conhecimento; Odontopediatria; Inquéritos e questionários.

## INTRODUCTION

Bruxism is a repetitive jaw-muscle activity characterized by clenching or grinding of the teeth and/ or by bracing or thrusting of the mandible. It has two distinct circadian manifestations: during sleep (sleep bruxism - SB) and wakefulness (awake bruxism - AB) [1]. Over the years, several efforts have been made to clarify bruxism physiology, classification, and diagnosis [1-3]. Recently, the first steps towards the creation of a Standardized Tool for the Assessment of Bruxism (STAB) have been introduced, which will facilitate the assessment of bruxism patients by providing a comprehensive examination of the clinical implications of various bruxism activities and etiologies [3].

Despite concerted efforts by task forces, one challenge persists: bruxism exhibits a higher prevalence among children, ranging globally from 3.5% to 40.6% between the ages of two and twelve years. Furthermore, the bulk of available research on bruxism has been centered on adults. Notably, the prevalence of bruxism tends to decline progressively around the ages of 9 and 10, underscoring that a significant portion of children do not persist with bruxism into adulthood [4].

The pediatric dentist typically is often the initial point of contact for parents and children reporting bruxism symptoms. Identifying potential deficiencies in professional education in this domain and improving comprehension of this condition can optimize the diagnostic process, treatment planning, and prognostic outcomes. In this context, the current study sought to assess the knowledge of pediatric dentists regarding both SB and AB in children.

## MATERIAL AND METHODS

### Study design and ethical considerations

The present study was an observational, cross-sectional, descriptive study, approved by the Human Research Ethics Committee (protocol number: 2.812.303). All enrolled participants signed a written informed consent form before entering the study.

### Participant screening and eligibility assessment

Participants were recruited from August to December 2018 through social media. Eligible

participants were pediatric dentists, residing in Brazil, registered in the Federal Council of Dentistry, without the restriction of age, gender, or time since dental school graduation.

### Survey form

The survey was carried out by using an online form (Google Forms app from Google™). The survey Google Forms link was distributed through authors' personal Instagram® (Kevin Systrom, Mike Krieger, Burbn, Inc., USA), WhatsApp® (WhatsApp LLC, Meta Inc., USA), and Facebook® (Meta Inc., USA). The survey comprised two sections. The first one included data regarding age, gender, time (years) since dental school graduation, and time (years) since completion of pediatric dentistry training. In the second section, volunteers were asked to indicate their opinions regarding SB and AB in children. The survey form was developed based on a preexisting form used to evaluate Temporomandibular Disorders (TMD) knowledge among dentists [5,6] since there were no published studies with this kind of questionnaire. The survey form was developed and revised by two professionals with years of experience in the field.

The form comprised 17 statements divided into three domains: (1) Classification and Diagnosis (composed of 6 statements: 1, 2, 3, 8, 9, 10); (2) Etiology and Pathophysiology (composed of 6 statements: 4, 5, 6, 7, 11,17); and (3) Treatment (composed by 5 statements: 12, 13, 14, 15, 16). These statements were created as affirmations, ones with correct and others with incorrect information. Each statement was followed by an 11-point numerical scale ranging from "0" to "10", where "0" represented "strongly disagreed" and "10" represented "strongly agree". The number "5" represented a "neutral" opinion. The answers were classified as "agree" (scored 7 to 10), "disagree" (scored 0 to 3) or "neutral" (scored 4 to 6) [5,6].

The survey's form data was interpreted in two distinct ways: participant's knowledge and statements knowledge. Participant's knowledge was considered acceptable when at least 10 out of 17 statements were correctly answered. Statements knowledge was considered "satisfactory" when it was correctly answered by at least 70% of the participants, "intermediate" when it was correctly answered between 50%

and 69% of the participants, and “unsatisfactory” when it was correctly answered by 50% of participants or under.

For statistical analysis, the score obtained for each statement was transformed into an ordinal variable: (1) for correctly answered; (2), for a neutral answer, and (3), for wrong answer.

### Sample calculation and statistical analysis

It was estimated that a minimum of 383 participants from a total amount of 8,546 pediatric dentists registered at the Brazilian Federal Council of Dentistry, was adequate for the present study. A sampling error of 5% and a confidence level of 95% were considered. For statistical analysis, a qualitative and quantitative description was performed.

## RESULTS

Sample description and main findings are presented in Table I. A total of 425 pediatric dentists completed the survey form. The frequency of agreements, disagreements, and neutralities for each statement is described in Table II.

The average number of correct answers was 9.73 ( $\pm 3.41$ ). Approximately half of the participants (52%) showed acceptable knowledge. Only 2% ( $n=9$ ) answered all statements correctly and none answered all incorrectly.

Statements with the highest percentage of correct answers were items 7 (81%) and 8 (91%),

and statements with the lowest percentage of correct answers were items 9 (39%) and 11 (31%). Only 4 statements were correctly answered by at least 70% of the participants (Table II).

## DISCUSSION

This cross-sectional study aimed to evaluate pediatric dentists' knowledge regarding SB and AB in children. In general, the sample was mainly composed of women, with a mean age of 39.7 years, and a mean time since dental school graduation and completion of pediatric dentistry training of 16.6 years and 11.9 years, respectively. Fifty-two percent of the sample showed acceptable knowledge and only four statements obtained a percentage of answers considered as satisfactory.

The findings are of concern and are discussed below.

### Classification and diagnosis domain (statements 1, 2, 3, 8, 9 and 10)

There seems to be a satisfactory level of understanding by pediatric dentists regarding the definition of SB and the fact that bruxism is related to other systemic alterations (statements 1 and 2) [1]. However, only 40% of the sample agreed that bruxism is more prevalent during childhood (statement 3). In a previous study, Guillot et al. [7] found that 90.6% of the participants considered SB to be more prevalent among adults.

Table I - Sample description and main findings

	Mean $\pm$ SD age, y	39.7 $\pm$ 9.8
Gender, %		
Female		95.29%
Male		4.71%
Mean $\pm$ SD Time since graduation completion, y		16.6 $\pm$ 9.9
Mean $\pm$ SD Time since completion of the pediatric dentistry specialization, y		11.9 $\pm$ 9.8
Participants Knowledge (n, %)		
Acceptable		221; 52%
Unacceptable		204; 48%
Brazilian regional division (n, %)*		
Southeast		209; 49.2%
Northeast		71; 16.7%
South		101; 23.8%
Central-West		34; 8.00%
North		7; 1.6%

\*3 volunteers did not answer the question. SD = standard deviation; % = percentage; y = years.

Table II - Survey's form statements; answers for each statement

Statement	Correct Answer	Dentists Answers			Statement's knowledge
		Agree	Disagree	Neutral	
1. Concerning the definition of sleep bruxism, it is an activity of the masticatory muscles during sleep, which is characterized as rhythmic (phasic) or non-rhythmic (tonic).	Agree	69.18%	8.94%	21.88%	Intermediate
2. Bruxism can be considered a protective or signaling activity associated with other systemic alterations.	Agree	79.29%	11.29%	9.41%	Satisfactory
3. Sleep bruxism is more prevalent among children and its occurrence reduces during adulthood.	Agree	40.00%	44.71%	15.29%	Unsatisfactory
4. Occlusal problems, such as premature contact, may cause child bruxism.	Disagree	33.18%	53.88%	12.94%	Intermediate
5. Attention Deficit Hyperactivity Disorder (ADHD) may be associated with child bruxism.	Agree	80.00%	7.53%	12.47%	Satisfactory
6. Drugs used in ADHD therapy, such as Ritalin, can be associated with the presence of child bruxism.	Agree	54.35%	16.24%	29.41%	Intermediate
7. Mouth breathing, presence of allergic rhinitis, asthma, adenoid, and tonsil hypertrophy may cause or perpetuate child bruxism.	Agree	80.71%	12.71%	6.59%	Satisfactory
8. Awake bruxism may be associated with moments of stress, anxiety, and concentration.	Agree	90.82%	4.00%	5.18%	Satisfactory
9. Bracing/thruster the mandible during wakefulness, even without tooth contact, is considered awake bruxism.	Agree	39.29%	32.71%	28.00%	Unsatisfactory
10. The presence of dental attrition is a clear sign of bruxism demanding immediate treatment.	Disagree	34.82%	50.59%	14.59%	Intermediate
11. Episodes of sleep bruxism are common during childhood, especially in the period of tooth eruption, characterizing physiological bruxism.	Disagree	50.35%	31.06%	18.59%	Unsatisfactory
12. Intraoral acrylic splints are not indicated in pediatric dentistry as they limit mandibular growth.	Disagree	27.53%	56.24%	16.24%	Intermediate
13. The management of awake bruxism is based on patient education through self-knowledge and behavior avoidance, without the need for an occlusal appliance.	Agree	46.59%	25.41%	28.00%	Unsatisfactory
14. To date, no therapy is effective in the cure or prevention of primary bruxism.	Agree	57.88%	23.53%	18.59%	Intermediate
15. Restoring occlusal balance through occlusal adjustments, oral rehabilitation, or orthodontic treatment are valid therapy options for primary bruxism.	Disagree	42.59%	44.24%	13.18%	Unsatisfactory
16. The prescription of muscle relaxants is indicated to reduce episodes of bruxism, reducing its masticatory muscle overload and pain.	Disagree	33.18%	42.35%	24.47%	Unsatisfactory
17. The correction of malocclusions prevents the occurrence of sleep bruxism.	Disagree	28.94%	56.47%	14.59%	Intermediate

% = percentage

Statement 8 showed the highest percentage of correct answers (90.82%). There is a common opinion, especially among patients and clinicians, that bruxism is related to stress [7]. AB is probably a result of a prolonged contraction of the masticatory muscles after emotional tension [8] and children with a high level of responsibility and neuroticism are more likely to present SB [9].

AB definition was partially addressed in statement 9, which showed the highest percentage of neutral responses. Although the term bruxism derives from the Greek term

“brychein”, meaning grinding of the teeth, the current consensus on bruxism states that AB is characterized by tooth-contacting behaviors or mandible bracing, without the need for tooth contact [10].

Statement 10 refers to dental attrition as a definitive sign of bruxism requiring immediate treatment, and almost half of the sample agreed or remained neutral regarding this statement. Canine wear, dental wear, headache [11], and non-carious cervical lesions [12] are the most prevalent signs and symptoms of SB in children,



however, dental attrition may indicate past bruxism without current activity [1]. Besides, dentists should be aware of several other factors that may contribute to dental damage, such as erosion, poor density of enamel, and certain medication use [13].

### **Etiology and pathophysiology domain (statements 4,5,6,7,11 and 17)**

Pediatric dentists seem to be aware of bruxism as a protective or signaling activity associated with Attention Deficit Hyperactivity Disorder (ADHD) [14], mouth breathing, allergic rhinitis [15], asthma [16], adenoid and tonsil hypertrophy [17] (statement 5). However, only 54.35% of the sample agreed drugs administered for ADHD management, such as Ritalin, may be associated with child bruxism (statement 6). Malki et al. [18] observed a positive relationship between the use of Central Nervous System stimulants and tooth wear. In addition, other drugs may also be associated with higher chances of SB, such as duloxetine, paroxetine, and venlafaxine [19].

Statements 4, 11, and 17 refer to the association between peripheral components (premature contact, tooth eruption, and malocclusion correction) as preventive for SB, however, none of these factors were deemed to possess an adequate level of knowledge among the specialists evaluated. Only 31.06% of participants did not correlate SB with tooth eruption during childhood. Besides, the idea that bruxism is physiological may be destructive. Bruxism has been associated with sleep arousals, autonomic sympathetic cardiac activation, psychosocial components, exogenous factors, and comorbidities [20]. As previously established, bruxism is mainly regulated centrally - not caused by anatomical factors [1], thus the influence of peripheral components on its pathophysiology is not supported [21,22].

### **Treatment domain (12, 13, 14, 15 and 16)**

In this domain, any statement was considered as presenting a satisfactory level of knowledge, thus showing professionals are not qualified for bruxism management. Only 46.59% of the participants agreed AB therapy is based on patient education through self-awareness and control without the need for a protective occlusal device (Statement 13). Currently, SB management

consists of wearing occlusal splints while sleeping; sleep hygiene, and other lifestyle behavioral approaches [23]. AB management consists of behavior identification, monitoring, and avoidance [24]. In a preliminary study, ecological momentary intervention for AB management has been proposed for healthy young adults [25], however, for children, psychological management must be preferred [10,26,27].

Statement 12 concerns the use of acrylic splints in pediatric dentistry, and 43.76% of the sample agreed or was neutral on the belief that those appliances limit mandibular growth. The use of occlusal splints is a reversible, non-invasive treatment and a previous study showed it is effective in reducing symptoms of SB, such as grinding sounds and headache [28]. To date, no study associated using occlusal splints with limited mandibular growth, however, its indication should be constantly monitored by the dentist [29].

Regarding statement 14, 57.88% of the sample agreed no therapy is effective for the cure or prevention of primary bruxism (Statement 14). Also, although some drugs are promising to attenuate bruxism, such as hydroxyzine, there is not enough scientific evidence to support the use of any drug for bruxism management [19] (Statement 16).

As discussed above, there is no scientific support for the role of occlusion on AB or SB pathophysiology [21,22], thus, restoring occlusal balance through occlusal adjustments, oral rehabilitation, or orthodontic alignment (statement 15) must be avoided. Moreover, given that most children do not maintain SB behavior during adulthood, non-interventionist measures are recommended for its control [4].

This study is relevant since it emphasizes the need for continuing education programs for pediatric dentists when it comes to bruxism etiology, diagnosis, and treatment. One of the study's strengths was that it assessed participants from different regions of Brazil, which could guide the national education sector. However, our study has some limitations, such as the absence of a reference group formed by TMD and Orofacial Pain specialists and other groups for comparison, such as general dentists and orthodontists [30]. Additionally, bias related to online form application may have occurred. Lastly, the findings presented here should not be

generalized and future studies conducted between pediatric dentists from different nationalities are suggested.

## CONCLUSION

Based on the results of this observational, cross-sectional, descriptive study, a high percentage of pediatric dentists showed unacceptable knowledge regarding child bruxism, and only 4 statements obtained a percentage of answers considered satisfactory. There is a lack of knowledge of pediatric dentists regarding AB and SP in children and continuous education about this topic is necessary to avoid misdiagnosis and insufficient management.

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## Author's Contributions

JAOB: Conceptualization, Methodology, Investigation, Writing – Original Draft Preparation, Writing – Review & Editing. MAVL: Writing – Original Draft Preparation, Writing – Review & Editing. AOL: Conceptualization, Methodology. LMSPF: Investigation, Writing – Original Draft Preparation, Writing – Review & Editing, Visualization, Supervision. COC: Formal Analysis, Writing – Review & Editing, Visualization, Supervision. PCRC: Conceptualization, Writing – Review & Editing, Visualization, Supervision. JSB: Conceptualization, Methodology, Writing – Review & Editing, Visualization, Supervision.

## Conflict of Interest

The authors declare no conflicts of interest.

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## Regulatory Statement

This study was approved and conducted following all the Human Research Ethics

Committee of the Universidade Federal do Ceará, Brazil, (Protocol number 2.812.303) and under the 1964 Helsinki Declaration and its later amendments.

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