

## Bruxism and quality of life in schoolchildren aged 11 to 14

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**Abstract** *The purpose of this study is to assess quality of life in relation to oral health in schoolchildren with sleep bruxism. It is a transversal observational study of 594 schoolchildren (aged 11–14) of the municipality of Teresina, in the Brazilian State of Piauí. Quality of life was assessed through the Brazilian version of the CPQ<sub>11-14</sub> questionnaire, in the short form (ISF:16). The presence of sleep bruxism was assessed from reports by the people legally responsible for the children. The results were analyzed by: calculation of an Odds Ratio (OR) estimate of chances; descriptive analysis; a Pearson Chi-squared test; a Likelihood Ratio test; and multiple logistic regression. A statistically significant association was found between sleep bruxism and the total score on the CPQ<sub>11-14</sub> ( $p < 0.001$ ), and with the scores in two domains: functional limitation ( $p = 0.033$ ); and social wellbeing ( $p = 0.020$ ). No association was found between quality of life and the variables gender or age. The final regression model showed that the presence of sleep bruxism increases the chance of having a greater effect on quality of life ( $OR_{adj} = 1.82$  (1.54 – 2.10), IC = 95%). It is concluded that sleep bruxism had a negative impact on the quality of life of the schoolchildren, principally in the two domains functional limitations and changes in social wellbeing.*

**Key words** Sleep bruxism, Adolescent, Quality of life

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## Introduction

Bruxism is a repetitive activity of the jaw muscles, characterized by grinding or clenching of the teeth, and/or exercising pressure of the jaws. It can occur during sleep or while awake<sup>1</sup>.

The occurrence of sleep bruxism (herein for quick reference 'SB') in schoolchildren varies from 3.5% to 40.6%, depending on the age group, gender and methods used for measurement<sup>2-6</sup>. There is an inverse relationship between the occurrence of sleep bruxism and age, with a significant reduction in adolescence<sup>3,7-8</sup>.

The presence of sleep bruxism in the stage of growth and development can contribute to the emergence of craniofacial and temporomandibular alterations, such as muscular fatigue, headache, respiratory difficulties, tooth wear, and adverse effects on quality of life<sup>8-10</sup>.

The etiology of sleep bruxism is still not the subject of consensus, the general indication being multi-factorial causes, associated with local, systemic, psychological, occupational and hereditary factors<sup>6,11-16</sup>.

Assessment of the quality of life of individuals related to oral health has been studied<sup>17-21</sup>, but there is little in the literature about the association between quality of life and sleep bruxism in schoolchildren aged 11-14.

Assessment of quality of life related to oral health involves an evaluation of the effect that oral illnesses set off in individuals' daily activities, interfering in their psychological and emotional wellbeing<sup>22</sup>.

The objective of the study was to assess the effect that sleep bruxism causes on the quality of life on schoolchildren aged 11-14.

## Materials and methods

### Sample

This was a transversal observational study carried out with a representative sample of schoolchildren aged 11 to 14 registered in public and private schools of the municipality of Teresina in the State of Piauí, Brazil. In 2011 there were 54,056 schoolchildren registered in schools at Teresina<sup>23</sup>.

The sample was probabilistic, stratified and random, with calculation made on the software Epi-info 7.0, in the STATCALC module which applies the formula:  $n = \frac{\delta^2 \cdot p \cdot q \cdot N}{e^2 \cdot (N-1) + \delta^2 \cdot p \cdot q}$ , in which 'n' is the sample that was calcu-

lated, ' $\delta$ ' is the confidence level, ' $p \cdot q$ ' is the prevalence with which the phenomenon occurs, ' $N$ ' is the population, and ' $e$ ' is the sampling error. The calculation of the size of the sample was based on data published by Serra-Negra *et al.*<sup>24</sup>, who reported prevalence of sleep bruxism of 35.3% (~36%) in Brazilian children aged 7 to 10, and in the population of schoolchildren in 2011. A correction factor of 1.5 was applied to increase the precision of the stratified sample, with confidence interval (CI) of 95% and standard error of 5%. Thus, the size of the ideal sample should be at least 524 schoolchildren. 20% was added to compensate for any possible losses. A total of 629 schoolchildren were invited to take part in the study.

The study was proportionally stratified by type of school (25.9% private and 74.1% public) and by zone of location (north, south, southeast, east and center), in accordance with the quantitative levels of public and private schools in the teaching network of Teresina. Three schools were randomly chosen for each location zone. After this random choice, the classes and the individual schoolchildren were randomized.

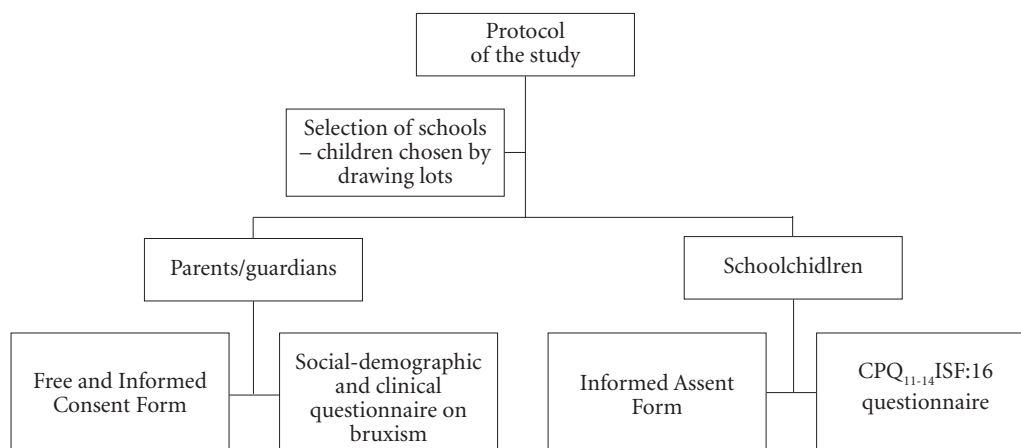
The study included schoolchildren aged 11 to 14 who agreed to participate in the study and whose parents or guardians also authorized participation. The criteria of exclusion were: schoolchildren outside the age range 11 to 14, presentation of toothache, absence on the day of data collection, and/or schoolchildren who did not accept taking part in the study. As a result 24 schoolchildren were excluded who did not accept taking part in the study, and 11 who were absent on the day of collection of data.

The final sample, taking into account the losses of 5.6%, comprised 594 schoolchildren and was divided into two groups: group 1, of schoolchildren with sleep bruxism; and group 2 without it. This division was based only on the report of the parents or guardians about whether or not sleep bruxism was present.

### Collection of data

Data was collected over the period September to November 2013, through application of questionnaires with the schoolchildren and their parents/guardians (Figure 1).

The children took home the Free and Informed Consent Form, and a questionnaire to be answered by the parents/guardians with questions on social-demographic aspects, according to the variables: gender, age, monthly family income, type of school, presence of health prob-



**Figure 1.** Protocol of the study.

lems reported, and whether or not the child had the habit of grinding his/her teeth while asleep. In the assessment of the questionnaires, when unanswered questions were found, telephone contact was made with the parents/guardians to obtain the data.

Schoolchildren who had the consent form signed by the parent/guardian were chosen randomly, organized into small groups and sent to a chosen room for application of the questionnaire on health and quality of life.

For assessment of Quality of Life the CPQ<sub>11-14</sub> ISF:16, validated by Torres et al.<sup>25</sup>, was used, self-applied under the supervision of the investigator responsible. The CPQ<sub>11-14</sub> ISF:16 comprises 16 items in 4 areas: 1. Oral symptoms (questions 1 to 4); 2. Functional limitations (questions 5 to 8); 3. Emotional wellbeing (questions 9 to 12); and 4. Social wellbeing (questions 13 to 16). Replies were scored on the following scale: never = 0; one/two times = 1; sometimes = 2; frequently = 3; and everyday/almost every day = 4. The total score could thus vary between 0 and 64, higher values showing a greater impact of the condition on the quality of life<sup>25</sup>.

The impact on quality of life was assessed through the median total score on the CPQ<sub>11-14</sub>. The presence of sleep bruxism was decided on the basis of report by the parent/guardian, a criterion proposed by AAMS (American Academy of Sleep Medicine)<sup>26</sup>, indicated by Lobezoo et al.<sup>1</sup> for the purposes of research.

The variables gender and type of school were dichotomized as female and male, public and

private, respectively. Age is a continuous quantitative variable that was categorized into 11, 12, 13 and 14 years. Monthly income was categorized at less than two times the minimum wage (MW) and 2 MW or more, in accordance with the cut-off point determined by the median. The general condition of health was assumed as reported by the parent/guardian and categorized as presence or absence of health problems, in accordance with mention of at least one of the problems listed in the questionnaire (psychological, neurological, respiratory, circulatory or immunological problems, and parasites).

Before the collection of data, a pilot study was carried out to assess the methodology proposed, with 52 schoolchildren, who did not participate in the sample, selected in a school that was not among those chosen by lots for the study. After this phase it was observed that there was no need to modify the methodology of the study.

### Statistical analysis

The statistical analysis was made using the statistical software for generation of results SPSS® version 21.0. In the univariate analysis a descriptive analysis was made of the data through the measures of central tendency, dispersion and percentages.

In the bivariate analysis, the Chi-squared ( $\chi^2$ ) test and the Likelihood Ratio test were used, to determination association between presence or absence of sleep bruxism and the scores on CPQ<sub>11-14</sub> (ISF:16), of each domain, and the total score.

A multivariate analysis was made through binary logistic regression to assess the association of sleep bruxism with the social-demographic and clinical characteristics in the quality of life, through the total score on the CPQ<sub>11-14</sub> (ISF:16), the Odds Ratio (OR) being used as a measure of effect with all the variables that showed  $p < 0.20$  in the bivariate analysis, using the stepwise forward method. The level of significance established was 5%.

### Ethical aspects

The study was approved by the Research Ethics Committee of the Federal University of Piauí (UFPI). The participation by the schoolchildren was voluntary. The parents or guardians signed the Free and Informed Consent form (*Termo de Consentimento Livre e Esclarecido* – TCLE) and the schoolchildren signed a Free and Informed Assent form (*Termo de Assentimento Livre e Esclarecido* –TALE), confirming awareness and acceptance of participation in the survey, as per Resolution 466/12<sup>27</sup> of the Brazilian National Health Council.

### Results

A total of 594 (94.4%) schoolchildren took part in the study. The social-demographic and clinical characteristics of the sample are shown in Table 1. In accordance with the report by the parents/guardians, this sample was divided into 2 groups: group 1 (with sleep bruxism,  $n = 132$ , 22.2%) and group 2 (without sleep bruxism,  $n = 462$ , 77.8%). Among the relationships between sleep bruxism and social-demographic and clinical variables, there was a significant association of

sleep bruxism with gender ( $p = 0.012$ ) and age ( $p = 0.031$ ) (Table 1).

Table 2 is a description and comparison in relation to the use of the CPQ<sub>11-14</sub> on the groups of the sample (with and without sleep bruxism), both in relation to the final score and in relation to the counting of each domain. There was a statistically significant difference between the total

**Table 1.** Social-demographic and clinical profile of the schoolchildren with and without SB ( $n = 594$ ).

Variables	Group 1 With SB $n = 132$ $n$ (%)	Group 2 Without SB $n = 462$ $n$ (%)	P*
Gender			<b>0.012</b>
Male	61 (46.2)	158 (34.2)	
Female	71 (53.8)	304 (65.8)	
Age (years)			<b>0.031</b>
11	37 (28.0)	117 (25.3)	
12	41 (31.1)	120 (26.0)	
13	18 (13.6)	120 (26.0)	
14	36 (27.3)	105 (22.7)	
Family income (multiples of MW)			0.545
< 2	118 (22.6)	404 (77.4)	
≥ 2	14 (19.4)	58 (80.6)	0.064
Type of school			0.149
Public	106 (80.3)	334 (72.3)	
Private	26 (19.7)	128 (27.7)	
General condition of health reported			
Presence of problems	63 (47.7)	188 (40.7)	
Absence of problems	69 (52.3)	274 (59.3)	

\* Pearson Chi-Squared ( $\chi^2$ ); MW = minimum wage (R\$ 678.00).

**Table 2.** Descriptive and comparison data from the CPQ11-14: total and sub-scales of schoolchildren with and without SB.

CPQ <sub>11-14</sub>	Number of items	With SB			Without SB			P*
		Average (SD)	Median	Min-Max	Average (SD)	Median	Min-Max	
Total score (0-64)	16	14.0 (8.3)	14	0-47	11.4 (7.8)	9.5	0-47	<b>0.048</b>
Sub-scales								
Oral symptoms (0-16)	4	4.6 (2.6)	4	0-12	4.0 (2.3)	4	0-12	0.212
Functional limitation (0-16)	4	4.0 (3.0)	4	0-12	3.2 (2.8)	3	0-12	<b>0.033</b>
Emotional well-being (0-16)	4	3.0 (2.7)	3	0-12	2.4 (2.8)	1	0-12	0.301
Social well-being (0-16)	4	2.5 (2.7)	2	0-16	1.8 (2.2)	1	0-16	<b>0.020</b>

\* Likelihood ratio test.

scores found in the groups with SB and without SB ( $p = 0.040$ ), and also in the domains of *functional limitation* ( $p = 0.033$ ) and *social wellbeing* ( $p = 0.020$ ). The medium score on the CPQ<sub>11-14</sub> was higher in the group with SB, principally in the two domains *functional limitation* and *social wellbeing*.

Quality of life was classified using the median of the total scores on the CPQ<sub>11-14</sub> as the dividing point. The scores on the CPQ<sub>11-14</sub> varied from 0 to 47, with median of 10, in which values of 0-10

represented low impact and  $> 10$  were classified as high impact on quality of life. The majority of the schoolchildren (51%) presented low impact. However, among the group with SB ( $n = 132$ ), the majority ( $n = 81$ ) showed high impact of SB on the quality of life, as per the Chi-squared test (Table 3).

The logistic regression analysis showed that monthly family income of 2 MW or more {OR<sub>adj</sub> = 0.72 (0.51-0.98)}, and being a student in a private school {OR<sub>adj</sub> = 0.61 (0.39-0.97)}, with absence of health problems {OR<sub>adj</sub> = 0.70 (0.50-0.98)} reduced the impact on the quality of life with pupils with SB. The independent variables gender ( $p = 0.285$ ) and age ( $p = 0.757$ ) were not statistically significant. The present of SB increased by 82% (or 1.82 times) the chance of a high impact on the quality of life of the schoolchildren {OR<sub>adj</sub> = 1.82 (1.54 – 2.1); IC = 95%}, with statistical significance ( $p < 0.001$ ) (Table 4).

**Table 3.** Association between quality of life and SB in the schoolchildren participating in the study ( $n = 594$ ).

	Low impact (CPQ <sub>11-14</sub> 0-10) n (%)	High impact (CPQ <sub>11-14</sub> > 10-47) n (%)	P*
With SB	51 (16.8)	81 (27.8)	0.001
Without SB	252 (83.2)	210 (72.2)	
Total	303 (100.0)	291 (100.0)	

\* Pearson Chi-squared test ( $\chi^2$ ).

## Discussion

Sleep Bruxism is a highly frequent condition that can interfere in the quality of life of individu-

**Table 4.** Logistic regression model for the impact of quality on quality of life by the CPQ11-14, taking into account SB and all possible confusion factors ( $n = 594$ ).

Variables	OR <sub>gross</sub> (CI95%)	OR <sub>adjusted</sub> (CI95%)	P*
Social-demographic and clinical			
Gender			
Male	Ref.	Ref.	0.285
Female	1.20 (0.86-1.68)	1.20 (0.86-1.68)	
Age			
11	Ref.	Ref.	0.757
12	1.68 (1.17-2.42)	1.57 (0.99-2.48)	
13	0.75 (0.51-1.01)	0.96 (0.59-1.55)	
14	0.98 (0.68-1.45)	1.09 (0.68-1.76)	
Family income (multiples of MW)			
< 2 MW	Ref.	Ref.	0.001
≥ 2 MW	1.20 (0.65-2.25)	0.72 (0.51-0.98)	
Type of school			
Public	Ref.	Ref.	0.037
Private	0.48 (0.33-0.70)	0.61 (0.39-0.97)	
General condition of health reported			
Presence of problems	Ref.	Ref.	0.036
Absence of problems	0.72 (0.52-0.99)	0.70 (0.50-0.98)	
Sleep bruxism			
Without SB	Ref.	Ref.	< 0.001
With SB	1.91 (1.28-2.83)	1.82 (1.54-2.1)	

OR adjusted: variables adjusted; CI95%: Confidence interval 95%; \* Wald test for trend; Hosmer-Lemeshow Test = 0.896.

als<sup>28</sup>, and is studied through validated questionnaires<sup>25,29</sup>.

Studies seeking to establish prevalence, etiology and the possible factors associated with bruxism have not been the subject of wide consensus, with variations in methodology and in the age group of samples of studies<sup>2,4,30,31</sup>. In the analysis of the social-demographic and clinical profile of the sample, among the variables studied, only *gender* and *age* showed a significant relationship for the sample. However, the American Academy of Sleep Medicine (AASM)<sup>26</sup> affirms that there is no influence of gender on the prevalence of SB. Studies carried out in Iran<sup>9</sup>, Brazil<sup>30</sup> and Israel<sup>31</sup> also found no association between gender and SB.

The intense variability of the studies on bruxism also makes it difficult to associate SB with age, thus it is not possible to state, nor find a justification to explain, the higher frequency of SB in adolescents of age 12 – since the literature is contradictory to the results found in this sample, and surveys in general tend to show that prevalence of bruxism diminishes with increasing age<sup>7,32</sup>.

Studies prove that oral disturbances exercise an influence on people's functional, psychological and social aspects<sup>18,33-35</sup>. Functional limitations and limitations of social wellbeing affected the quality of life of the schoolchildren of this sample, and these results corroborate with those presented by other authors<sup>18,34,35</sup>. This result can be explained by the muscular pain caused by SB<sup>2,8-10</sup> and by the fact that the population of the age studied presented better perception on its health and quality of life, and capacity to make judgments on its social wellbeing<sup>36</sup>.

The domain of functional limitation comprises issues that deal with the children's experience as to difficulties in the physiological functions of biting or chewing food, pronouncing certain words and eating or drinking hot or cold food. The domain of social wellbeing investigates issues associated with social co-existence, such as avoiding smiling or laughing in public, arguing with another pupil or family member, or the child suffering due to being given a nickname on account of her/his teeth, lips, mouth or jaws<sup>25</sup>.

Literature associating bruxism with quality of life in the 11 to 14 age group, using the instrument CPQ<sub>11-14</sub><sup>7</sup> is still very scarce, and thus the data were compared with other age groups and/or other conditions that affect oral health. A study that relates bruxism and quality of life used the instrument AUQUEI on children in the age group 6 to 8, and found no association between bruxism and impact on quality of life<sup>37</sup>. This dis-

cussion is weakened when comparisons are made with different methodologies and different age groups, and for this reason we suggest that other studies should be carried out using the same questionnaire with populations that have different social-demographic conditions.

The majority of the schoolchildren diagnosed with SB presented higher scores on the CPQ<sub>11-14</sub> questionnaire. According to the logistic regression model, schoolchildren with SB presented almost twice the chance of a high impact on quality of life compared to those without it. These results can be justified by the association of SB with psycho-emotional and/or systemic problems<sup>2,38-42</sup>.

Health and wellbeing are influenced by age and gender, in which older children present perception on the impact that illnesses cause in their lives<sup>35</sup>. In the sample studied, gender did not present interference in quality of life, a result corroborated by other authors<sup>33,43</sup>. Other studies showed that schoolchildren of the female gender with other oral health problems presented worse quality of life<sup>18,44</sup>.

The variable *age* showed no effect on the quality of life of the sample studied. In harmony with this result is the study on schoolchildren undergoing orthodontic treatment, by Costa *et al.*<sup>18</sup>. However, the study by Oliveira and Sheiham<sup>45</sup>, on individuals of age 15 and 16 undergoing orthodontic treatment using the instrument OIDP contrasts with this result. In the construction of the short versions of the CPQ<sub>11-14</sub> (ISF:8 and ISF:16) questions were selected from its long version that most represented the schoolchildren's principal complaints, and for this reason the short versions showed good sensitivity to a detection of alterations in the quality of life of schoolchildren in the 11-14 age group<sup>46</sup>.

Social-demographic, psychosocial and lifestyle factors adopted by the individuals can also influence behavior in relation to health at any phase of life<sup>47</sup>. The final regression model showed that in this sample the quality of life was positively influenced by higher family income, private school and good health condition, and that these can be considered as factors of protection for the quality of life for schoolchildren with SB.

The analysis of the association of quality of life with social-economic factors showed that higher family income was a factor of protection for the high impact on the quality of life of schoolchildren with SB. Inflammatory oral illnesses are more frequent in poor populations<sup>44,47,48</sup>. Thus, the quality of life is directly associated with con-

ditions and lifestyle<sup>29,47,49</sup>. The result found in this study corroborates with results presented in other surveys that evaluated quality of life in schoolchildren of the same age group<sup>50,51</sup>. However, the study by Nurelhuda et al.<sup>52</sup>, in Sudan with schoolchildren aged 12, using the OIDP, contrasts with these results.

Economic status also reflects a greater power to achieve better living conditions, property and levels of education. The significant association of the type of school with quality of life, in which individuals at private school had lower chances of high impact on the quality of life, can be considered a reflection of the results found in the analysis of the economic situation presented in the sample. This result was also observed in the study by Paula et al.<sup>51</sup> and is contrary to Costa et al.<sup>18</sup>, who found no statistically significant association between quality of life and type of school.

The association of other clinical conditions with oral problems increased the impact on quality of life<sup>45,49,53</sup>. Good general health, in this study, presented a significant association with better quality of life in schoolchildren with bruxism, and these results agreed with those presented by Di Francesco et al.<sup>54</sup> and Liu et al.<sup>55</sup>.

In view of the results found in this sample, which showed a negative impact of SB on quality of life, this study has clinical importance to serve

as a basis for studies and for assistance to patients, for the purpose of providing better quality of life. However, transversal studies have limitations: the information collected was in relation to a given moment in the life of the schoolchildren, and for this reason the associations found cannot be considered to be a causal relationship.

The report of the variables SB and general conditions of health also may be considered to be a limitation of the survey, since the parents/guardians might possibly not perceive the signs and symptoms of SB, for example because they do not sleep in the same environment as the schoolchildren, and due to the lack of confirmation of the existence of health problems. The diagnosis of SB was based only on the self-report of the parents/guardians, which in spite of being one of the criteria proposed by the AASM, can be used in association with other diagnostic criteria such as clinical examination, electromyography and polysomnography (considered the gold standard for this diagnosis). The use of these criteria would give greater epidemiological viability to the study.

It is recommended that further studies be carried out, for the purpose of comparing the results found in the sample studied, through longitudinal studies that can enable greater comprehension of the effects of SB on the quality of life of individuals.

## Collaborations

AMB Carvalho participated in writing up the project, data collection, results and discussion. MDM Lima participated in the conception and write-up of the project, discussion about results and critical analysis. JMN Silva participated in the statistical analysis and results. NB Dantas Neta participated in the data collection and results. LFAD Moura was responsible for overall orientation as well as for the conception and write-up of the project, discussion of results, and critical analysis.

## References

- Lobbezoo F, Ahlberg J, Glaros AG, Kato T, Koyano K, Lavigne GJ, Leeuw R, Manfredini D, Svensson P, Winocur E. Bruxism defined and graded: an international consensus. *J Oral Rehabil* 2013; 40(1):2-4.
- Gonçalves LPV, Toledo OAD, Bezerra ACB, Leal SC. Variables associated with bruxism in children and adolescents. *Conscientiae Saúde* 2009; 8(3):397-403.
- Manfredini D, Restrepo C, Diaz-Serrano K, Winocur E, Lobbezoo F. Prevalence of sleep bruxism in children: a systematic review of the literature. *J Oral Rehabil* 2013; 40(8):631-642.
- Serra-Negra JM, Paiva SM, Abreu MH, Flores-Mendoza CE, Pordeus IA. Relationship between tasks performed, personality traits, and sleep bruxism in Brazilian school children - a population-based cross-sectional study. *Plos One* 2013; 8:11.
- Thomaz EBAF, Cangussu MCT, Assis AMO. Malocclusion and deleterious bucal habits among adolescents in a developing area in northeastern Brazil. *Braz Bucal Res* 2013; 27(1):62-69.
- Serra-Negra JM, Paiva SM, Fulgêncio LB, Chavez BA, Lage CF, Pordeus IA. Environmental factors, sleep duration, and sleep bruxism in Brazilian schoolchildren: a case-control study. *Sleep Med* 2014; 15(2):236-239.
- Liu X, Ma Y, Wang Y, Jiang Q, Rao X, Lu X, Teng H. Brief report: an epidemiologic survey of the prevalence of sleep disorders among children 2 to 12 years old in Beijing, China. *Pediatrics* 2005; 115(1):266-268.
- Carra MC, Huynh N, Morton P, Rompre PH, Papadakis A, Remise C, Lavigne GJ. Prevalence and risk factors of sleep bruxism and wake-time tooth clenching in a 7- to 17-yr-old population. *Eur J Oral Sci* 2011; 119(5):386-394.
- Ghafournia M, Tehrani MH. Relationship between bruxism and malocclusion among preschool children in Isfahan. *J Dent Res Dent Clin Dent Prospects* 2012; 6(4):138-142.
- Serra-Negra JM, Paiva SM, Auad SM, Ramos-Jorge ML, Pordeus IA. Signs, symptoms, parafunctions and associated factors of parent-reported sleep bruxism in children: a case-control study. *Braz Dent J* 2012; 23(6):746-752.
- Lavigne GJ, Huynh N, Kato T, Okura K, Adachi K, Yao D, Sessle B. Genesis of sleep bruxism: motor and autonomic-cardiac interactions. *Arch Oral Biol* 2007; 52(4):381-384.
- Lavigne GJ, Khoury S, Abe S, Yamaguchi T, Raphael K. Bruxism physiology and pathology: an overview for clinicians. *J Oral Rehabil* 2008; 35(7):476-494.
- Diniz MB, Silva RC, Zuanon ACC. Bruxismo na infância: um sinal de alerta para odontopediatras e pediatras. *Rev Paul Pediat* 2009; 27(3):329-334.
- Seraidarian P, Seraidarian PI, Cavalcanti BN, Marchini L, Neves ACC. Urinary levels of catecholamines among individuals with and without sleep bruxism. *Sleep Breath* 2009; 13(1):85-88.
- Manfredini D, Lobbezoo F. Role of psychosocial factors in etiology of bruxism. *J Orofac Pain* 2009; 23(2):153-166.
- Rossi D, Manfredini D. Family and school environmental predictors of sleep bruxism in children. *J Orofac Pain* 2013; 27(2):135-141.
- Kiyak HA. Does orthodontic treatment affect patients' quality of life? *J Dent Educ* 2008; 72(8):886-894.
- Costa AA, Ferreira MC, Serra-Negra JM, Pordeus IA, Paiva SM. Impact of wearing fixed orthodontic appliances on bucal health-related quality of life among Brazilian children. *J Orthod* 2011; 38:275-281.
- Aguilar-Díaz FC, Irigoyen-Camacho ME, Borges-Yáñez SA. Bucal-health-related quality of life in schoolchildren in an endemic fluorosis area of Mexico. *Quality of life research* 2011; 20(10):1699-1706.
- Barbosa TS, Leme MS, Castelo PMC, Gavião MBD. Evaluating bucal health-related quality of life measure for children and preadolescents with temporomandibular disorder. *Health Qual Life Outcomes* 2011; 9:32.
- Leal SC, Bronkhorst EM, Fan M, Frencken JE. Untreated Cavitated Dentine Lesions: Impact on Children's Quality of Life. *Caries research* 2012; 46(2):102-106.
- Locker D, Allen F. What do measures of 'bucal health-related quality of life' measure? *Community Dent Bucal Epidemiol* 2007; 35(6):401-411.
- Secretaria de Estado da Educação e Cultura do Piauí (SEDUC-PI). *Censo Escolar 2011: Matrícula do Ensino Fundamental por Idade*. Teresina: SEDUC-PI; 2011.
- Serra-Negra JM, Paiva SM, Seabra AP, Dorella C, Lemos BF, Pordeus IA. Prevalence of sleep bruxism in a group of Brazilian schoolchildren. *Eur Arch Paediatr Dent* 2010; 11(4):192-195.
- Torres CS, Paiva SM, Vale MP, Pordeus IA, Ramos-Jorge ML, Oliveira AC, Allison PJ. Psychometric properties of the Brazilian version of the Child Perceptions Questionnaire (CPQ<sub>11-14</sub>) - Short Forms. *Health Qual Life Outcomes* 2009; 7:43-49.
- American Academy of Sleep Medicine. *International classification of sleep disorders, revised: diagnostic and coding manual*. Chicago: American Academy of Sleep Medicine; 2001.
- Brasil. Ministério da Saúde (MS). Conselho Nacional de Saúde. Resolução nº 466, de 12 de dezembro de 2012. Diretrizes e Normas Regulamentadoras de Pesquisas Envolvendo Seres Humanos. *Diário Oficial da União* 2012; 13 dez.
- Barbosa TS, Mialhe FL, Castilho ARF, Gavião MBD. Qualidade de vida e saúde bucal em crianças e adolescentes: aspectos conceituais e metodológicos. *Rev Saúde Coletiva* 2010; 20(1):283-300.
- Minayo MCS, Hartz ZMA, Buss PM. Qualidade de vida e saúde: um debate necessário. *Cien Saude Colet* 2000; 5(1):7-18.
- Serra-Negra JM, Tirsá-Costa D, Guimarães FH, Paiva SM, Pordeus IA. Evaluation of parents/guardian knowledge about the bruxism of their children: family knowledge of bruxism. *J Indian Soc Pedod Prev Dent* 2013; 31(3):153-158.



31. Emodi-Perlman A, Eli I, Friedman-Rubin P, Goldsmith C, Reiter S, Winocur E. Bruxism, oral parafunctions, anamnestic and clinical findings of temporomandibular disorders in children. *J Oral Rehabil* 2012; 39(2):126-135
32. Laberge L, Tremblay RE, Vitaro F, Montplaisir J. Development of Parasomnias From Childhood to Early Adolescence. *Pediatrics* 2000; 106(1):67-74.
33. Foster Page LA, Thomson WM, Jokovic A, Locker D. Validation of the Child Perceptions Questionnaire (CPQ11-14). *J Dent Res* 2005; 84(7):649-652.
34. O'brien C, Benson PE, Marshman Z. Evaluation of a quality of life measure for children with malocclusion. *J Orthod* 2007; 34(3):185-193.
35. Bendo CB, Paiva SM, Torres CS, Oliveira AC, Goursand D, Pordeus IA, Vale MP. Association between treated/untreated traumatic dental injuries and impact on quality of life of Brazilian schoolchildren. *Health Qual Life Outcomes* 2010; 8:114.
36. Jokovic A, Locker D, Guyatt G. What do children's global ratings of oral health and well-being measure? *Community Dent Oral Epidemiol* 2005; 33:205-211.
37. Castelo PM, Barbosa TS, Gavião MBD. Quality of life evaluation of children with sleep bruxism. *BMC bucal health* 2010; 10:16.
38. Shinkai RSA, Santos LM, Silva FA, Nobre dos Santos M. Contribuição ao estudo da prevalência de bruxismo excêntrico noturno em crianças de 2 a 11 anos de idade. *Rev Odontol Univ. São Paulo* 1998; 12(1):29-37.
39. Ferreira AM, Clemente V, Gozal D, Gomes A, Pissarra C, César H, Coelho I, Silva C F, Azevedo MHP. Snoring in Portuguese Primary School Children. *Pediatrics* 2000; 106(5):E64.
40. Bader G, Lavigne G. Sleep bruxism: an overview of an oromandibular sleep movement disorder. *Sleep Medicine Reviews* 2000; 4(1):27-43.
41. Blini CC, Morisso MF, Bolzan GP, Silva AMT. Relação entre bruxismo e o grau de sintomatologia de disfunção temporomandibular. *Rev CEFAC* 2009; 12(3):427-433.
42. Ferreira-Bacci ADV, Cardoso CLC, Díaz-Serrano KV. Behavioral problems and emotional stress in children with bruxism. *Brazilian dental journal* 2012; 23(3):246-251.
43. Oliveira CM, Sheiham A. The relationship between normative orthodontic treatment need and oral health-related quality of life. *Community Dent Oral Epidemiol* 2003; 31:426-436.
44. Piovesan C, Antunes JLF, Guedes RS, Ardenghi TM. Impact of socioeconomic and clinical factors on child oral health-related quality of life (COHRQoL). *Qual Life Res* 2010; 19(9):1359-1366.
45. Oliveira CM, Sheiham A. Orthodontic treatment and its impact on bucal health-related quality of life in Brazilian adolescents. *J Orthod* 2004; 31(1):20-27.
46. Jokovic A, Locker D, Guyatt G. Short forms of the Child Perceptions Questionnaire for 11-14-year-old children (CPQ11-14):Development and initial evaluation. *Health Qual Life Outcomes* 2006; 4:4.
47. Davoglio RS, Aerts DRGC, Abegg C, Freddo SL, Monteiro L. Fatores associados a hábitos de saúde bucal e utilização de serviços odontológicos entre adolescentes. *Cad Saude Publica* 2009; 25(3):655-667.
48. Scapini A, Feldens CA, Ardenghi TM, Kramer PF. Malocclusion impacts adolescents' oral health-related quality of life. *Angle Orthod* 2013; 83(3):512-518.
49. Kumar S, Kroon J, Lalloo R. A systematic review of the impact of parental socio-economic status and home environment characteristics on children's buccal health related quality of life. *Health Qual Life Outcomes* 2014; 12:41-56.
50. Locker D. Disparities in oral health-related quality of life in a population of Canadian children. *Community Dent Oral Epidemiol* 2007; 35(5):348-356.
51. Paula JS, Leite ICG, Almeida AB, Ambrosano, GMB, Pereira AC, Mialhe FL. The influence of oral health conditions, socioeconomic status and home environment factors on schoolchildren's self-perception of quality of life. *Health Qual Life Outcomes* 2012; 10:6.
52. Nurelhuda NM, Ahmed MF, Trovik TA, Astrom AN. Evaluation of oral health-related quality of life among Sudanese schoolchildren using Child-OIDP inventory. *Health Qual Life Outcomes* 2010; 8:152-164.
53. Foster Page LA, Thomson WM, Ukra A, Baker SR. Clinical status in adolescents: is its impact on oral health-related quality of life influenced by psychological characteristics? *Eur J Oral Sci* 2013; 121(3 PT 1):182-187.
54. Di Francesco RC, Fortes FSG, Komatsu CL. Melhora da qualidade de vida em crianças após adenoamigdalectomia. *Rev Bras Otorrinolaringol* 2004; 70(6):748-751.
55. Liu LJ, Xiao W, He QB, Jiang WW. Generic and bucal quality of life is affected by bucal mucosal diseases. *BMC bucal health* 2012; 12:2.

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