



## Review

## Risk factors related to sleep bruxism in children: A systematic literature review



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## ABSTRACT

**Objective:** The aim of this article was to systematically review the literature to identify papers dealing with risk factors associated with sleep bruxism (SB) in children.

**Design:** A systematic search was carried out based on the following databases: PubMed, Embase, Scopus, Cochrane Oral Health Group's Trial Register and Cochrane Register of Controlled Trials, Web of Science, LILACS, SciELO. Studies investigating risk factors related to SB after multiple regression analysis and bruxism symptoms assessed with clinical diagnosis or specific questionnaires were searched. Six out of the 4546 initially identified studies were selected.

This review was conducted according to the guidelines from the Cochrane Handbook for Systematic Reviews of Interventions, with reporting in agreement to the Preferred Reporting Items for Systematic Reviews and Meta-analyses guidelines.

**Results:** Among the six analyzed articles, one randomized clinical trial (RCT) suggested the increase of SB in heavily exposed patients to second hand smoke (SHS) (OR = 4.5, CI = 2.2–9.4), two cross-sectional studies suggested neuroticism as determinant factor for the development of sleep bruxism (OR = 1.9, CI = 1.3–2.6), among children and three case-control studies suggested that children with sleep disturbances were more likely to have SB (OR = 3.3, CI = 1.6–6.6). Parafunctional behaviours (OR = 2.3, CI = 1.2–4.3) had a moderate association.

**Conclusions:** SHS and sleep disturbances presented the strongest association with SB. The most recurrent source of bias was the lack of blinding procedures. Furthermore, the use of reliable SB diagnostic procedures should be recommended to increase the quality of future studies. The evidence emerged from the considered studies was clinically relevant.

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## 1. 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 with circadian manifestations (i.e. sleep or awake bruxism) (Lobbezoo et al., 2013; Manfredini & Lobbezoo, 2009). Sleep bruxism (SB) is the sleep-related motor disorder of primary interest for the health of the craniofacial complex, considering several detrimental consequences on the stomatognathic system, including tooth wear, masticatory muscle tenderness and pain, headache and temporomandibular disorders (TMDs) (De Meyer & de Boever, 1997; Lavigne et al., 2007). The prevalence of SB in children varies among different studies. A recent review by Manfredini, Winocur, Guarda-Nardini, Paesani, and Lobbezoo, 2013, reported a variability of prevalence between 3.5% and 40.6% with a commonly described decrease with age and no gender differences. The variability was mainly due to methodological reasons avoiding the support of any reliable estimate of the prevalence of SB in children.

According to the World Health Organization (WHO) a risk factor is defined as any attribute, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury (World Health Organization, 2014). Multiple risk factors have been associated to SB. Nevertheless, there are still many unsolved issues concerning the etiology of bruxism that have consequences on the clinical management strategies.

Based on these premises, the purpose of the current study was to conduct a systematic review of the existing literature to determine the relationship between risk factors and SB symptoms in children from 6 to 11 years of age, in the attempt to find answers to the following two clinical research questions:

1. Which are the identified risk factors for bruxism in children?
2. Which is the weight of each risk factor?

## 2. Materials and methods

### 2.1. Focused question

The selected articles were evaluated according to the following criteria and the selection procedure was thoroughly described through a detailed flow chart, according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses guidelines (PRISMA) Statement (Moher, Liberati, Tetzlaff, Altman, & The PRISMA group, 2009) (Fig. 1). The PICOS template format was not perfectly fitting to all the included studies because of the different study designs, especially concerning the selection of the target population and the comparison group. Nevertheless, it was the best possible approach to a systematic assessment of the included papers.

### 2.2. Search protocol

This systematic review was conducted with reporting in agreement to the PRISMA statement (Moher et al., 2009) and according to guidelines from the Cochrane Handbook for Systematic Reviews of Interventions (Higgins & Green, 2011). Searches of the databases MEDLINE, PubMed, Embase, Scopus, Cochrane Oral Health Group's Trial Register and Cochrane Register of Controlled Trials, Web of Science, LILACs, SciELO were completed in March 2015. Articles from 1950 to March 2015 were searched using the following Medical Subject Headings (MeSH) terms and key words and limited to "all children (6–11 years old)": (1) MeSH terms: bruxism, sleep bruxism, risk factors (2) key words: (bruxer\* or sleep brux\* AND ((risk orassoc\* or relat\*) AND factor\*) AND diagnosis).

The a priori inclusion criteria for this study were the following: (1) RCTs and observational studies assessing the relation between risk factors and bruxism, (2) RCTs and observational studies assessing the diagnosis of bruxism (3) RCTs and observational studies assessing any therapeutic intervention on bruxers, (4) RCTs and observational studies analyzing patients suffering from SB (5) RCTs and observational studies with a sample of minimum 10 patients. Reference lists from articles were explored for other potential studies. Article authors were contacted by e-mail to clarify any relevant article queries. A web research for ongoing trials using the terms bruxism and risk factors through the metaRegister of Controlled Trials on [controlled-trials.com](http://controlled-trials.com), including the National Institutes of Health [ClinicalTrials.gov](http://ClinicalTrials.gov) and the International Standard Randomized Controlled Trial Number Registers, was run in March 2015.

The reviewing process included randomized clinical trials (RCTs), controlled clinical trials (CCTs), Cohort studies, cross-sectional and case-control studies. After duplicates removal, all articles that appeared to meet the inclusion criteria were reviewed.

All considered participants were bruxers, with tooth grinding and/or clenching (age: 6–11 years old). These patients were identified by using specific questionnaires, clinical analysis of tooth wear, diagnostic criteria of the American Academy of Sleep Medicine (AASM) (Iber, Anacoli-Israel, & Chesson, 2015).

The following exclusion criteria were applied: lack of standardized measures for bruxism evaluation; lack of effective statistical analysis; case reports; reviews; abstracts and author debates or editorials; studies on patients with systemic diseases, syndromes or neurological or psychiatric disorders.

The primary outcome was represented by risk factors for SB in children.

The research strategy returned 4546 potential articles for inclusion. Non-English language literature and unpublished data were not included. Three authors (T.C., A.D., and G.R.) independently identified appropriate articles through examining relevant abstracts, reviewed trials for eligibility, and assessed the quality of trials. Inconsistencies were solved by consensus.

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