Association between sleep bruxism and alcohol, caffeine, tobacco, and drug abuse

A systematic review

Eduardo Bertazzo-Silveira, DDS; Cristian Maikel Kruger; Isabela Porto De Toledo, BS; André Luís Porporatti, DDS, MSc, PhD; Bruce Dick, MD, MSc, PhD; Carlos Flores-Mir, DDS, MSc, PhD; Graziela De Luca Canto, DDS, MSc, PhD

Bruxism is defined as "repetitive jaw-muscle activity characterised by clenching or grinding of the teeth and/or by bracing or thrusting of the mandible."[1] Bruxism has 2 distinct circadian manifestations: it can occur during sleep (sleep bruxism [SB]) or during wakefulness (awake bruxism).[2] Investigators in systematic reviews (SRs) have postulated an estimated prevalence of bruxism from 8% to 31.4%.[3,4] SB decreases over time, from an estimated prevalence of 14% in children[5] to approximately 13% in adults[3] and 3% in the elderly population.[3]

Supplemental material is available online.

The International Classification of Sleep Disorders Third Edition[6] has classified SB as a movement disorder associated with sleep, and it can be related to several consequences such as tooth wear, tooth fractures, toothaches, periodontal problems, muscle fatigue, and headaches.[7,8] Although SB has been linked to intrinsic factors such as stress level and genetic factors, the etiology and risk factors for SB are not understood fully from the available literature.[9,10] Study results have suggested an association between SB and drugs such as caffeine, alcohol, and illegal drugs such as methylenedioxymethamphetamine (MDMA), also known as *ecstasy*.[7,11,12] Nevertheless, consistent evidence regarding these actual associations is scarce. Also, we could not identify SRs

ABSTRACT

Background. The aim of this systematic review was to answer the focused question, "In adults, is there any association between sleep bruxism (SB) and alcohol, caffeine, tobacco, or drug abuse?"

Types of Studies Reviewed. This systematic review included studies in which the investigators assessed SB diagnosis by using questionnaires, clinical assessment, or polysomnography and evaluated its association with alcohol, caffeine, tobacco, or drug abuse. The authors graded SB as possible, probable, or definitive. The authors developed specific search strategies for Latin American and Caribbean Health Sciences Literature, PsycINFO, PubMed, ScienceDirect, and Web of Science. The authors searched the gray literature by using Google Scholar and ProQuest. The authors evaluated the methodological quality of the included studies by using the Meta-Analysis of Statistics Assessment and Review Instrument.

Results. From among 818 studies, the authors selected 7 for inclusion in which samples ranged from 51 through 10,229 participants. SB was associated highly with alcohol and tobacco use. In 1 study, the investigators noted a positive and weak association for heavy coffee drinkers. The odds for SB seem to increase almost 2 times for those who drank alcohol, almost 1.5 times for those who drank more than 8 cups of coffee per day, and more than 2 times for those who were current smokers. The abuse of methylenedioxymethamphetamine associated with SB remained without sufficient evidence.

Conclusions and Practical Implications. On the basis of limited evidence, SB was associated positively with alcohol, caffeine, and tobacco. The association between the studied drugs could not be discredited; however, there is still a need for stronger evidence based on studies with greater methodological rigor.

Key Words. Alcohol abuse; caffeine; tobacco smoking; drug abuse; bruxism; review literature.

JADA 2016:■(■):■-■

http://dx.doi.org/10.1016/j.adaj.2016.06.014

involving this topic. Thus, the purpose of this SR was to answer the following focused question, "In adults, is there any association between SB and alcohol, caffeine, tobacco, or drug abuse?"

METHODS

Protocol and registration. We performed this SR by adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Checklist.[13] We registered the SR protocol on the Prospective Register of Systematic Reviews (Centre for Reviews and Dissemination, University of York, Heslington, York, United Kingdom; and the National Institute for Health Research, London, United Kingdom) under the number CRD42015024078.[14]

Inclusion and exclusion criteria. We selected observational studies conducted in adults in which the investigators evaluated the association between SB and alcohol, caffeine, tobacco, or drug abuse. We applied no language or time restrictions. We accepted professionally determined or self-reported use, including illegal drugs, caffeine, alcohol, and tobacco (smoked or not). SB diagnosis had to be made with the aid of questionnaires, clinical assessment, or polysomnography (PSG). For the classification of SB in each of the selected studies, we used the diagnostic grading system Lobbezoo and colleagues[1] proposed. This grading system suggested that *possible SB* should be based on self-report by means of questionnaires or the anamnestic part of a clinical examination. *Probable SB* should be based on self-report and the results of the inspection part of a clinical examination. *Definite SB* should be based on self-report, clinical examination results, and a PSG recording, likely along with audio or video recordings.[1] We excluded studies according to the following criteria: reviews, letters, conference abstracts, and personal opinions; studies in which the sample included children or adolescents who could not be discerned from adult samples; studies in which the sample included diagnosed craniofacial genetic syndromes or neuromuscular diseases; studies in which the sample included patients taking medicines; and studies with the same sample reported in another included study.

Information sources. With the help of a health sciences librarian, we selected appropriate truncation and word combinations and adapted them for these databases: Latin American and Caribbean Health Sciences Literature, PsycINFO, PubMed, ScienceDirect, and Web of Science. In addition, we performed a partial gray literature search by using Google Scholar and ProQuest. We limited the Google Scholar search to the first 15 result pages. eTable 1 (available online at the end of this article) provides more information about the search strategies. We also hand searched the reference lists of relevant articles, and we consulted experts to identify any studies that could have been missed in the electronic database searches.

Search. We managed the references and removed the duplicates by using reference manager software (EndNote Basic, Thomson Reuters). We conducted the database search on May 20, 2015, and updated it on April 20, 2016.

Study selection. We selected the final studies according to a 2-phase process. In phase 1, 3 reviewers (E.B.S., C.M.K., I.P.T.) independently evaluated the titles and abstracts of all identified electronic database citations. They discarded any studies that did not appear to fulfill the inclusion criteria. In phase 2, they applied the same selection criteria to the full articles to confirm their eligibility. Disagreements were solved in either phase by means of discussion and mutual agreement. A fourth author (A.L.P.) was involved when we did not reach a consensus required to make a final decision.

Data collection process and data items. We performed the data collection process independently (E.B.S., C.M.K., I.P.T.) and cross-checked all information to ascertain the completeness of the retrieved data. From all included studies, we recorded author, year of publication, country, sample size, demographic features of the sample, and results concerning the association between SB and alcohol, caffeine, tobacco, or drug abuse. If the required data were not included in articles, we tried to contact the authors to retrieve the missing information.

Risk of bias within the studies. Two independent reviewers (E.B.S., I.P.T.) evaluated the quality of the included studies by using the Meta-Analysis of Statistics Assessment and Review Instrument (MAStARI).[15] We used different MAStARI questionnaires according to the design of the included studies: cross-sectional or descriptive studies and cohort or case-control studies. Both questionnaires consist of 9 questions that were answered with *yes*, *no*, *unclear*, or *not applicable*, enabling assessment of the studies as having a high, moderate, or low risk of bias according to the score obtained. We categorized the risk of bias as *high* when the study reached a *yes* score of 49% or less, *moderate* when the study reached a *yes* score of 50% to 69%, and *low* when the study reached a *yes* score of 70% or more.[15]

Summary measures. We considered any outcome measurements that the investigators used in the publications to evaluate the association between SB and alcohol, caffeine, tobacco, or drug abuse. These included risk ratio, odds ratio (OR), or risk difference for dichotomous outcomes and mean difference or standardized mean difference for continuous outcomes.

ABBREVIATION KEY. **CNS:** Central nervous system. **EMG:** Electromyography. **LILACS:** Latin American and Caribbean Health Sciences Literature. **MAStARI:** Meta-Analysis of Statistics Assessment and Review Instrument. **MDMA:** Methylenedioxymethamphetamine. **NA:** Not applicable. **PSG:** Polysomnography. **SB:** Sleep bruxism. **SR:** Systematic review.