Trabalho de Conclusão de Curso

Associação entre bruxismo do sono e sintomas de ansiedade em adultos: uma revisão sistemática

Helena Polmann

Universidade Federal de Santa Catarina
Curso de Graduação em Odontologia

UNIVERSIDADE FEDERAL DE SANTA CATARINA
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Helena Polmann

ASSOCIAÇÃO ENTRE BRUXISMO DO SONO E SINTOMAS DE ANSIEDADE: UMA REVISÃO SISTEMÁTICA

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Orientador(a): Profª. Drª. Graziela De Luca Canto

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Helena Polmann

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Este Trabalho de Conclusão de Curso foi julgado adequado para a obtenção do título de cirurgião-dentista e aprovado em sua forma final pelo Departamento de Odontologia da Universidade Federal de Santa Catarina.

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Banca Examinadora:

Profª. Drª. Graziela De Luca Canto, UFSC
Orientador

Profª. Drª. Beatriz Dulcinéia Mendes de Souza, UFSC
Membro

Profª. Joyce Duarte, UFSC
Membro

Dedico este trabalho à minha mãe, que me mostrou o poder do estudo e da ciência.

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APRESENTAÇÃO

Esta revisão sistemática foi originalmente escrita como um artigo na língua inglesa, com o objetivo de ser submetido ao periódico *Journal of Oral Rehabilitation* (JOR) em parceria com os pesquisadores da Universidade Federal de Santa Catarina Drª. Graziela De Luca Canto, Dr. André Luís Porporatti e o mestrando Gilberto Melo; com a pesquisadora da Universidade de São Paulo (USP) Drª. Juliana Stuginski-Barbosa; a pesquisadora da Universidade de Brasília (UnB) Drª. Eliete Neves; e os pesquisadores Dr. Carlos Flores-Mir e Dr. Bruce D. Dick da University of Alberta (Canadá

RESUMO

Objetivo. O objetivo desta revisão sistemática foi avaliar a associação entre bruxismo do sono (BS) e sintomas de ansiedade em adultos. **Métodos.** Os estudos incluídos deveriam ter utilizado questionários, exames clínicos e/ou polissonografia para diagnosticar o BS e questionários validados para avaliar os sintomas de ansiedade. Estratégias de busca foram desenvolvidas para as sete principais bases de dados e para três da literatura cinzenta. O risco de viés dos estudos incluídos foi avaliado utilizando a ferramenta *Joanna Briggs Institute Critical Appraisal Checklist for Analytical Cross-Sectional Studies* e a qualidade da evidência encontrada foi avaliada utilizando o *Grading of Recommendations Assessment, Development and Evaluation*. **Resultados.** Cinco estudos transversais foram incluídos, dos quais quatro foram julgados com baixo e um com moderado risco de viés. Nenhuma associação com BS provável foi observada em dois estudos que avaliaram níveis genéricos de ansiedade. Um estudo avaliou níveis genéricos de ansiedade através do *State-Trait Anxiety Inventory* (STAI) e uma associação positiva foi observada com BS provável em ambas as subescalas STAI-1 ($p=0.030$) e STAI-2 ($p=0.010$). Dois estudos avaliaram sintomas específicos de ansiedade utilizando o questionário *Panic-Agoraphobic Spectra Evaluation* (PAS-SR). Escores significantemente mais altos do PAS-SR foram observados em dois estudos em relação ao BS provável. Nenhum estudo com diagnóstico de BS definitivo foi identificado. **Conclusão.** Ainda não há evidência suficiente proveniente de estudos com metodologia apropriada para confirmar ou refutar a associação entre BS e sintomas genéricos de ansiedade.

Palavras-chaves: odontologia baseada em evidências; bruxismo do sono; ansiedade; revisão sistemática.

ABSTRACT

Purpose. The purpose of this systematic review was to evaluate the association between sleep bruxism (SB) and anxiety symptoms in adults. **Methods.** Studies assessing SB by means of questionnaires, clinical examination, and/or polysomnography (PSG), and validated questionnaires to assess anxiety,were included. Search strategies were developed for seven main electronic databases and for three gray literature databases. Risk of bias was assessed using the Joanna Briggs Institute Critical Appraisal Checklist for Analytical Cross-Sectional Studies and confidence in cumulative evidence was evaluated using the Grading of Recommendations Assessment, Development and Evaluation criteria. **Results.** Five cross-sectional studies were included, of which four were judged with low and one with moderate risk of bias. No association with probable SB was observed in two studies that invastigated generic levels of anxiety. One paper evaluated generic anxiety levels through the State-Trait Anxiety Inventory (STAI) and a positive association was observed with probable SB in both STAI-1 ($p=0.030$) and STAI-2 ($p=0.010$) subscales. Two studies assessed specific symptoms of anxiety using the panic-agoraphobic spectra evaluation (PAS-SR) questionnaire. Significantly higher PAS-SR total scores were observed in both studies with regard to SB. No study with definitive diagnosis of SB was identified. **Conclusion**. Evidence from properly designed studies, to credit or discredit an association between SB and generic symptoms of anxiety in adults, is still insufficient.

Keywords: Evidence-based dentistry; sleep bruxism; anxiety; systematic review.

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LISTA DE ABREVIATURAS E SIGLAS

BS: Bruxismo do Sono

PSG: Polissonografia

RS: Revisão Sistemática

Do inglês

BAI: *Beck Anxiety Inventory*

HADS: *Hospital Anxiety and Depression Scale*

PAS-SR: *Panic-Agoraphobic Spectrum Self-Report*

STAI: *State-Trait Anxiety Inventory*

SUMÁRIO

1 INTRODUÇÃO

Bruxismo do sono (BS) foi definido como uma atividade muscular repetitiva dos músculos da mandíbula, caracterizada por apertamento e rangimento dos dentes (LOBBEZOO *et al.*, 2013). Os sinais e sintomas clássicos do BS incluem desgaste dental, dor e/ou hipertrofia dos músculos mastigatórios, dor de cabeça pela manhã (especialmente nas regiões do músculo frontal e temporal), marcas de dentição na língua e bochecha e travamento mandibular (BADER, KAMPE e TAGDAE, 2000; KOYANO *et al.*, 2008).

A etiologia do BS é considerada multifatorial e foi associada a vários fatores como distúrbios do sono, polimorfismo genético, fatores exógenos, medicação ingerida, uso de substâncias de abuso e componentes psicossociais (LOBBEZOO e NAEIJE, 2001; MANFREDINI e LOBBEZOO, 2009; LOBBEZOO *et al.*, 2013; DE LUCA CANTO *et al.*, 2015; BERTAZZO-SILVEIRA *et al.*, 2016). Estudos recentes demonstraram que interferências na oclusão não influenciam na atividade do bruxismo (KATO *et al.*, 2003). Todavia, o papel dos fatores psicológicos continua sendo um tópico em debate e o mecanismo exato de como eles contribuem para o desenvolvimento ainda é incerto (MANFREDINI e LOBBEZOO, 2009).

Ansiedade é uma emoção caracterizada por sentimentos de tensão, pensamentos preocupantes, mudanças físicas como aumento da pressão sanguínea e é associada com desconforto físico e psicológico (MAJOR *et al.*, 2000). Indivíduos que relatam altos níveis de sintomas de ansiedade são frequentemente englobados no espectro das desordens de ansiedade (SYLVERS, LILIENFELD e LAPRAIRIE, 2011) como descrito no Manual de Diagnóstico e Estatística dos Transtornos Mentais (DSM-5) (AMERICAN PSYCHIATRIC ASSOCIATION, 2013).

Sintomas genéricos de ansiedade, tais como falta de ar, palpitações, fatiga, dor de cabeça, tontura e cansaço são sintomas que não são relacionados a uma desordem específica e são normalmente avaliados por questionários validados tais como o *State-Trait Anxiety Inventory* (STAI), o *Beck Anxiety Inventory* (BAI) ou o *Hospital Anxiety and Depression Scale* (HADS) (BECK e STEER, 1988; CLARK *et al.*, 1994; JULIAN, 2011; LUNDIN, HALLGREN e FORSELL, 2015).

Sintomas específicos de ansiedade, por outro lado, são associados a desordens de ansiedade catalogadas no DSM-5 (AMERICAN PSYCHIATRIC ASSOCIATION, 2013). Esses sintomas são ansiedade e preocupação excessivos e

não específicos, sentimentos de estar “no limite”, dificuldade de concentração, irritabilidade e dificuldade de dormir, que podem ser avaliados através de questionários mais específicos, tais como o *Panic-Agoraphobic Spectrum Self-Report* (PAS-SR) (SHEAR *et al.*, 2001).

Além disso, sintomas específicos de ansiedade diferem dos sintomas genéricos pelas suas características mais debilitantes, tais como a disfunção social (MUNIR e HUGHES, 2017). Todavia, todas as desordens de ansiedade compartilham sintomas em comum, tais como medo, ansiedade e negação (AMERICAN PSYCHIATRIC ASSOCIATION, 2013).

Estudos anteriores sugerem que BS pode estar potencialmente associado com componentes psicossociais, tais como ansiedade e estresse (LAVIGNE *et al.*, 2003). Além disso, o papel dos fatores psicossociais na etiologia do BS foram investigados em uma revisão prévia (MANFREDINI e LOBBEZOO, 2009), porém, a maioria dos estudos identificados diagnosticaram o BS através de exames clínicos e/ou relato do paciente, e não pelo diagnóstico padrão de referência polissonografia (PSG). Ao mesmo tempo, a falta de uma definição clara para o BS e uma diferenciação do diagnóstico do bruxismo em vigília, foram as principais limitações. Sendo assim, uma análise mais aprofundada no que diz respeito à avaliação da etiologia é muitas vezes prejudicada (MANFREDINI e LOBBEZOO, 2009). Por essas razões, uma associação entre BS e componentes psicossociais ainda não é totalmente suportada pela literatura.

Portanto, o objetivo dessa revisão sistemática (RS) foi avaliar criteriosamente a atual evidência disponível e responder a seguinte questão: “Em adultos, há uma associação entre bruxismo do sono e sintomas de ansiedade?”

2 OBJETIVOS

2.1 Objetivo geral

Revisar sistematicamente a literatura para avaliar se há associação entre bruxismo do sono e sintomas de ansiedade em adultos.

2.2 Objetivos específicos

- Realizar uma busca sistemática da literatura e, com base em critérios de elegibilidade pré-definidos, selecionar os estudos com maior nível de evidência disponível;

- Verificar a significância estatística resultante da associação entre as variáveis relativas a ansiedade e bruxismo do sono nos estudos incluídos;

- Avaliar o risco de viés dos estudos incluídos;

- Avaliar o nível de confiança na evidência acumulada referente ao assunto pesquisado.

3 CAPÍTULO 1

Association between sleep bruxism and anxiety symptoms in adults: a systematic review

Helena Polmann[1], Fabio Luiz Domingos[1], Gilberto Melo[1], Juliana Stuginski-Barbosa[2], Eliete Neves da Silva Guerra[3], André Luís Porporatti[1], Bruce D. Dick[4], Carlos Flores-Mir[4], Graziela De Luca Canto[1].

[1] Brazilian Centre for Evidence-Based Research, Department of Dentistry, Federal University of Santa Catarina (UFSC), Florianópolis, Santa Catarina, Brazil.

[2]Bauru School of Dentistry, University of São Paulo (USP), São Paulo, São Paulo, Brazil.

[3]Laboratory of Oral Histopathology, Health Sciences Faculty, University of Brasilia (UnB), DF, Brazil.

[4]Faculty of Medicine and Dentistry, University of Alberta, Edmonton, Alberta, Canada.

Corresponding author: Helena Polmann

Department of Dentistry, Federal University of Santa Catarina

University Campus, Mailbox 476 – Trindade, Florianópolis, Santa Catarina, Brazil

Zip code: 88040900

Telephone number: +55 48 3721 4952

E-mail: hpolmann@hotmail.com

ABSTRACT

Purpose. The purpose of this systematic review was to evaluate the association between sleep bruxism (SB) and anxiety symptoms in adults. **Methods.** Studies assessing SB by means of questionnaires, clinical examination, and/or polysomnography (PSG), and validated questionnaires to assess anxiety,were included. Search strategies were developed for seven main electronic databases and for three gray literature databases. Risk of bias was assessed using the Joanna Briggs Institute Critical Appraisal Checklist for Analytical Cross-Sectional Studies and confidence in cumulative evidence was evaluated using the Grading of Recommendations Assessment, Development and Evaluation criteria. **Results.** Five cross-sectional studies were included, of which four were judged with low and one with moderate risk of bias. No association with probable SB was observed in two studies that invastigated generic levels of anxiety. One paper evaluated generic anxiety levels through the State-Trait Anxiety Inventory (STAI) and a positive association was observed with probable SB in both STAI-1 ($p=0.030$) and STAI-2 ($p=0.010$) subscales. Two studies assessed specific symptoms of anxiety using the panic-agoraphobic spectra evaluation (PAS-SR) questionnaire. Significantly higher PAS-SR total scores were observed in both studies with regard to SB. No study with definitive diagnosis of SB was identified. **Conclusion**. Evidence from properly designed studies, to credit or discredit an association between SB and generic symptoms of anxiety in adults, is still insufficient.

Keywords: Evidence-based dentistry; sleep bruxism; anxiety; systematic review.

INTRODUCTION

Sleep bruxism (SB) has been defined as a repetitive jaw-muscle activity, characterized by clenching or grinding of the teeth and/or by bracing or thrusting of the mandible while asleep [1]. Classical signs and symptoms of SB are tooth wear, masticatory muscles pain and/or hypertrophy, morning headaches (especially in the frontal and temporal areas), tongue and cheek indentations, and jaw locking [2,3].

The etiology of SB is considered multifactorial and has been linked to several factors such as sleep disturbances, genetic polymorphisms, exogenous factors, medication intake, substance abuse, and psychosocial components [4,1,5-7]. Recent insights have shown that interferences in occlusion have no influence on bruxism activities [8]. Nonetheless, the role of psychological factors remains a topic of debate, and the exact mechanism by which they contribute to SB development continues unclear [6].

Anxiety is an emotion characterized by feelings of tension, worried thoughts and physical changes like increased blood pressure and is associated with physical and psychological discomfort [9]. Individuals experiencing high levels of anxiety symptoms are often encompassed under the umbrella category of anxiety disorders [10], as described in the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) [11].

Generic symptoms of anxiety, such as shortness of breath, palpitations, fatigability, headache, dizziness and restlessness are symptoms not related to a specific disorder [17] and are often assessed through validated questionnaires such as the State-Trait Anxiety Inventory (STAI), the Beck Anxiety Inventory (BAI), or the Hospital Anxiety and Depression Scale (HADS) [12-15]. Specific symptoms of anxiety, on the other hand, are associated with anxiety disorders catalogued on the DSM-V [11]. Such symptoms are excessive, nonspecific anxiety and worry, feeling on edge, difficulty concentrating, irritability, and sleep difficulty, and can be assessed through more specific questionnaires, such as the panic-agoraphobic spectrum self-report (PAS-SR) [16].

Moreover, specific symptoms of anxiety differ from generic symptoms of anxiety due to other key sequel such as severe social disability and impairment characteristics [17]. Nonetheless, all anxiety disorders share common symptoms, such as fear, anxiety, and avoidance [11].

Previous studies have suggested that SB might be potentially associated with psychosocial components, such as anxiety and stress [18]. In addition, the role of

psychosocial factors in the etiology of SB was investigated in a previous review [6]. However, the majority of identified studies have diagnosed SB based on clinical examination and/or self-report alone, and not the reference standard PSG diagnosis. In addition, the lack of a clear definition of SB and a distinction between SB and awake bruxism were major limitations, thus further analysis with regard to etiology assessment were often impaired [6]. For these reasons, an association between SB and psychosocial components was not fully supported.

Thus, the purpose of this systematic review (SR) was critically evaluate current evidence and answer the following focused question: “Among adults, is there an association between sleep bruxism and anxiety symptoms?”

METHODS

Protocol and registration

A study protocol was elaborated following the PRISMA-P guidelines [19] and registered at the Prospective Register of Systematic Reviews (PROSPERO; Centre for Reviews and Dissemination, University of York; and the National Institute for Health Research) under the registry number CRD42017064877 [20]. This SR was reported according to Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) [21].

Eligibility criteria

The PECOS process (Population, Exposition, Comparison, Outcomes, Studies), was used to formulate the focused question in this SR, in which: P) Adults with anxiety; E) Presence of SB; C) Absence of SB; O) Association between SB and anxiety; and S) Observational studies.

Inclusion criteria consisted of observational studies that investigated the association between the occurrence of SB and anxiety in adults. According to an international consensus [1], SB could be classified into possible, probable, or definite based on established diagnostic criteria. Bruxism diagnosis was considered possible if based solely on anamnesis, questionnaires, or familiar/self-report; probable bruxism if diagnosis was complemented with clinical examination, which must identify at least one of the following criteria: wear of tooth or shiny spots on restorations, report of morning fatigue of the masticatory muscle or pain, or hypertrophy of the masseter muscle upon digital palpation; definite bruxism diagnosis if all before mentioned methods were combined with a polysomnography (PSG) exam. Furthermore, anxiety

must have been assessed through validated questionnaires, such as STAI, BAI, or HADS [13]. No language, sex, or time of publication restriction was applied.

The following exclusion criteria were applied: 1) Studies in which members of the sample were children or adolescents (younger than 18 years old); 2) Studies that evaluated awake bruxism; 3) Studies that did not correlate SB and anxiety; 4) Studies in which SB diagnostic criteria was not reported or not sufficiently described; 5) Studies that included individuals with comorbidities such as temporomandibular joint disorders; obstructive sleep apnea, depression, or other psychiatric disorders; 6) Studies in which anxiety was not evaluated through validated questionnaires; 7) Studies with no control group; 8) Reviews, letters, conference abstracts, personal opinions, case reports, laboratory research; 9) Full-text not available.

Information sources and search strategy

Electronic search strategies were developed for Embase, Latin American and Caribbean Center on Health Sciences (LILACS), LIVIVO, PubMed (including MedLine), Scopus, Web of Science and PsycINFO. An additional grey literature search was performed on Google Scholar, OpenGrey, and ProQuest. Furthermore, hand-searches were performed on the reference list of included articles. Experts were consulted in order to improve search findings, following the recommendations of Greenhalgh and Peacock [22]. More information concerning appropriate truncation and word combinations are available in Appendix 1. A reference manager software (EndNote X7, Thomson Reuters, Philadelphia, USA) was used to collect references and to exclude duplicates.

Study selection

The selection process was conducted in two-phases. In phase-one, two reviewers (H.P. and F.L.D.) independently screened titles and abstracts of all identified references. The studies that did not fulfill the eligibility criteria were excluded. In phase-two, the same two reviewers applied the eligibility criteria to the full-text of the studies. A third reviewer (G.M.) was consulted in the event of a disagreement not solved by a consensus discussion.

Data collection process and data items

The first reviewer (H.P.) collected the required information from the selected studies. A second reviewer (F.L.D.) confirmed the accuracy of the information collected. Any controversies were discussed and decided with a third reviewer (G.M.). Data collected consisted of: study characteristics (authors, year of publication, country,

type of study), population characteristics (sample size, mean age of participants, gender), reported signs and/or symptoms of sleep bruxism, anxiety assessment and main findings.

Risk of bias in individual studies

Risk of bias was assessed by using the Joanna Briggs Institute Critical Appraisal Checklist for Analytical Cross Sectional Studies [23]. Two reviewers (H.P.; F.L.D.) separately performed the risk of bias evaluation and judge included articles as “high risk” when the study reaches up to 49% score “yes”, “moderate risk” when the study reached 50% to 69% score “yes”, and “low risk” when the study reached more than 70% score “yes”. A conference between the two reviewers was made, and any discordance was discussed and decided with a third review (G.M.). Figures were generated using software RevMan 5.3 (Review Manager 5.3, The Cochrane Collaboration).

Summary measures

Outcome measures for dichotomous data such as odds ratio (OR), prevalence ratio (PR), relative risk (RR), and its 95% confidence intervals (95%CI) were considered, as well as quantitative data reported in relative or absolute frequencies.

Synthesis of results

A descriptive analysis of the results was performed. To decrease heterogeneity among studies, results were synthesized according to SB diagnosis, and were grouped into possible, probable, or definite SB, as recommended by an expert consensus [1].

Risk of bias across studies

Clinical heterogeneity across studies was assessed by comparing variability among participant’s characteristics (such as age and type of medication used) and methodological heterogeneity by comparing variability in study design (such as diagnostic methods) and risk of bias in individual studies.

Confidence in cumulative evidence

Overall quality of evidence was assessed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) criteria. A summary of findings table was generated using online software (GRADEpro GDT; the GRADE Working Group).

RESULTS

Study selection

From 1416 references identified from main electronic databases, 775 studies remained after duplicated records had been removed. In addition, 206 studies were identified from the grey literature. No studies were included by hand-searching reference lists and experts did not provide additional references. At the end of phase-one, 39 references were considered for eligibility, of which five were finally included after full-text reading. Figure 1 summarizes the complete selection process and reasons for exclusion were presented in Appendix 2.

Study characteristics

Five analytical cross-sectional studies published between 2004 and 2016 were included, of which two were conducted in Italy [24,25], one in Spain [26], and two in Turkey [27,28]. A total of 525 participants were enrolled (268 women). With regard to sample size of included studies, the largest study population encompassed 192 individuals [26], while 65 participants were enrolled in the smallest sample [28].

Moreover, only one of included studies performed a priori calculations to estimate sample size [27]; it is unclear if studies with no sample size estimation could be biased due to insufficient number of participants to detect differences between groups [29].

SB diagnosis was considered probable in all included studies, since both clinical examination and questionnaires were applied. None of included studies, however, met the definitive SB criterion regarding the use of PSG. In addition, three studies investigated generic symptoms of anxiety [27,26,28], while two evaluated specific symptoms of the anxiety disorders spectrum [24,25]. Anxiety symptoms were assessed by validated questionnaires, which included STAI [28], BAI [26], SCL-90-R [27], and PAS-SR [24,25]. A summary of the descriptive characteristics of included articles is presented in Table 1.

Risk of bias within studies

Four studies were judged as with low risk of bias [24,27,28,26] and one with moderate risk [25]. Regarding the question “Was the exposure measured in a valid and reliable way?”, only one study [26] did not ensure that individuals diagnosing SB were previously calibrated for using diagnostic criteria consistently. In addition, only one study did not clearly report any methods to deal with confounders and therefore was considered at unclear risk of bias [25]. More information about the risk of bias assessment can be found in Figure 2.

Results of individual studies

The results of the analytical cross-sectional studies were analyzed according the subgroups: 1) Possible SB; 2) Probable SB; 3) Definite SB. Since no PSG exam was performed, no included study met the criterion for definite SB diagnosis. However, probable SB diagnosis was achieved by all included studies, as questionnaires were combined with clinical assessment.

Bayar et al. (2011) [27] evaluated 85 participants, 12 diagnosed with probable SB and 16 controls. Anxiety symptoms assessment was based on the SCL-90-R subscales, and the association with SB was evaluated using the Kruskal-Wallis test. Based on results of this study, no significant differences in SCL-90-R scores between participants with SB and controls were observed (p=0.074).

Kara et al. (2012) [28] conducted a study with 65 participants, of which 36 were diagnosed with SB. Anxiety symptoms were evaluated through the State-Trait Anxiety Inventory, using the STAI-1 and STAI-2 scales. Multivariate analysis of variance was conducted, and results suggested that SB participants presented significantly higher scores in STAI-1 (p=0.030) and STAI-2 (p=0.010) comparing to controls.

Cruz-Fierro et al. (2016) [26] diagnosed 26 participants with probable SB from a sample of 192 individuals. Anxiety symptoms were assessed using the BAI questionnaire, and the association with SB was analyzed using the Pearson correlation. There were no significant differences in BAI scores between SB participants and controls (p=0.950).

Manfredini et al. (2004) [25] performed a study with 85 participants, of which 34 were diagnosed with probable SB. Specific symptoms of anxiety were assessed through the PAS-SR questionnaire. The Chi-squared test was used to investigate possible associations, and the mean scores in PAS-SR were compared by the Mann-Whitney test. SB participants presented significantly higher scores in PAS-SR total scores, stress sensitivity, anxious expectation, and reassurance sensitivity.

Manfredini et al. 2005 [24] evaluated 98 individuals, of which 35 were diagnosed with probable SB. The PAS-SR questionnaire was used to assess specific symptoms of anxiety. The Chi-squared test and the Mann-Whitney test were used to analyze anxiety variables between SB and controls. Based on the results of this study, SB participants presented higher scores of PAS-SR, panic symptoms, stress sensitivity and reassurance sensitivity.

Synthesis of results

Outcomes measurements collected from included studies were relative frequencies, absolute frequencies, and p-values. In addition, since different questionnaires were used to evaluate anxiety symptoms, included studies were considered heterogeneous. Therefore, quantitative data were not directly comparable and a meta-analysis was not appropriate.

Overall, two studies found no differences between participants diagnosed with probable SB and controls in regard to generic symptoms of anxiety [27,26]. Only one study reported that STAI-1 and STAI-2 scores were significantly higher among SB participants [28]. Furthermore, concerning specific symptoms of anxiety, two studies reported significantly higher scores in some PAS-SR domains [24,25]. In these studies, probable SB was associated with higher scores in PAS-SR total scores, stress sensitivity, and reassurance sensitivity, as well as anxious expectation [25] and panic symptoms [24].

Confidence in cumulative evidence

Confidence in cumulative evidence was considered very low according to the GRADE criteria. Inconsistency was judged to be serious since different tools for anxiety assessment were used. In addition, some concerns regarding SB diagnosis were present as no standardized method was observed across studies. Imprecisions were also judged as serious since conflicting results were observed regarding a possible association between SB and anxiety. More information with regard to the GRADE assessment is provided in Table 2.

DISCUSSION

Summary of evidence

Results from this SR indicated that there is still not enough evidence from high quality studies to fully support an association between SB and generic symptoms of anxiety. However, a plausible association between probable SB and some specific symptoms of anxiety may be proposed.

Included studies were considered highly heterogeneous with regard to anxiety assessment due to the different tools applied. In addition, some concerns with regard to SB diagnosis were present. Questionnaires and clinical examinations were not identical across studies and none followed standardized methods, such as the criteria proposed by the American Academy of Sleep Medicine [30]. In addition, it is worth mentioning that participants were sampled from different departments of the same

institution in two studies, however, there was not enough information to determine if samples were independent or if some individuals may have participated in both studies [24,25].

Although some authors suggested that probable SB could be associated with anxiety symptoms [31,32], conflicting results were observed. Kara et al. (2012) presented a positive association between probable SB and generic anxiety levels assessed through STAI subscales [28]. However, two other studies failed to demonstrate any association regarding generic symptoms of anxiety [27,26]. Regarding specific symptoms of anxiety, an association with SB could not be fully supported, although, some specific symptoms such as stress sensitivity, reassurance sensitivity, anxious expectation, and panic symptoms were more frequently observed among participants diagnosed with probable SB in two studies [25,24].

A possible hypothesis for substantially conflicting results observed might be proposed based on previous observations with regard to over report of certain conditions by individuals with specific psychosocial traits, such as depression and stress [33]. Another possible explanation might be related to SB diagnostic methods, since self-report of SB itself may also have influenced the results. A preliminary study indicated high sensitivity but low specify of self-report SB comparing with PSG diagnosis criteria [34] and a recent systematic review indicated that questionnaires and the clinical assessment are not that fully reliable in identifying subjects with SB [35]. Per reasons listed above, heterogeneous results observed due to probable bruxism diagnosis might not be sufficiently reliable for an association assessment between SB and anxiety symptoms.

Furthermore, with regard to confounding factors, it is suggested that some comorbidities such as depression, stress, use of drugs of abuse, and even some medications might be positively associated with SB [36], which may hinder the evaluation of an association between SB and anxiety in particular. However, most of the included studies reported the exclusion of participants with potentially confounding characteristics [24,27,26,28]. It is worth mentioning that the literature is sparse about the possible role of SB on the different disorders of the anxiety spectrum [6].

Statistical analyses within studies were considered appropriate for their proposed objectives. However, for the assessment of an association between SB and anxiety symptoms, summary measures presented in odds ratio or relative risk would be more suitable. Of note, methodological characteristics inherent to anxiety

assessment tools might be a limitation for this type of analysis, since data are often presented with continuous variables.

In addition, a previous SR, covering data published from 1979 to 2013 evaluated the association between SB and psychosocial factors in children (6-11 years old) and adolescents (12-17 years old). It was suggested that psychological factors, such as stress, anxiety and mood disturbances, temperamental traits, and emotions could be possibly linked with the presence of SB in adolescents [7]. Due to the fact that few studies have been published since then, the inclusion of non-adult populations in this SR was considered not reasonable, and more studies in the field are necessary. It is worth mentioning that some major drawbacks were observed within studies evaluating younger populations, such as the use of no validated tools for anxiety evaluation, as well as limitations attributable to diagnosis based solely on self-report or parent report.

Limitations

Included studies were considered highly heterogeneous due to the different tools used for the diagnosis of anxiety. Moreover, all the samples were considered convenience samples, since the subjects were selected from private clinics, hospitals or from universities. Furthermore, non-standardized methods for SB diagnosis was observed across studies and the majority of included studies did not report the calibration of researchers for bruxism evaluation. A better standard method to assess both SB and anxiety should be used in future studies.

CONCLUSIONS

There is not enough evidence from well-designed studies to credit or discredit an association between SB and generic symptoms of anxiety in adults. Based on limited evidence, some specific symptoms, such as stress sensitivity, and reassurance sensitivity, as well as anxious expectation and panic symptoms of anxiety might be associated with probable SB.

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Figura 1. *Flow diagram of literature search and selection criteria (adapted from Preferred Reporting Items for Systematic Reviews and Meta-Analysis [21] and generated using the software Review Manager 5.3, The Cochrane Collaboration).*

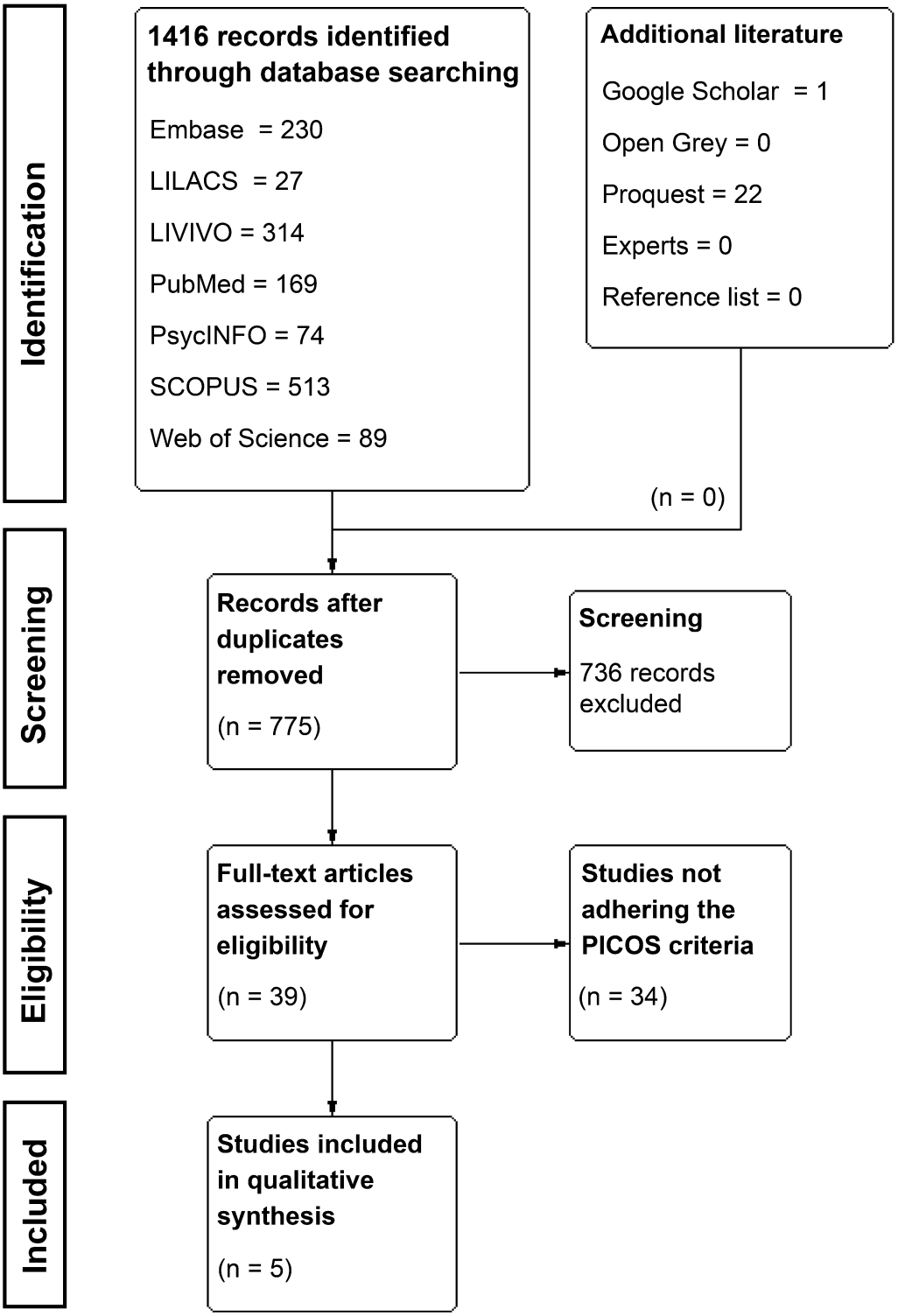

Figure 2. Risk of bias summary, assessed by Joanna Briggs Institute Critical Appraisal Checklist for Analytical Cross-Sectional Studies: author's judgments for each included study (generated using the software Review Manager 5.3, The Cochrane Collaboration).

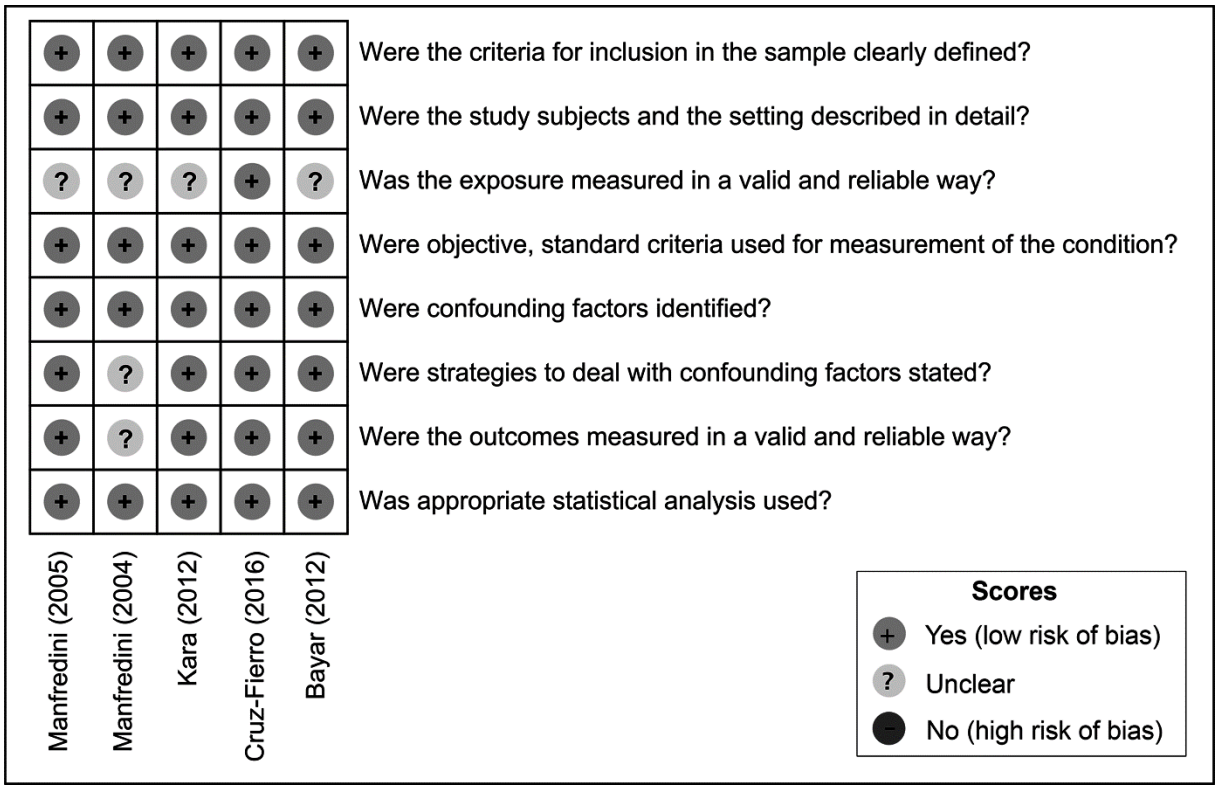

Table 1 - Summary of descriptive characteristics of included articles (n=5).

Author (Year) Country	Sample (n)	Groups (n)	Age (mean±SD) or range in years)	SB Diagnostic Methods and Classification†	Anxiety Diagnostic Method	Results (Mean ± SD, or other pertinent findings)				Main conclusion	Study design
Bayar et al. (2012) Turkey	85	NB (16) SB (12) AB (24) SB/AB (33)	26.8±8.6	1) Clinical examination 2) Self-report 3) Partner report	SCL-90-R	**SB and anxiety** 0.14±0.22	**NB and anxiety** 0.31±0.32	**p-value** p=0.074		Participants with SB did not present significant differences in SCL-90-R scores in comparison to NB.	Cross-sectional
Cruz-Fierro et al. (2016) Spain	192	NB (64) SB (26) AB (52) SB/AB (50)	35.91±13.10	1) Clinical examination 2) Questionnaire	BAI	**SB and anxiety** 8.76±7.16	**NB and anxiety** 8.65±8.41	**p-value** p=0.950 *		Participants with SB did not present significant differences in BAI scores in comparison to NB.	Cross-sectional
Kara et al. (2012) Turkey	65	NB (32) SB (36)	**NB** 18.92±2.2 **SB** 20.47±1.31	1) Clinical examination 2) Questionnaire	STAI	**SB and STAI-1** 43.52±4.2	**NB and STAI-1** 40.38±6.50	**p-value** p=0.030		STAI I and II scores were significantly higher in the SB patients that in the NB group.	Cross-sectional
						SB and STAI-2 49.15±7.6	**NB and STAI-2** 43.34±5.10	**p-value** p=0.010			
Manfredini et al. (2004) Italy	85	NB (51) SB (34)	**NB** 25.2 20 to 34 **SB** 24.7 20 to 31	1) Clinical examination 2) Questionnaire	PAS-SR	**PAS-SR**	**NB**	**SB**	**p-value**	SB was associated with significant higher scores in PAS-SR total score, stress sensitivity, anxious expectation and reassurance sensitivity.	Cross-sectional
						Total score	15.57±10.83	22.59±14.33	p<0.050		
						Separation anxiety	2.86±2.01	3.59±2.19	NS		
						Panic symptoms	4.25±3.51	6.71±5.88	NS		
						Stress sensitivity	0.43±0.67	0.94±0.78	p<0.010		
						Substances sensitivity	0.75±0.93	0.88±1.15	NS		
						Anxious expectation	0.84±0.95	1.56±1.40	p<0.050		
						Agoraphobia	2.14±2.67	3.09±3.08	NS		
						Other phobias	1.02±1.05	1.41±1.35	NS		
						Reassurance sensitivity	2.96±3.05	4.32±3.10	p<0.050		
Manfredini et al. (2005) Italy	98	NB (64) SB (34)	**NB** 25.5 **SB** 24.2	1) Clinical examination 2) Questionnaire	PAS-SR	**PAS-SR**	**NB**	**SB**	**p-value**	SB participants presented higher scores of PAS-SR total scores, panic symptoms, stress sensitivity and reassurance sensitivity.	Cross-sectional
						Total score	15.80±11.56	21.44±13.09	0.026		
						Separation anxiety	2.98±2.20	3.32±2.03	0.284		
						Panic symptoms	4.58±4.52	6.76±5.58	0.039		
						Stress sensitivity	0.38±0.60	0.76±0.74	0.006		
						Substances sensitivity	0.75±0.98	0.76±0.89	0.833		
						Anxious expectation	0.89±0.89	1.38±1.44	0.129		
						Agoraphobia	2.12±2.68	2.82±3.21	0.251		
						Hypochondria	1.03±1.23	0.94±1.20	0.692		
						Reassurance sensitivity	2.80±2.91	4.59±3.36	0.005		

Legenda: BAI: Beck Anxiety Inventory; NB: Non-bruxism; NS: Not significant; STAI: State-Trait Anxiety Inventory; PAS-SR: Panic-agoraphobic spectrum self-report; SB: Sleep bruxism; SCL-90-R: Symptom Checklist-90-Revised; (*) estimated by the reviewers; (†) Based on an expert consensus (Lobbezoo et al., 2013) [7].

Table 2 - Grading of Recommendations Assessment, Development and Evaluation summary of findings table.

Quality assessment							№ of patients		Quality
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Bruxism**	**Non-bruxism**	
Sleep bruxism association with anxiety symptoms in adults									
5	observational studies	Not serious	serious [a]	not serious	serious [b]	none	142	227	⊕◯◯◯ VERY LOW

Legend:
a. Studies used different tools for anxiety assessment. As for SB diagnosis, questionnaires and clinical examinations were not identical across studies, and none followed standardized methods.
b. Conflicting results were observed. Sleep bruxism was not associated with anxiety in some studies, but in others an association with generic symptoms and some specific symptoms of anxiety was observed.

APÊNDICE A

Supplementary Online Data

Appendix 1: Database search strategy

Database	Search query 2017, June 04th
EMBASE	#1 = (bruxism/exp OR 'sleep bruxism' OR bruxer/exp OR bruxers OR 'tooth grinding' OR 'tooth clenching' OR 'teeth grinding' OR 'teeth clenching') #2 = anxiety/exp OR 'anxiety disorders' OR anxieties OR hypervigilance OR anxiousness OR nervousness OR agoraphobia OR 'panic disorder' OR 'generalized anxiety disorder' OR 'social phobia' OR 'post traumatic stress disorder' OR 'post-traumatic stress disorder' OR 'posttraumatic stress disorder') #3 = #1 AND #2
LILACS	(tw:(bruxismo OR rangimento OR rechinamiento OR apertamento OR apretamiento OR bruxômano$ OR bruxador$ OR "bruxismo do sono" OR "bruxismo del sueño" OR "bruxismo noturno" OR "bruxismo nocturno")) AND (tw:(ansiedade$ OR "desordens de ansiedade" OR hipervigilância OR nervosismo OR hipervigilância OR "transtorno de ansiedade generalizada" OR agorafobia OR "fobia específica" OR "transtorno de ansiedade social" OR "transtorno de estresse pós-traumatico" OR "transtorno do pânico" OR ansiedad$ OR "desórdenes de ansiedad" nerviosismo OR hipervigilancia OR "trastorno de ansiedad generalizada" OR ahorafobia OR "fobia específica" OR "trastorno de ansiedad social" OR "trastorno de estrés postraumático" OR "transtorno del pánico"))
LIVIVO	(bruxism OR "sleep bruxism" OR bruxer OR bruxers OR "tooth grinding" OR "tooth clenching" OR "teeth grinding" OR "teeth clenching") AND (anxiety OR "anxiety disorders" OR anxieties OR hypervigilance OR anxiousness OR nervousness OR agoraphobia OR "panic disorder" OR "generalized anxiety disorder" OR "social phobia" OR "post traumatic stress disorder" OR "post-traumatic stress disorder" OR "posttraumatic stress disorder")
PubMed	#1 = (bruxism[MeSH Terms] OR "sleep bruxism"[MeSH Terms] OR bruxism OR bruxer OR bruxers OR "tooth grinding"[All Fields] OR "tooth clenching"[All Fields] OR "teeth grinding"[All Fields] OR "teeth clenching"[All Fields]) #2 = (Anxiety[MeSH Terms] OR "Anxiety Disorders"[MeSH Terms] OR anxiety OR anxieties OR hypervigilance OR anxiousness OR nervousness OR agoraphobia OR "panic disorder"[All Fields] OR "generalized anxiety disorder"[All Fields] OR "social phobia"[All Fields] OR "post traumatic stress disorder"[All Fields] OR "post-traumatic stress disorder"[All Fields] OR "posttraumatic stress disorder"[All Fields] OR "specic phobia"[All Fields]) #3 = #1 AND #2
PsycINFO	Any Field : (bruxism OR " sleep bruxism" OR bruxer OR bruxers OR " tooth grinding" OR " tooth clenching" OR " teeth grinding" OR " teeth clenching") AND Any Field : (anxiety OR " anxiety disorders" OR anxieties OR hypervigilance OR anxiousness OR nervousness OR agoraphobia OR " panic disorder" OR " generalized anxiety disorder" OR " social phobia" OR "post traumatic stress disorder" OR " post-traumatic stress disorder" OR " posttraumatic stress disorder")

SCOPUS	ALL(bruxism OR "sleep bruxism" OR bruxer OR bruxers OR "tooth grinding" OR "tooth clenching" OR "teeth grinding" OR "teeth clenching") AND TITLE-ABS-KEY(anxiety OR "anxiety disorders" OR anxieties OR hypervigilance OR anxiousness OR nervousness OR agoraphobia OR "panic disorder" OR "generalized anxiety disorder" OR "social phobia" OR "post traumatic stress disorder" OR "post-traumatic stress disorder" OR "posttraumatic stress disorder")
Web of Science	TS=(bruxism OR "sleep bruxism" OR bruxer OR bruxers OR "tooth grinding" OR "tooth clenching" OR "teeth grinding" OR "teeth clenching") AND TS=(anxiety OR "anxiety disorders" OR anxieties OR hypervigilance OR anxiousness OR nervousness OR agoraphobia OR "panic disorder" OR "generalized anxiety disorder" OR "social phobia" OR "post traumatic stress disorder" OR "post-traumatic stress disorder" OR "posttraumatic stress disorder")
	Grey Literature
Google Scholar	(bruxism OR "sleep bruxism" OR bruxer OR bruxers) AND (anxiety OR "anxiety disorders" OR anxieties OR hypervigilance OR anxiousness OR nervousness)
Open Grey	(bruxism OR "sleep bruxism" OR bruxer OR bruxers) AND (anxiety OR "anxiety disorders" OR anxieties OR hypervigilance OR anxiousness OR nervousness)
Proquest	all(bruxism OR "sleep bruxism" OR bruiser OR bruisers OR "tooth grinding" OR "tooth clenching" OR "teeth grinding" OR "teeth clenching") AND all(anxiety OR "anxiety disorders" OR anxieties OR hyperventilate OR anxiousness OR nervousness OR agoraphobia OR "panic disorder" OR "generalized anxiety disorder" OR "social phobia" OR "post traumatic stress disorder" OR "post-traumatic stress disorder" OR "posttraumatic stress disorder")

APÊNDICE B

Supplementary Online Data

Appendix 1: Articles excluded and the reasons for exclusion (n=34).

Reference	Authors	Reasons for Exclusion*
1	Ahlberg, J. et al. (2013)	4
2	Alves et al. (2013)	4
3	Basson et al. (2010)	7
4	Bellini, M. et al. (2011)	4
5	Cavallo, P.; Savarese, G.; Carpinelli, L. (2014)	4
6	Da Silva, A. et al. (1997)	8
7	Dal'Fabro, C.; de Siqueira, J.; Tufik, S. (2009)	8
8	Dias, I. et al. (2014)	6
9	Endo, H. et al, (2011)	2
10	Fischer, W. and O'Toole E. (1993)	4
11	Fissmer, J. et al. (2008)	4
12	Funch, D. and Gale E. (1980)	8
13	Gungormus, Z. and Erciyas K. (2009)	4
14	Harness, D. (1990)	6
15	Heller, R. (1975)	6
16	Hermesh, H. et al, (2015)	3
17	Hernandez, R. et al. (2001)	3
18	Kampe et al. (1997)	7
19	Kampe, T.; Edman, and G.; Hannerz, H. (1996)	3
20	Kiliçoğlu, A. and Pekkan, G. (2009)	5
21	Major, M. et al. (1999)	6
22	Manfredini, D. et al. (2011)	3
23	Mayer, P.; Heinzer, R.; and Lavigne G. (2016)	3
24	Molin, C. and Levi, L. (1966)	4

25	Mora, M. et al (2012)	5
26	Ohayon M.; Li, K.; and Guilleminault, C. (2001)	1
27	Pierce, C. et al. (1995)	3
28	Serralta, F. and Freitas P. (2010)	4
29	Tavares, L. et al (2016)	5
30	Thaller, J; Rosen, G.; and Saltzman, S. (1967)	6
31	Velly, A.; Gornitsky, M.; and Philippe, P. (2003)	3
32	Vernallis F. (1955)	4
33	Walsh, J. (1965)	8
34	Winocur et al, (2011)	5

Legend: 1) Studies in which members of the sample were children or adolescents (younger than 18 years old); 2) Studies that evaluated awake bruxism; 3) Studies that did not correlate sleep bruxism and anxiety; 4) Studies in which SB diagnostic criteria was not reported or not sufficiently described; 5) Studies that included individuals with comorbidities such as temporomandibular joint disorders; obstructive sleep apnea, depression, or other psychiatric disorders; 6) Studies in which anxiety was not evaluated through validated questionnaires; 7) Studies with no control healthy group; 8) Reviews, letters, conference abstracts, personal opinions, case reports, laboratory research, or full-text not available.

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4 CONCLUSÃO

Ainda não há evidência suficiente proveniente de estudos com metodologia apropriada para confirmar ou refutar a associação entre BS e sintomas genéricos de ansiedade. Baseada na evidência limitada, alguns sintomas específicos, como sensibilidade ao estresse, sensibilidade ao reasseguramento, também como a expectativa ansiosa e sintomas de pânico relacionados à ansiedade podem estar associados ao BS provável.

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ANEXO A -ATA DA APRESENTAÇÃO DO TRABALHO

DE CONCLUSÃO DE CURSO

UNIVERSIDADE FEDERAL DE SANTA CATARINA
CENTRO DE CIENCIAS DA SAÚDE
CURSO DE ODONTOLOGIA
DISCIPLINA DE TRABALHO DE CONCLUSÃO DE CURSO DE ODONTOLOGIA

ATA DE APRESENTAÇÃO DO TRABALHO DE CONCLUSÃO DE CURSO

Aos 24 dias do mês de Maio de 2018, às _____ horas, em sessão pública no (a) CCS desta Universidade, na presença da Banca Examinadora presidida pelo Professor Graziela De Luca Canto e pelos examinadores:

1 - Beatriz Mendes de Sousa.

2 - Joyce Duarte.

o aluno Helena Pohmann

apresentou o Trabalho de Conclusão de Curso de Graduação intitulado:

Associação entre bruxismo do sono e síndromes de ansiedade uma revisão sistemática

como requisito curricular indispensável à aprovação na Disciplina de Defesa do TCC e a integralização do Curso de Graduação em Odontologia. A Banca Examinadora, após reunião em sessão reservada, deliberou e decidiu pela aprovação c/ nota máximo do referido Trabalho de Conclusão do Curso, divulgando o resultado formalmente ao aluno e aos demais presentes, e eu, na qualidade de presidente da Banca, lavrei a presente ata que será assinada por mim, pelos demais componentes da Banca Examinadora e pelo aluno orientando.

Presidente da Banca Examinadora

Examinador 1

Examinador 2

Aluno