UNIVERSIDADE FEDERAL DE JUIZ DE FORA
FACULDADE DE ODONTOLOGIA
PPG EM CLÍNICA ODONTOLÓGICA

LARISSA DE OLIVEIRA REIS

ASSOCIAÇÃO ENTRE BRUXISMO E DISFUNÇÃO TEMPOROMANDIBULAR EM CRIANÇAS: UMA REVISÃO SISTEMÁTICA E META-ANÁLISE

Juiz de Fora
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Dissertação apresentada ao Programa de Pós-graduação em Clínica Odontológica, da Faculdade de Odontologia da Universidade Federal de Juiz de Fora, como requisito parcial para obtenção do título de Mestre. Área de concentração em Clínica Odontológica.

Orientadora: Profa. Dra. Karina Lopes Devito

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Aprovada em: ____/____/____

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(Isaac Newton)

RESUMO

O bruxismo em crianças e sua relação com o desenvolvimento das disfunções temporomandibulares (DTM) ainda não foram claramente definidos. O objetivo desta revisão sistemática foi avaliar a possível associação entre bruxismo e DTM em crianças. Sete bases de dados foram pesquisadas e 497 artigos foram avaliados. A qualidade metodológica foi avaliada através da Escala de Newcastle-Ottawa. A meta-análise foi realizada com os artigos em que a extração de dados foi possível e o efeito sumário foi medido por meio do odds ratio (OR) e respectivos intervalos de confiança de 95% (IC). A classificação de recomendações, avaliação, desenvolvimento e avaliação (GRADE) foi usada para avaliar a certeza da evidência. Dez estudos transversais foram incluídos na revisão sistemática. Destes, 8 apresentaram associação estatisticamente significante entre bruxismo e DTM. No entanto, 7 apresentaram alto risco de viés. A meta-análise foi realizada com 3 artigos e obteve OR de 2,97 (IC 95% variando de 1,72 a 5,15), indicando que crianças com bruxismo têm 2,97 vezes mais chances de apresentar DTM, com nível de certeza muito baixo definido pelo GRADE. Embora os estudos mostrem alto risco de viés, a análise qualitativa de estudos individuais mostrou que as crianças com bruxismo têm maior chance de desenvolver DTM.

Palavras-chaves: Saúde Oral, Odontopediatria, Transtornos da Articulação Temporomandibular, Bruxismo, Criança.

ABSTRACT

Bruxism in children and its relation to the development of temporomandibular disorders (TMD) has not been clearly determined yet. The objective of this systematic review was to evaluate the possible association between bruxism and TMD in children. Seven databases were searched and 497 articles were assessed. Methodological quality was assessed through Newcastle-Ottawa Scale. The meta-analysis was performed with the articles in which extraction of data was possible and the summary effect measure through odds ratio (OR) and respective 95% confidence intervals (CI). Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) was used to assess the certainty of evidence. Ten cross-sectional studies were included in the systematic review. Of these, 8 showed a statistically significant association between bruxism and TMD. However, 7 presented a high risk of bias. The meta-analysis was performed with 3 articles and obtained an OR of 2.97 (95% CI ranging from 1.72 - 5.15), indicating that children with bruxism are 2.97 times more likely to present TMD, with very low level of certainty defined by GRADE. Although the studies showed high risk of bias, the qualitative analysis of individual studies showed that the children with bruxism have greater chance of developing TMD.

Keywords: Oral Healthy, Paediatric Dentistry, Temporomandibular Joint Disorders, Bruxism, Child.

LISTA DE ILUSTRAÇÕES

LISTA DE ABREVIATURAS E SIGLAS

ATM	Articulação Temporomandibular
COMUT	Sistema de Comutação Bibliográfica
CAPES	Coordenação de Aperfeiçoamento de Pessoal de Nível Superior
DC/TMD	*Diagnostic Criteria for Temporomandibular Disorders*
DTM	Disfunção Temporomandibular
GRADE	*Grading of Recommendations, Assessment, Development, and Evaluation*
MeSH	*Medical Subject Headings*
PRISMA	*Preferred Reporting Items for Systematic Reviews and Meta-Analyses*
PROSPERO	*Register of Systematic Reviews*
RDC/TMD	*Research Diagnostic Criteria for Temporomandibular Disorders*
TMJ	*Temporomandibular Joint*
TMD	*Temporomandibular Disorders*

SUMÁRIO

1 INTRODUÇÃO

O bruxismo é definido como uma atividade repetitiva dos músculos mastigatórios, caracterizada pelo apertamento ou ranger dos dentes e/ou pelo ato de segurar ou empurrar a mandíbula. Pode ser uma atividade diurna (bruxismo da vigília) ou noturna (bruxismo do sono) (LOBBEZOO et al., 2013). É mais comum em crianças do que em adultos e menos comum em idosos, uma vez que tende a diminuir com a idade (BADER e LAVIGNE, 2000; MANFREDINI et al., 2013). A prevalência do bruxismo em crianças varia de 3,5 a 40,6% e não tem preferência por sexo (MANFREDINI et al., 2013).

As forças geradas pelo bruxismo são transmitidas às estruturas do sistema mastigatório. Algumas dessas forças são absorvidas sem nenhum efeito deletério, enquanto outras podem predispor a distúrbios de variados graus, quando a atividade excede a tolerância fisiológica individual (LAVIGNE e MONTPLAISIR, 1994; OKESON, 2013). A sobrecarga muscular resultante das atividades musculares mastigatórias pode estar associada ao fluxo sanguíneo local e a distúrbios da microcirculação, além da dor decorrente de uma isquemia (MONTEIRO, 1988). Níveis mais altos dessas atividades aumentam o risco de consequências negativas para a saúde bucal (por exemplo, dor muscular mastigatória grave ou dor na articulação temporomandibular) (RAPHAEL, SANTIAGO E LOBBEZOO, 2016).

A principal causa não-dental de dor na região orofacial entre crianças e adolescentes é a Disfunção Temporomandibular (DTM) (GOODMAN e McGRATH, 1991; NILSSON, LIST e DRANGSHOLT, 2005), que é definida como um conjunto de distúrbios envolvendo os músculos mastigatórios, a articulação temporomandibular e as estruturas associadas (FETEIH, 2006). Diferentemente dos adultos, estudos com relação à prevalência de DTM em crianças e adolescentes não são baseados em diagnósticos específicos de DTM, mas sim na prevalência de sinais e sintomas da disfunção (FETEIH, 2006; TECCO e FESTA, 2010), associada aos fatores de risco (LERESCHE et al., 2007) e ao autorrelato de dor (NILSSON, LIST e DRANGSHOLT, 2005). A prevalência de DTM em crianças e adolescentes variam de 9,8 a 80% (FETEIH, 2006).

A considerável variação tanto na prevalência de DTM como na de bruxismo pode ser atribuída a diferentes metodologias de pesquisa, critérios clínicos

para diagnóstico, amostras populacionais (ATTANASIO, 1997; CAMPARIS e SIQUEIRA, 2006) e procedimentos de exame (KÖHLER et al., 2009; TOSCANO e DEFABIANIS, 2009). Além disso, estudos não deixam claro até que ponto o bruxismo em crianças pode estar relacionado com a DTM. Uma revisão sistemática sobre o tema contribuiria para estabelecer a relação entre essas duas condições em crianças.

2 PROPOSIÇÃO

O objetivo deste trabalho foi identificar, através de uma revisão sistemática da literatura, se o bruxismo em crianças pode estar relacionado com a DTM.

3 MATERIAL E MÉTODOS

A presente revisão sistemática foi realizada seguindo as normativas do *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA) (www.prisma-statement.org). A revisão sistemática foi registrada e atualizada na *International Prospective Register of Systematic Reviews* (PROSPERO) pelo código CRD42017071281 (APÊNDICE A e APÊNDICE B).

3.1 *PECO QUESTION*

Esta revisão sistemática foi conduzida de modo a responder à seguinte pergunta clínica (*PECO question*): “O bruxismo em crianças pode estar relacionado à DTM? ”.

P (*population*) = crianças
E (*exposition*) = ter bruxismo
C (*comparison*) = não ter bruxismo
O (*outcome*) = DTM

3.2 CRITÉRIOS DE ELEGIBILIDADE

Os critérios de elegibilidade incluíram: estudos observacionais, crianças com idade inferior ou igual a 12 anos, um grupo “com bruxismo”, um grupo controle (sem bruxismo) e da condição “com DTM”.

Foram excluídos os estudos de revisão (narrativa ou sistemática), cartas ao editor, relatos de casos, estudos laboratoriais, em animais, estudos que não discriminaram a idade dos pacientes, amostra com pacientes especiais e/ou grupo específico e trabalhos nos quais não foram possíveis correlacionar bruxismo e DTM na faixa etária em questão.

3.3 ESTRATÉGIA DE BUSCA

Uma busca detalhada da literatura foi realizada nas bases eletrônicas de dados: Medline via Pubmed and BVS, Web of Science, Cochrane, SciELO, Lilacs, Scopus e BBO. Buscas na literatura cinzenta - Google Scholar - também foram incluídas. Uma busca manual da lista de referência dos estudos incluídos foi realizada para publicações que não foram identificadas eletronicamente. O período de busca foi até setembro de 2017, identificando os estudos sobre bruxismo e DTM em crianças. Não foram impostas restrições quanto à data de publicação.

As palavras chaves foram divididas em três grupos de acordo com a *PECO question*: população (P), exposição (E) e desfecho (O), incluindo unitermos *Medical Subject Headings* (MeSH) e não-MeSH (Figura 1). Foram realizadas combinações entre elas com os operadores booleanos “and” e “or” (Figura 2), a fim de refinar os resultados da pesquisa.

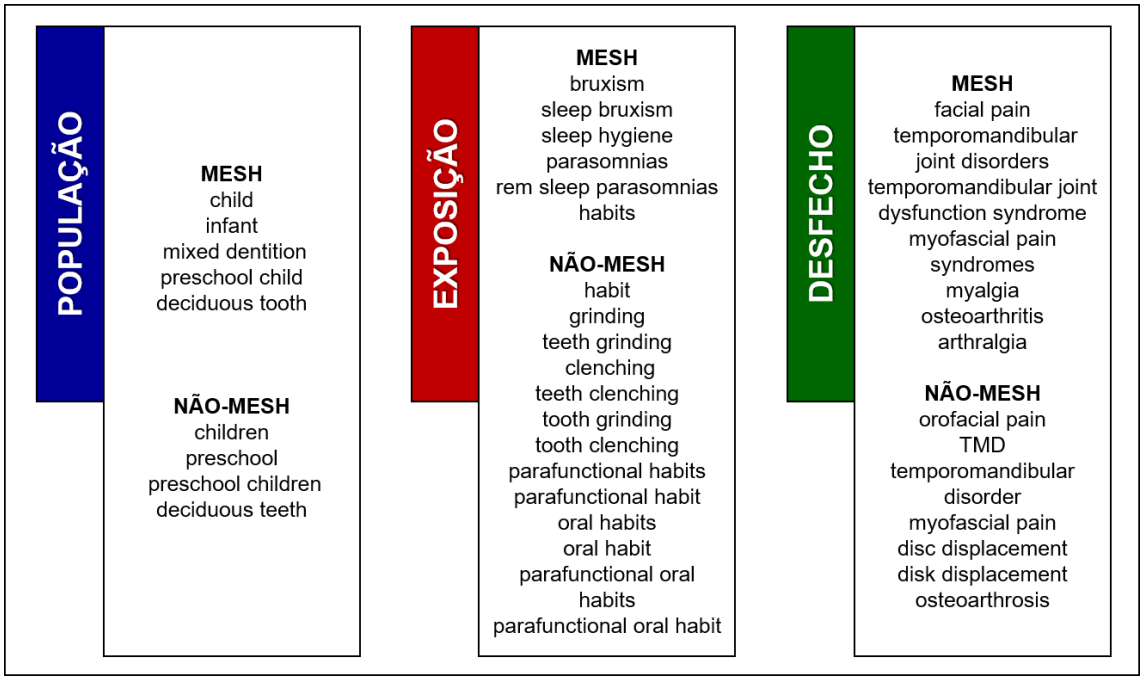

Figura 1 - Termos MeSH e não-MeSH divididos em três grupos de acordo com *PECO question*: população, exposição e desfecho
Fonte: O autor.

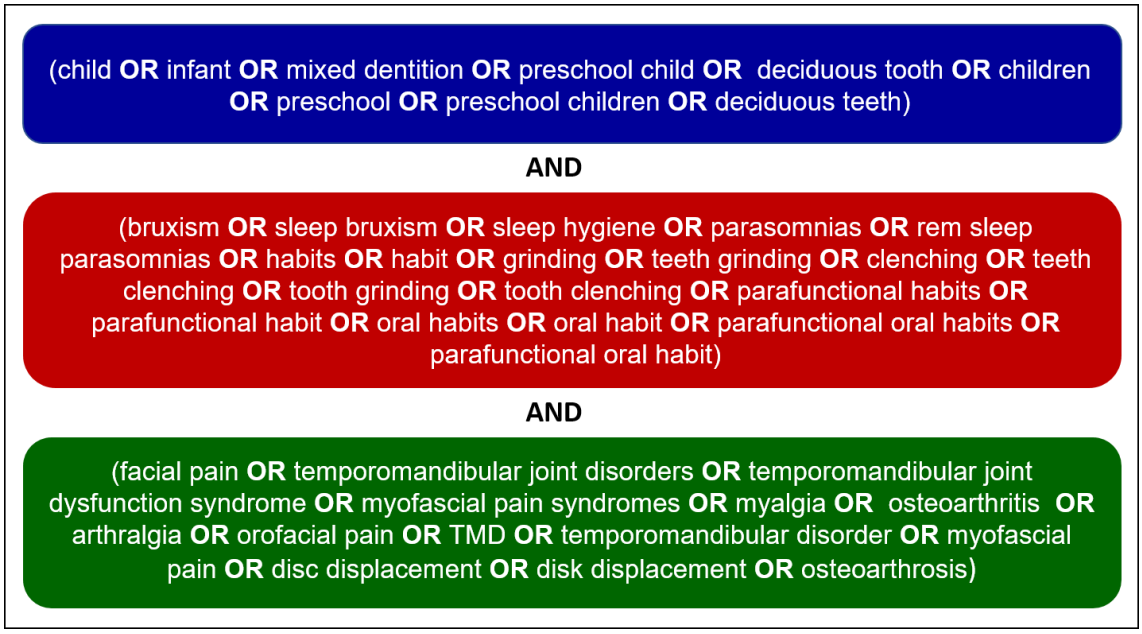

Figura 2 - Termos divididos de acordo com a *PECO question* combinados com os operadores booleanos “and” e “or”
Fonte: O autor.

3.4 SELEÇÃO DOS ESTUDOS

Um total de 499 registros foi obtido: 247 da Medline via Pubmed, 3 do Scopus, 131 da Web of Science, 93 da Cochrane, 11 da Scielo, 6 da Lilacs, 5 da Medline via BVS, 1 da BBO e 2 da literatura cinzenta. Após a remoção das duplicatas, 447 foram selecionados para a leitura de título e resumo. Dois avaliadores foram calibrados na aplicação dos critérios de elegibilidade acima descritos. A avaliação dos títulos e resumos foi realizada individualmente por cada um dos avaliadores. Para o cálculo da concordância interexaminador, 10% das publicações, ou seja, 43 registros tiveram suas avaliações comparadas, obtendo-se um Kappa de 85%, indicando excelente concordância (LANDIS e KOCH, 1977) entre os avaliadores.

Após a leitura de títulos e resumos pelos dois avaliadores, 335 foram excluídos, restando 112 artigos para a leitura completa. Os critérios de elegibilidade foram aplicados novamente pelos mesmos avaliadores que mais uma vez fizeram a avaliação independentemente. Discordância na decisão foi discutida e resolvida por consenso.

Dos 112 artigos, 10 foram incluídos na análise qualitativa e, destes, 3 na análise quantitativa (meta-análise).

Na Figura 3 está apresentado o diagrama do PRISMA que mostra a seleção dos estudos.

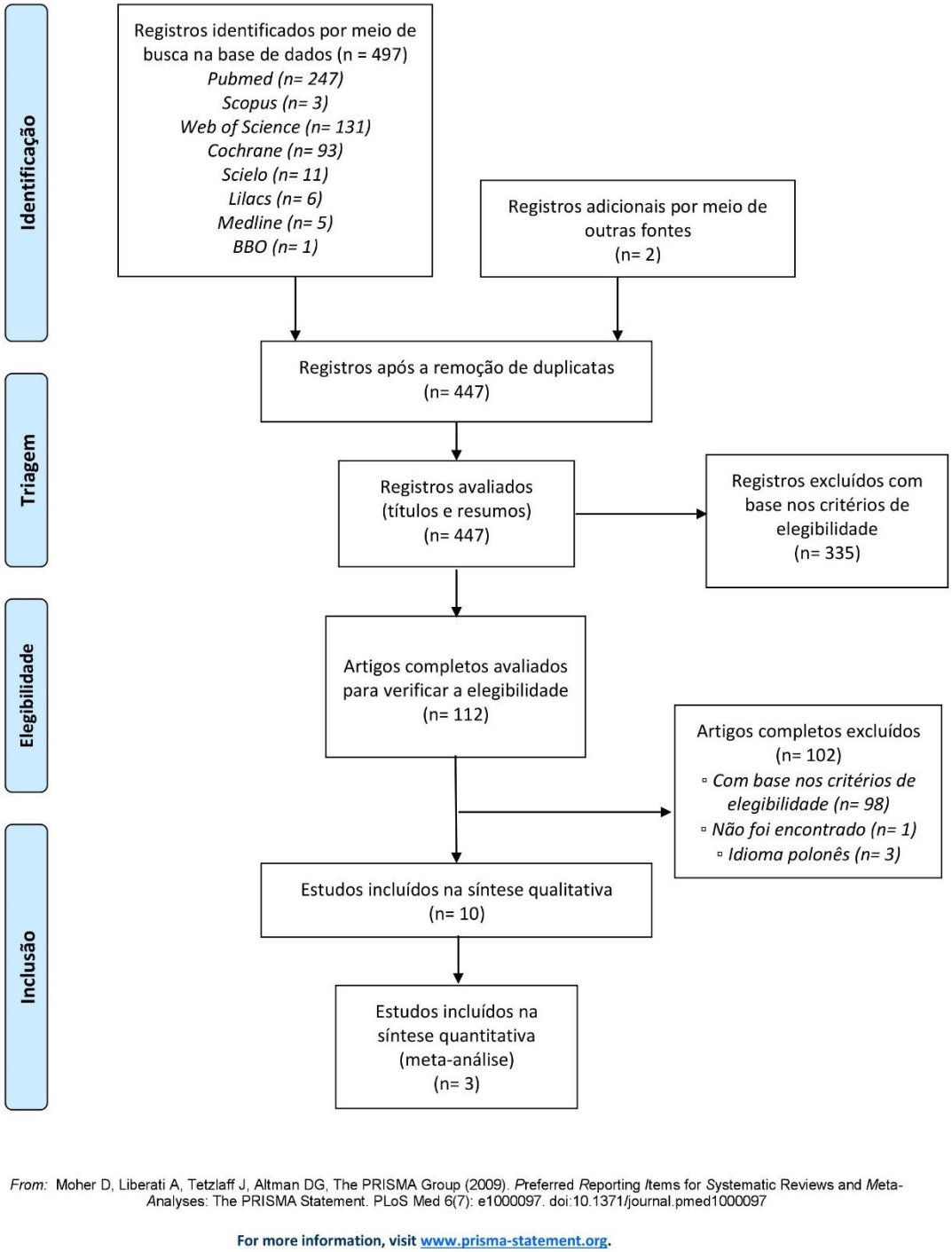

Figura 3 - Diagrama PRISMA
Fonte: O autor.

3.5 EXTRAÇÃO DOS DADOS

Os dados dos artigos incluídos foram compilados e organizados de acordo com: 1) os autores do artigo e ano de publicação; 2) total da amostra; 3) sexo da amostra; 4) idade da amostra; 5) diagnóstico de bruxismo; 6) classificação do bruxismo de acordo com o período que ocorreu e do padrão; 7) diagnóstico de DTM; 8) tratamento estatístico utilizado para relacionar o bruxismo com a DTM; 9) resultados encontrados pelos autores.

3.6 VERIFICAÇÃO DA QUALIDADE

A análise da validade de um estudo, verificando até que grau o seu desenho, sua condução e análise minimizaram os possíveis vieses ou erros, foi feita através dos critérios de análise de estudos transversais através da escala de qualidade Newcastle-Ottawa adaptada para estudos transversais (ANEXO A).

A qualidade dos estudos foi avaliada por uma escala de 0 (alto risco de viés) a 10 (baixo risco de viés). Os critérios seguidos foram: representatividade da amostra, tamanho da mesma, taxa de não respondentes, determinação da exposição, controle dos fatores confundidores da exposição, avaliação do desfecho e teste estatístico utilizado. Cada item poderia marcar até um ponto, exceto na determinação da exposição (marcaria dois pontos caso utilizasse uma ferramenta validada) e na avaliação do desfecho (marcaria dois, caso fosse uma avaliação cega independente).

3.7 MÉTODOS ESTATÍSTICOS

Foi utilizado o programa STATA Statistical Software (versão 15, College Station, TX: Stata Press) para realizar a meta-análise. Os dados foram extraídos em números absolutos relacionados ao número de indivíduos com e sem bruxismo e número de indivíduos com DTM e sem DTM. Os dados foram extraídos de acordo com o relatado nos artigos incluídos, e apenas aqueles artigos nos quais os mesmos poderiam ser extraídos foram incluídos na meta-análise.

A heterogeneidade estatística foi calculada através do teste estatístico I^2 (DEEKS, HIGGINS, ALTMAN, 2015). O modelo de efeito fixo de Mantel-Haenszel foi

utilizado quando a heterogeneidade estatística não era significativa (p> 0,05) (DEEKS, HIGGINS, ALTMAN, 2015). Calculou-se a estimativa do efeito (OR) para a ocorrência de DTM em indivíduos com exposição (bruxismo) versus indivíduos sem exposição (ausência de bruxismo). Esta comparação de dados foi possível em apenas três estudos (EGGER et al., 1997).

3.8 *GRADE*

A certeza da evidência foi avaliada pelo GRADE (*Grading of Recommendations, Assessment, Development, and Evaluation*) por meio da plataforma GRADEpro.

4 ARTIGO

O artigo a seguir está apresentado nas normas da revista “International Journal of Paediatric Dentistry”, classificada no Qualis da CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior), na Área de Avaliação de Odontologia, como A1 (ANEXO B e C).

Association between bruxism and temporomandibular disorders in children: a systematic review and meta-analysis

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Abstract

Background. Bruxism in children and its relation to the development of temporomandibular disorders (TMD) has not been clearly determined yet. **Aim.** The objective of this systematic review was to evaluate the possible association between bruxism and TMD in children. **Design.** Seven databases were searched and 497 articles were assessed. Methodological quality was assessed through Newcastle-

Ottawa Scale. The meta-analysis was performed with the articles in which extraction of data was possible and the summary effect measure through odds ratio (OR) and respective 95% confidence intervals (CI). Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) was used to assess the certainty of evidence. **Results.** Ten cross-sectional studies were included in the systematic review. Of these, 8 showed a statistically significant association between bruxism and TMD. However, 7 presented a high risk of bias. The meta-analysis was performed with 3 articles and obtained an OR of 2.97 (95% CI ranging from 1.72 - 5.15), indicating that children with bruxism are 2.97 times more likely to present TMD, with very low level of certainty defined by GRADE. **Conclusions.** Although the studies showed high risk of bias, the qualitative analysis of individual studies showed that the children with bruxism have greater chance of developing TMD.

Introduction

Definitions of bruxism are numerous and have varied widely in the scientific literature. In 2013, consensus was obtained on a definition of bruxism as repetitive masticatory muscle activity and specified as either sleep bruxism or awake bruxism[1]. However, currently the international consensus on the assessment of bruxism was revised and updated, aiming to further clarify the 2013 definition and to develop separate definitions for sleep and awake bruxism[2]. Thus, sleep bruxism is characterized as masticatory muscle activities that occur during sleep (activities rhythmic or non-rhythmic) and awake bruxism occur during the wakefulness (characterised by repetitive or sustained tooth contact and/or by bracing or thrusting of the mandible)[2].

The bruxism is more common among children than adults and less common in elderly as it trends to decrease with age[3, 4]. The prevalence of bruxism in children ranges from 3.5 - 40.6%, and it has no gender preference[4].

The muscle overloading resulting of masticatory muscular activities could be associated with local blood flow and microcirculation disorders, and pain derived from an ischemia[5]. Higher levels of this activities increase the risk of negative oral health consequences (e.g., severe masticatory muscle pain or temporomandibular joint pain)[6].

The main non-dental cause of pain in the orofacial region among children and adolescents is temporomandibular disorders (TMD)[7, 8], that is defined as a set of disorders involving the masticatory muscles, temporomandibular joint and associated structures. The prevalence of TMD in children and adolescents ranges from 9.8 - 80%[9].

The remarkable variation in both TMD and bruxism prevalence can be attributed to different research methodologies, clinical criteria for diagnosis, population samples[10, 11] and examination procedures[12, 13]. In addition, studies with children are even less enlightening about the extent to which bruxism may be related to TMD.

Therefore, the objective of this study was to identify, through a systematic literature review, whether or not bruxism in children may be related to TMD, clarifying this relationship with scientific evidence and guide clinical behavior.

Material and methods

The present systematic review was registered in PROSPERO (#CRD42017071281). The authors also followed the recommendations of the PRISMA statement[14].

The PECO methodology was utilized to formulate the research question. The research question was as follows: “Is there an association between bruxism and temporomandibular disorders in children?”.

Eligibility criteria

Eligibility criteria included: observational studies, children less than or equal to 12 years of age, a bruxism group, a control group (without bruxism) and the condition "with TMD".

We excluded from the review studies (narrative or systematic) letters to the editor, case reports, laboratory studies in animals, studies that did not discriminate the age of the patients, samples with special patients and/or specific group, and studies in which they did not correlate bruxism and TMD in the age group in question.

Search strategy

The databases consulted were Cochrane, Medline via PubMed and BVS, Web of Science, SciELO, Lilacs, Scopus and BBO. Sources of gray literature – Google Scholar – were also included. A manual search of the reference list of the included studies was carried out for publications that were not electronically identified. The search period was up to September 2017, identifying the studies on bruxism and TMD in children. No restrictions were imposed regarding date of publication.

Studies were uploaded into Endnote Basic (www.myendnoteweb.com) to delete duplicates and to build a virtual library. Then, the title and abstract of identified studies were assessed by two independent reviewers (KLD and LOR) and evaluated for eligibility criteria. Studies that met the inclusion criteria were selected for full-text reading. Articles were compared between the two reviewers, and in cases of disagreement, the articles were discussed to obtain consensus.

The following search strategy was used: ((child [Mesh] OR infant [Mesh] OR mixed dentition [Mesh] OR preschool child [Mesh] OR deciduous tooth [Mesh] OR children [No Mesh] OR preschool [No Mesh] OR preschool children [No Mesh] deciduous teeth [No Mesh]) AND (bruxism [Mesh] OR sleep bruxism [Mesh] OR sleep hygiene [Mesh] OR parasomnias [Mesh] OR habits [Mesh] OR habit [No Mesh] OR grinding [No Mesh] OR teeth grinding [No Mesh] OR clenching [No Mesh] OR teeth clenching [No Mesh] OR tooth grinding [No Mesh] OR tooth clenching [No Mesh] OR parafunctional habits [No Mesh] OR parafunctional habit [No Mesh] OR oral habits [No Mesh] OR oral habit [No Mesh] OR parafunctional oral [No Mesh] OR habits [No Mesh] OR parafunctional oral habit [No Mesh]) AND (facial pain [Mesh] OR temporomandibular joint disorders [Mesh] OR temporomandibular joint dysfunction syndrome [Mesh] OR myofascial pain [Mesh] OR syndromes [Mesh] OR myalgia [Mesh] OR osteoarthritis [Mesh] OR arthralgia [Mesh] OR orofacial pain [No Mesh] OR TMD [No Mesh] OR temporomandibular disorder [No Mesh] OR myofascial pain [No Mesh] OR disc displacement [No Mesh] OR disk displacement [No Mesh] OR osteoarthrosis [No Mesh])).

A total of 499 potentially relevant records were found: 247 references from Medline via PubMed, 3 references from Scopus, 131 references from Web of Science, 93 references from the Cochrane Library, 11 references from SciELO, 6

references from Lilacs, 5 references from Medline via BVS, 1 reference from BBO and 2 references from gray literature. After the duplicate references were removed, a total of 447 studies were selected based on titles/abstracts. Two reviewers were calibrated on the application of the inclusion and exclusion criteria. As a calibration exercise, the reviewers thoroughly discussed the criteria and applied them to a sample of 10% of the retrieved studies to determine inter-examiner agreement. After adequate agreement was achieved (kappa 0.85), all the studies were independently read by the reviewers (KLD and LOR). A total of 335 studies were excluded after selection based on titles/abstracts, and 112 studies were selected for the full text analysis. Among the 112 studies, 10 were selected, and the rest were excluded. Figure 1 describes the search process.

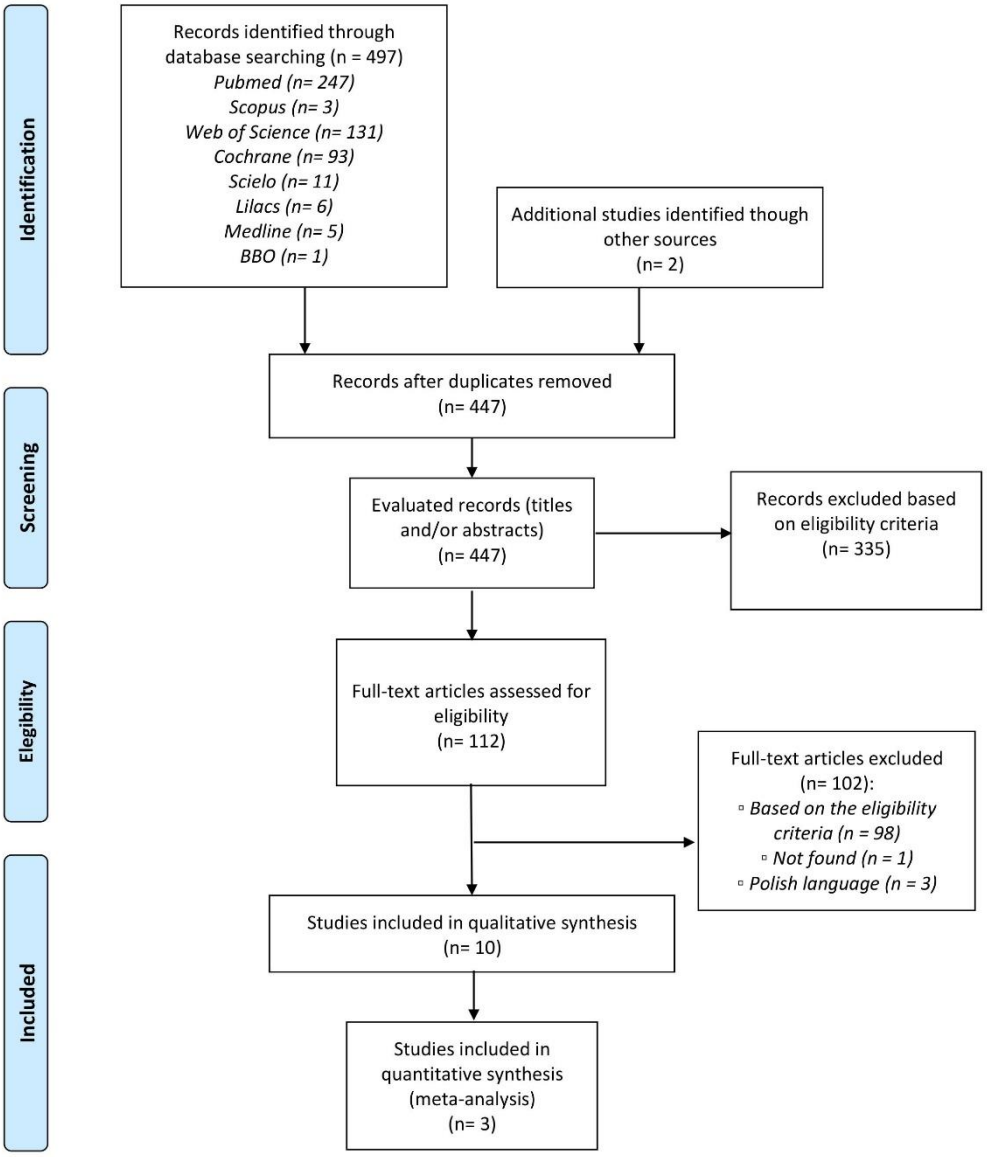

Fig. 1. PRISMA flowchart summarising the systematic review process in identification of the included studies.

Data extraction

The following items were extracted: author names, year of publication, total sample size, sample sex, sample age, diagnosis of bruxism, classification of

bruxism according to the period that occurred and the pattern, diagnosis of TMD, statistical treatment used to relate bruxism to TMD and results found by the authors.

Quality assessment

An adapted version of the Newcastle-Ottawa scale for cross-sectional studies was used[15]. Studies' quality was rated on a scale from 0 (high risk of bias) to 10 (low risk of bias).

The following criteria were used: sample representativity, sample size, non-respondent rate, exposure determination, control of exposure confounding factors, outcome assessment and statistical test used. Each item could mark up to one point, except for the determination of the exposure (mark two points if using a validated tool, which was considered when there was a distinction between sleep or waking bruxism and validated protocols were used for the diagnosis of bruxism) and the evaluation of the outcome (would mark two points, if it was an independent blind evaluation).

Disagreements between the reviewers in relation to quality assessment were resolved by consensus.

Statistical methods and data synthesis

The STATA Statistical Software (version 15, College Station, TX: Stata Press) program was used to perform meta-analysis. Data were abstracted using absolute numbers related to the number of individuals with and without bruxism and the number of individual with TMD and without TMD. Data were abstracted according to what was reported in papers, and only those papers in which data could be extracted were included in meta-analysis.

Statistical heterogeneity was calculated by I^2 statistics[16]. The fixed effect model from the Mantel-Haenszel was used when statistical heterogeneity was non-significant ($p>0.05$)[16]. The effect estimated the occurrence of TMD in individuals with exposure (bruxism) versus individuals without exposure (absence of bruxism) (OR). Comparison data were available in only three studies[22].

Results

Search and selection results

Ten studies were included in the present systematic review, all cross-sectionals.

General studies characteristics

Detailed information regarding population characteristics, age, sex, diagnosis of bruxism and diagnosis of TMD is summarized in the data extraction table (Table 1).

The studies enrolled populations from age groups between 3 and 12 years old and samples of 52 - 600 individuals.

Bruxism diagnosis

Several diagnostic criteria were used (data extraction table). The diagnosis of bruxism was made by parents or guardians in 70% of the studies[18-24], and in the others, it was made by the children themselves[25-27]. Despite the wide variety of diagnostic forms for bruxism, 30% used the American Academy of Sleep Medicine criteria[19, 21, 22], and the other questionnaires were prepared by the authors themselves[18, 20, 23-27].

TMD diagnosis

The method for diagnosis of TMD was also quite varied: 20% of the articles used the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) with different approaches[19, 22], 20%[18, 20] used clinical examination of signs and symptoms based at Bonjardim *et al.*[28], and the others used questionnaires and/or examinations prepared by the authors[21, 23-27].

Quality assessment

Most of the studies had a high risk of bias: seven out of ten included articles presented a high risk of bias[18, 20, 23-27] (Table 2).

Only the study sample by Restrepo *et al.*[22] was particularly representative and justified in the article. In addition, it was the only study that controlled the confounding factors of bruxism (three or more parafunctional habits).

Data synthesis

Eight of the selected studies had a positive and statistically significant association between bruxism in children and TMD, according to the variables they analyzed ($p < 0.05$)[18, 19, 22-27].

Table 1. Data extraction

Author and year	Sample size	Sex	Age (years)	Bruxism diagnosis	Bruxism classification	TMD diagnosis	Statistical treatment of bruxism and TMD	Results of the association between bruxism and TMD
Alencar *et al*. (2016)[19]	66	It does not determine.	3 – 7	Parents reported the occurrence of audible bruxism at night (according to criteria of the American Academy of Sleep Medicine).	Sleep bruxism Grinding	Parents/caregivers were interviewed with RDC/TMD axis II modified: issues concerning child applicable pain.	Multiple logistic regression	Children with bruxism have more headaches and orofacial pain (p<0,05).
Castelo *et al*. (2005)[20]	99	58 boys and 41 girls	3 – 5	Parents/guardians were interviewed to determine the presence and frequency of bruxism. Clinical examination to confirm the facets of wear.	It does not determine. It does not determine.	Clinical examination to assess TMD signs (Bonjardim *et al*.[32]) Parents/guardians were interviewed about TMD symptoms.	Fisher test	There was no significant relationship between bruxism and TMD (p>0,05).
Emodi-Perlman *et al.* (2012)[21]	244	61 boys and 183 girls	5 -12	Parents reported the occurrence of audible bruxism at night (according to criteria of the American Academy of Sleep Medicine). Clinical examination to confirm wear facets (Johansson *et al*.[33]).	Sleep bruxism Grinding and clenching	Questionnaire adapted from an existing one for adolescents, completed by parents in collaboration with children and clinical examination, assessing signs and symptoms.	Fisher exact test and t test for independent samples	Sleep bruxism was not associated with any anamnestic symptom or clinical findings of TMD (p>0,05).

Author	Sample size	Sex	Age (years)	Bruxism diagnosis	Bruxism classification	TMD diagnosis	Statistical treatment of bruxism and TMD	Results of the association between bruxism and TMD
Pereira *et al.* (2009)[18]	106	It does not determine.	4 - 12	Questionnaire answered by parents.	It does not determine. Grinding and clenching	Questionnaire answered by parents and clinical examination with presence of at least one sign or symptom (Bonjardim *et al*.[32]).	Logistic regression and Odds Ratio.	Bruxism was considered an indicator of risk for the presence of TMD signs and symptoms (p<0,05).
Restrepo *et al.* (2008)[22]	52	It does not determine.	8 – 11	Parents reported the occurrence of bruxism (according to criteria of the American Academy of Sleep Medicine). Clinical examination of facets of dental wear.	Sleep bruxism Grinding and clenching	Axis I RDC/TMD adapted.	Multivariate logistic regression and Odds Ratio	The bruxist child has more signs and symptoms of TMD (p <0.05). A strong correlation between bruxism and TMD was found.
Seraj*, et al*. (2010)[23]	600	314 boys and 286 girls	4 - 12	Questionnaire completed by parents.	Sleep and awake bruxism It does not determine.	Questionnaire completed by parents.	Fisher's Test, t-Test, Chi-Square Test, Mann-Whitney	Children with bruxism have a significant correlation with TMD (p<0,05).
Vanderas (1995)[24]	386	It does not determine.	6 – 10	Parents responded to an interview.	It does not determine. Grinding and clenching	Parents answered a TMD symptom interview and clinical signs examination.	Chi-Square Test	TMD symptoms showed significant correlations between clenching (p=0,015) and grinding (p=0,0007).

Author	Sample size	Sex	Age (years)	Bruxism diagnosis	Bruxism classification	TMD diagnosis	Statistical treatment of bruxism and TMD	Results of the association between bruxism and TMD
Vanderas e Papagiannoulis (2002)[25]	314	161 boys and 153 girls	6 – 8	The children were interviewed and clinical facet evaluation was performed.	It does not determine. Grinding and clenching	Clinical signs and TMD symptoms interview. One or more signs/symptoms: the child has TMD.	Multivariate logistic regression	Clenching bruxism has a significant correlation with muscle sensitivity (p<0,05).
Wildmalm, Christiansen, Gunn (1995)[26]	525	282 boys and 243 girls	4 – 6	The children were interviewed.	It does not determine. It does not determine.	Children were interviewed and clinical examination was done for signs and symptoms.	Chi-square of Pearson and Cramer. Logistic regression.	Bruxism was significantly associated with most (8 of 10) of the pain variables. (p<0,05).
Widmalm *et al.* (1995)[27]	203	113 boys and 90 girls	4 – 6	The children were interviewed.	It does not determine. It does not determine.	The children were interviewed and clinical examination of the signs and symptoms.	Chi-square of Pearson and Cramer.	Bruxism was significantly associated with most TMD variables (11 de 15) (p<0,05).

Table 2. Quality assessment criteria used for cross-sectional studies through Newcastle-Ottawa Scale.

	Alencar *et al*.[19]	Castelo *et al*.[20]	Emodi-Perlman *et al.*[21]	Pereira *et al.*[18]	Restrepo *et al.*[22]	Seraj, *et al*.[23]	Vanderas[24]	Vanderas e Papagiannoulis[25]	Wildmalm, Christiansen, Gunn[26]	Widmalm *et al.*[27]
Selection 1) Representativeness of the sample: a) Truly representative of the average in the target population. * (all subjects or random sampling) b) Somewhat representative of the average in the target population. * (non-random sampling) c) Selected group of users. d) No description of the sampling strategy.	b*	d	C	c	a*	c	d	c	c	c
2) Sample size: a) Justified and satisfactory. * b) Not justified.	b	b	B	b	a*	b	b	b	b	b
3) Non-respondents: a) Comparability between respondents and non-respondents characteristics is established, and the response rate is satisfactory. * b) The response rate is unsatisfactory, or the comparability between respondents and non-respondents is unsatisfactory. c) No description of the response rate or the characteristics of the responders and the non-responders.	c	c	a*	c	a*	c	c	c	c	c
4) Ascertainment of the exposure (risk factor): a) Validated measurement tool. ** b) Non-validated measurement tool, but the tool is available or	a**	b*	a**	b*	a**	c	c	b*	b*	b*

described.* c) No description of the measurement tool.										
Comparability 1) The subjects in different outcome groups are comparable, based on the study design or analysis. Confounding factors are controlled. a) The study controls for the most important factor (select one). * b) The study control for any additional factor. *	-	-	-	-	a*	-	-	-	-	-
Outcome 1) Assessment of the outcome: a) Independent blind assessment. ** b) Record linkage. ** c) Self report. * d) No description.	b**	c*	c*	c*	b**	c*	c*	c*	c*	c*
2) Statistical test: a) The statistical test used to analyze the data is clearly described and appropriate, and the measurement of the association is presented, including confidence intervals and the probability level (p value). * b) The statistical test is not appropriate, not described or incomplete.	a*	a*	a*	a*	a*	a*	a*	a*	a*	a*
	6/10	3/10	5/10	3/10	9/10	2/10	2/10	3/10	3/10	3/10

* awarded 1 point.

Meta-analysis

Figure 2 shows the OR of TMD for individuals with bruxism compared to individuals without bruxism in the three studies included[18, 20, 23]. The overall estimate showed that individuals with bruxism had an OR of 2.97 (1.72-5.15; I^2: 54.8%, p=0.109) for the probability of having TMD.

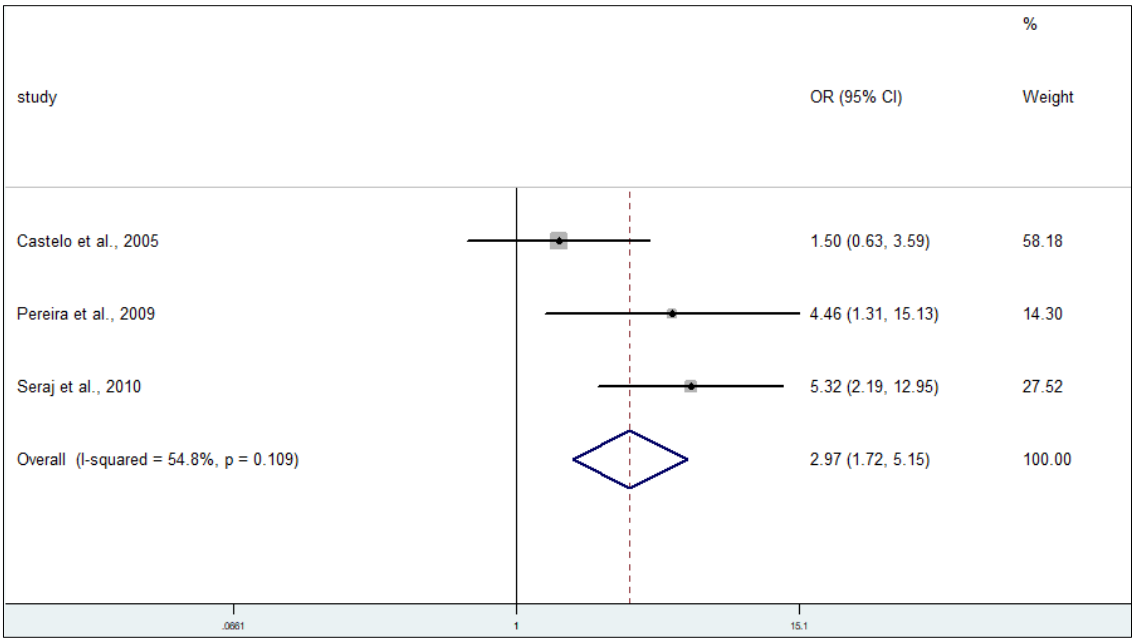

Figure 2. Meta-analysis of 3 cross-sectionals studies for occurrence of DTM in individuals with bruxism compared to individuals without bruxism. OR is related to the outcome (DTM). OR>1 means increased chance of occurrence of DMT in individuals with bruxism. Fixed effect model used.

GRADE

The certainty of evidence was evaluated by GRADE (Grading of *Recommendations*, Assessment, Development, and Evaluation) through GRADEpro plataform[29]. The certainty of evidence of the association between bruxism and DMT was very low (Table 3).

Table 3. GRADE table.

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations**	**Children with bruxism**	**children without bruxism**	**Relative (95% CI)**	**Absolute (95% CI)**		
3	observational studies	very serious [a]	serious [b]	serious [c]	serious [d]	strong association	33/805 (4.1%)	36/805 (4.5%)	**OR 2.97** (1.72 to 5.15)	**77 more per 1.000** (from 30 more to 150 more)	⨁◯◯◯ VERY LOW	CRITICAL

CI: Confidence interval; OR: Odds ratio.

Explanations:
a. The risk of bias was based on the score of the Newcastle Ottawa quality scale.
b. The inconsistency was defined by the value of $I^{2.}$
c. The evaluation of indirectness was based on the PICO question.
d. The imprecision assessment was based on the confidence interval.

Discussion

Considering the need for research based on scientific evidence, a systematic review about bruxism and infant TMD becomes quite important to clarify concepts and demystify clinical approaches.

Bruxism has two distinct circadian manifestations: it can occur during sleep (indicated as sleep bruxism) or during wakefulness (indicated as awake bruxism)[1]. Only four articles included in this systematic review discern sleep bruxism from awake bruxism[19, 21-23]; only one approaches both classifications[23], while the other three reported about sleep bruxism only[19, 21, 22]. The others (six articles) do not distinguish between the two manifestations[18, 20, 24-27]. Lavigne, Rompre and Montplaisir[30] argue that scientific knowledge about the characteristics and effects of bruxism is mainly based on the study findings on sleep bruxism. Sleep bruxism can be part of a sleep disorder, and it is more influenced by behavioral factors, such as the use of caffeine[31, 32], while awake bruxism is more likely to be associated with psychosocial factors, such as stress[33]. Both are mediated by the central nervous system, but they have different etiologies, clinical consequences, and therapeutic approaches, and therefore, their distinction is essential.

According Lobbezzo *et al.*[2] sleep and awake bruxism are considered as different behaviours and must have two different definitions: “Sleep bruxism is a masticatory muscle activity during sleep that is characterised as rhythmic (phasic) or non-rhythmic (tonic) and is not a movement disorder or a sleep disorder in otherwise healthy individuals”. “Awake bruxism is a masticatory muscle activity during wakefulness that is characterised by repetitive or sustained tooth contact and/or by bracing or thrusting of the mandible and is not a movement disorder in otherwise healthy individuals”.

The bruxism diagnosis is complex and should be performed with validated tools. In this study the measurement tool was considered validated when there was a distinction between sleep and waking bruxism and used for the diagnosis of bruxism guidelines from the American Academy of Sleep Medicine (AASM)[34]. Only three studies followed these requirements[19, 21, 22].

In regard to sleep/awake bruxism, Lobbezoo *et al*.[2] proposed the following diagnostic grading: "possible", when is based only in a positive self-report; "probable", when is based on a positive clinical inspection (findings in physical examination that justify the habit), with or without a positive self-report; or "definite", is based on a positive instrumental assessment (electromyography for awake bruxism and polysomnography for sleep bruxism), with or without a positive self-report and/or a positive clinical inspection. However, Restrepo, Gomez and Manrique[35] reported that polysomnography is not a representative exam in children, and it is costly and time-consuming.

In 1990, Marbach *et al.*[36] had already suggested that basing the diagnosis of bruxism on patient self-report is potentially tendentious, depending on what the dentist may have asked the patient. Regarding children, the report from parents or guardians can also limit the diagnosis. The study by Accinelli *et al*.[37] reported alterations on sleeping in 77 children aged 9 - 15 years old, in which 48.1% had nocturnal awakenings; 46.8%, repetitive limb movements; 46.8%, non-repairing sleep; and 33.8%, snoring. Only 10.4% of the parents had noticed sleep disorders in their children. Moreover, Cheifetz et al. (2005)[38] stated that keeping the room doors open increased the parents' reporting of bruxism by 1.7 times.

With respect to dental wear being used as a clinical finding to justify the diagnosis, Tantbirojn *et al.*[39] and El Aidi *et al.*[40] signaled that other causes may be

present, such as a diet rich in citrus foods; endogenous factors, such as gastroesophageal reflux; and physiological wear itself. In addition, El Aidi *et al.*[40] reported that soft drinks and teeth grinding are positively associated with wear on molar and incisors teeth, and wear must be analyzed with caution. According to Kiliaridis and Carlsson[41], this finding in children by itself may indicate an abandoned parafunctional habit, but according to Huynh, Desplats and Bellerive[42], it should not be neglected, requiring attention from their parents.

Some factors may predispose the development of TMD, the most relevant being trauma, direct or macrotrauma, indirect or microtrauma; psychosocial factors, such as anxiety and depression; and pathophysiological factors, such as systemic (degenerative, neurological and rheumatological diseases, for example) and local. Both sleep and awake bruxism are masticatory muscular activities[2]. The muscle overloading due to tooth clenching could be associated with local blood flow and microcirculation disorders, and pain derived from an ischemia[5], the latter related to substances that sensitize muscles nociceptors[43].

Raphael *et al.*[6] pointed out that if higher levels of masticatory muscle activity increase the risk of negative oral health consequences (e.g., severe masticatory muscle pain or temporomandibular joint pain), bruxism should be considered a risk factor rather than a disorder in otherwise healthy individuals. A risk factor increases the chance of developing the disease but it is not certain that it will happen. Even though it is known that bruxism can be a motor behavior of multifactorial etiology in cases of healthy individuals, or even a protective factor when associated with positive outcomes for other diseases[44]. According to Lobbezoo *et al.*[2] in terms of clinical consequences, bruxism may thus be classified as any of the following: not a risk or protective factor: bruxism is a harmless behavior; a risk factor:

bruxism is associated with one or more negative health outcomes; **a** protective factor: bruxism is associated with one or more positive health outcomes.

In this way, bruxism should be carefully evaluated, so the other factors, also called confounding factors, could determine the same outcome of exposure and therefore prevent correct association with the outcome of developing TMD. Nine of the evaluated articles did not control any confounding factor[18-21, 23-27], and only one limited three or more habits different from bruxism[22]. None of the articles controlled all the factors.

Regarding the diagnosis of TMD in children, the study by Wahlund, List and Dworkin[45] applied the RDC/TMD (Research Diagnostic Criteria for TMD) to children and adolescents from 12 - 18 years old, suppressing several axes II issues that were difficult to understand or inappropriate for children. Moyaho-Bernal *et al*.[46] used the same adapted RDC/TMD but in children aged 8 to 12 years without evaluating the emotional aspect, which is inappropriate for children under 12 years old. Other studies, such as Al-Khotani *et al.*[47], Paulsson *et al.*[48] and Pizolato, Fernandes and Gavião[49], also used the RDC/TMD in diagnoses for children at ages 10 - 18, 8 - 10 and 8 - 12 years, respectively. However, most studies in children are not based on the diagnosis of TMD but rather on the presence of signs and symptoms of dysfunction[9, 50]. The American Academy of Pediatric Dentistry[51] recommends that a diagnosis be based on a combination of historical, clinical examination and/or craniocervical and TMJ images and that the findings be classified as symptoms and signs. As there are several signs and symptoms that can be analyzed, the diagnostic evaluation of this form for research becomes conflicting. In addition, it is known that the use of diagnostic images of TMD in children should be indicated in specific situations.

Thereby, Casanova-Rosado *et al.*[52], Manfredini *et al*.[53], and Wieckiewicz *et al.*[54] recommend the use of validated tools such as the RDC/TMD in order to increase the level of reliability among studies in children and adolescents. This tool has been used as a method of diagnosis for both children and adults. However, one of its limitations is the lack of children's cognition, especially for the youngest children, to answer the questionnaire and receive the physical examination, which may compromise the veracity of the results. Nevertheless, this is the only existing validated diagnostic method. The DC/TMD (Diagnostic Criteria for TMD) recently published an RDC/TMD adaptation, but it has not been validated for children yet. Eight of the articles included in this systematic review use the self-report of children, reports from the parents or the presence of TMD signs and symptoms for the diagnosis of TMD[18, 20, 21, 23-27], while the other two adapted the RDC/TMD with their own alterations[19, 22].

Regarding the methodological criteria, the studies should use them in a way that qualifies the evidence, including randomization and calculation of sample size, calibration, blindness and control of the involved factors. Moreover, with respect to the diagnosis, using standardized and validated criteria is necessary[55]. In this systematic review, seven of the ten articles included presented high risk of bias, regarding methodological criteria[18, 20, 23-27]. In addition, nine articles were based on non-representative samples, recruiting populations of individuals in their places of study or in centers for dental care, or still did not present a description of the sampling strategy or even a sample calculation[18-21, 23-27]. Eight papers do not determine the response rate or characteristics of respondents and non-respondents[18-20, 23-27]. Such failures affect the validity and consistency of the findings.

Regarding the association of bruxism in children and TMD, eight articles presented positive results related to what each one proposed to evaluate[18, 19, 22-27]. However, only three articles allowed the extraction of data to be included in the meta-analysis[18, 19, 23]. In this study, it was possible to conclude that children with bruxism have a 2.97 times greater chance of developing TMD. Nevertheless, the included articles had some of the lowest scores in the quality evaluation.

Some investigations, not limited to children, based on self-report or clinical bruxism diagnosis showed a positive association with TMD pain, but they are characterized by some potential bias and confounders at the diagnostic level. Studies based on more quantitative and specific methods to diagnose bruxism showed much lower association with TMD symptoms[56, 57].

In this study, the GRADE evaluation showed the very low level certainty of the overall evidence. Therefore, these results should be interpreted with caution. The majority of the included studies have presented a high risk of bias since the subjectivity of the diagnostic criteria and methodological limitations of the clinical studies contribute to its heterogeneity. Studies with higher quality, in which the samples are representative, with standardized diagnostic methods for the two conditions and in which the confounding factors are controlled, are necessary.

Bullet Points

- This review offers paediatric dentists further clarification on the parafunctional bruxism habit and its relationship to TMD.
- Although the studies showed high risk of bias, the meta-analysis showed that children with bruxism have greater chance of developing TMD.

- Future studies with better methodological criteria and validated diagnostic tools are needed.

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Author contributions

LOR, KLD and CCM conceived the ideas. LOR and KLD carried out the literature search, collected the data, carried out the risk bias assessment; LOR, KLD and CCM analyzed the data; LOR, KLD and RAR review the manuscript. LOR and KLD led the writing.

Conflict of interest

The authors have no conflict of interest to declare.

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5 CONSIDERAÇÕES FINAIS

Embora a maioria dos estudos incluídos na revisão sistemática possua associação positiva entre bruxismo e DTM em crianças, a avaliação da qualidade revelou o alto risco de viés dos estudos. Da mesma forma, ainda que a meta-análise dos artigos incluídos tenha apontado que crianças com bruxismo possuem maior chance de desenvolver DTM, o GRADE mostrou o quanto esses estudos possuem muito baixa certeza de evidência. Assim, percebe-se a necessidade de estudos com maior controle metodológico, tanto no que diz respeito ao diagnóstico das duas condições, como na condução do trabalho.

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APÊNDICE A – REGISTRO NA PROSPERO

PROSPERO
International prospective register of systematic reviews

NHS
National Institute for Health Research

Association between bruxism and temporomandibular disorders in children: a systematic review

Larissa Reis, Carolina Martins, Karina Devito

Citation

Larissa Reis, Carolina Martins, Karina Devito. Association between bruxism and temporomandibular disorders in children: a systematic review. PROSPERO 2017 CRD42017071281 Available from: http://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42017071281

Review question

Is there an association between bruxism and temporomandibular disorders in children?

Searches

A detailed search was conducted in the following databases: MEDLINE via PubMed, Cochrane Library, Scopus, Web of Science. Additional literature was included in Google Scholar.
There was no restriction on language or date of publication.

Types of study to be included

Observational studies: case-control, cohorts, cross-sectional.Neither review studies nor case reports were included.

Condition or domain being studied

Bruxism is characterized by grinding and/or clenching of the teeth. Temporomandibular disorders includes a range of conditions associated with pain and dysfunction of the head and neck region.

Participants/population

Children.

Intervention(s), exposure(s)

Bruxism.

Comparator(s)/control

Children without bruxism.

Context

Primary outcome(s)

Temporomandibular disorders.

Secondary outcome(s)

None.

Data extraction (selection and coding)

Risk of bias (quality) assessment

Two review authors will independently assess the risk of bias in included studies by Newcastle-Ottawa scale.

Strategy for data synthesis

The data synthesis will be mainly quantitative.

Analysis of subgroups or subsets

None planned.

Contact details for further information

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Organisational affiliation of the review

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Review team members and their organisational affiliations

Miss Larissa Reis. UFJF
Professor Carolina Martins. UFMG
Professor Karina Devito. UFJF

Anticipated or actual start date

14 December 2016

Anticipated completion date

29 December 2017

Funding sources/sponsors

This study has no funding sources

Conflicts of interest

None known

Language

English

Country

Brazil

Stage of review

Review_Ongoing

Subject index terms status

Subject indexing assigned by CRD

Subject index terms

Bruxism; Child; Humans; Temporomandibular Joint Disorders

Date of registration in PROSPERO

05 July 2017

Date of publication of this version

05 July 2017

Details of any existing review of the same topic by the same authors

Stage of review at time of this submission

PROSPERO
International prospective register of systematic reviews

NHS National Institute for Health Research

Stage	Started	Completed
Preliminary searches	Yes	Yes
Piloting of the study selection process	Yes	Yes
Formal screening of search results against eligibility criteria	Yes	No
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No

Versions

05 July 2017

APÊNDICE B – ATUALIZAÇÃO DO REGISTRO NA PROSPERO

PROSPERO
International prospective register of systematic reviews

NHS National Institute for Health Research

UNIVERSITY of York
Centre for Reviews and Dissemination

Systematic review

1. * Review title.

Give the working title of the review, for example the one used for obtaining funding. Ideally the title should state succinctly the interventions or exposures being reviewed and the associated health or social problems. Where appropriate, the title should use the PI(E)COS structure to contain information on the Participants, Intervention (or Exposure) and Comparison groups, the Outcomes to be measured and Study designs to be included.
Association between bruxism and temporomandibular disorders in children: a systematic review

2. Original language title.

For reviews in languages other than English, this field should be used to enter the title in the language of the review. This will be displayed together with the English language title.

3. * Anticipated or actual start date.

Give the date when the systematic review commenced, or is expected to commence.
14/12/2016

4. * Anticipated completion date.

Give the date by which the review is expected to be completed.
15/05/2018

5. * Stage of review at time of this submission.

Indicate the stage of progress of the review by ticking the relevant Started and Completed boxes. Additional information may be added in the free text box provided.
Please note: Reviews that have progressed beyond the point of completing data extraction at the time of initial registration are not eligible for inclusion in PROSPERO. Should evidence of incorrect status and/or completion date being supplied at the time of submission come to light, the content of the PROSPERO record will be removed leaving only the title and named contact details and a statement that inaccuracies in the stage of the review date had been identified.
This field should be updated when any amendments are made to a published record and on completion and publication of the review.

The review has not yet started: No

Review stage	Started	Completed
Preliminary searches	Yes	Yes
Piloting of the study selection process	Yes	Yes
Formal screening of search results against eligibility criteria	Yes	Yes
Data extraction	Yes	Yes
Risk of bias (quality) assessment	Yes	Yes

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NHS National Institute for Health Research

Review stage	Started	Completed
Data analysis	Yes	Yes

Provide any other relevant information about the stage of the review here (e.g. Funded proposal, protocol not yet finalised).

6. * Named contact.

The named contact acts as the guarantor for the accuracy of the information presented in the register record.
Karina Devito

Email salutation (e.g. "Dr Smith" or "Joanne") for correspondence:

7. * Named contact email.

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Olegário Maciel Street, 1930, 302 E
Paineiras
ZIP CODE:36016-011
City: Juiz de Fora - Minas Gerais - Brazil

9. Named contact phone number.

Give the telephone number for the named contact, including international dialling code.
55 32 32119627

10. * Organisational affiliation of the review.

Full title of the organisational affiliations for this review and website address if available. This field may be completed as 'None' if the review is not affiliated to any organisation.
Federal University of Juiz de Fora

Organisation web address:

www.ufjf.br

11. Review team members and their organisational affiliations.

Give the title, first name, last name and the organisational affiliations of each member of the review team. Affiliation refers to groups or organisations to which review team members belong.

Miss Larissa Reis. UFJF
Professor Carolina Martins. UFMG
Professor Karina Devito. UFJF

12. * Funding sources/sponsors.

Give details of the individuals, organizations, groups or other legal entities who take responsibility for initiating, managing, sponsoring and/or financing the review. Include any unique identification numbers assigned to the review by the individuals or bodies listed.
This study has no funding sources

13. * Conflicts of interest.

List any conditions that could lead to actual or perceived undue influence on judgements concerning the main topic investigated in the review.

None

14. Collaborators.

Give the name and affiliation of any individuals or organisations who are working on the review but who are not listed as review team members.

15. * Review question.

State the question(s) to be addressed by the review, clearly and precisely. Review questions may be specific or broad. It may be appropriate to break very broad questions down into a series of related more specific questions. Questions may be framed or refined using PI(E)COS where relevant.
Is there an association between bruxism and temporomandibular disorders in children?

16. * Searches.

Give details of the sources to be searched, search dates (from and to), and any restrictions (e.g. language or publication period). The full search strategy is not required, but may be supplied as a link or attachment.
A detailed search was conducted in the following databases: MEDLINE via PubMed, Cochrane Library, Scopus, Web of Science. Additional literature was included in Google Scholar.
There was no restriction on language or date of publication.

17. URL to search strategy.

Give a link to the search strategy or an example of a search strategy for a specific database if available (including the keywords that will be used in the search strategies).

Alternatively, upload your search strategy to CRD in pdf format. Please note that by doing so you are consenting to the file being made publicly accessible.

Yes I give permission for this file to be made publicly available

18. * Condition or domain being studied.

Give a short description of the disease, condition or healthcare domain being studied. This could include health and wellbeing outcomes.
Bruxism is characterized by grinding and/or clenching of the teeth. Temporomandibular disorders includes a range of conditions associated with pain and dysfunction of the head and neck region.

19. * Participants/population.

Give summary criteria for the participants or populations being studied by the review. The preferred format includes details of both inclusion and exclusion criteria.
Children.

20. * Intervention(s), exposure(s).

Give full and clear descriptions or definitions of the nature of the interventions or the exposures to be reviewed.
Bruxism.

21. * Comparator(s)/control.

Where relevant, give details of the alternatives against which the main subject/topic of the review will be compared (e.g. another intervention or a non-exposed control group). The preferred format includes details of both inclusion and exclusion criteria.
Children without bruxism.

22. * Types of study to be included.

Give details of the types of study (study designs) eligible for inclusion in the review. If there are no restrictions on the types of study design eligible for inclusion, or certain study types are excluded, this should be stated. The preferred format includes details of both inclusion and exclusion criteria.
Observational studies: case-control, cohorts, cross-sectional.Neither review studies nor case reports were included.

23. Context.

Give summary details of the setting and other relevant characteristics which help define the inclusion or exclusion criteria.

24. * Primary outcome(s).

Give the pre-specified primary (most important) outcomes of the review, including details of how the outcome is defined and measured and when these measurement are made, if these are part of the review inclusion criteria.
Temporomandibular disorders.

Timing and effect measures

25. * Secondary outcome(s).

List the pre-specified secondary (additional) outcomes of the review, with a similar level of detail to that required for primary outcomes. Where there are no secondary outcomes please state 'None' or 'Not applicable' as appropriate to the review
None.

Timing and effect measures

26. Data extraction (selection and coding).

Give the procedure for selecting studies for the review and extracting data, including the number of researchers involved and how discrepancies will be resolved. List the data to be extracted.

27. * Risk of bias (quality) assessment.

State whether and how risk of bias will be assessed (including the number of researchers involved and how discrepancies will be resolved), how the quality of individual studies will be assessed, and whether and how this will influence the planned synthesis.
Two review authors independently assessed the risk of bias in included studies by Newcastle-Ottawa scale.

28. * Strategy for data synthesis.

Give the planned general approach to synthesis, e.g. whether aggregate or individual participant data will be used and whether a quantitative or narrative (descriptive) synthesis is planned. It is acceptable to state that a quantitative synthesis will be used if the included studies are sufficiently homogenous.
The data synthesis were mainly quantitative.

29. * Analysis of subgroups or subsets.

Give details of any plans for the separate presentation, exploration or analysis of different types of participants (e.g. by age, disease status, ethnicity, socioeconomic status, presence or absence or co-morbidities); different types of intervention (e.g. drug dose, presence or absence of particular components of intervention); different settings (e.g. country, acute or primary care sector, professional or family care); or different types of study (e.g. randomised or non-randomised).
None planned.

30. * Type and method of review.

Select the type of review and the review method from the lists below. Select the health area(s) of interest for your review.

Type of review

Cost effectiveness
No

Diagnostic
No

Epidemiologic
No

Individual patient data (IPD) meta-analysis
No

Intervention
No

Meta-analysis
No

Methodology
No

Network meta-analysis
No

Pre-clinical
No

Prevention
No

Prognostic
No

Prospective meta-analysis (PMA)
No

Qualitative synthesis
No

Review of reviews
No

Service delivery
No

Systematic review
Yes

Other
No

Health area of the review

Alcohol/substance misuse/abuse
No

Blood and immune system
No

Cancer
No

Cardiovascular
No

Care of the elderly

No

Child health
No

Complementary therapies
No

Crime and justice
No

Dental
No

Digestive system
No

Ear, nose and throat
No

Education
No

Endocrine and metabolic disorders
No

Eye disorders
No

General interest
No

Genetics
No

Health inequalities/health equity
No

Infections and infestations
No

International development
No

Mental health and behavioural conditions
No

Musculoskeletal
No

Neurological
No

Nursing
No

Obstetrics and gynaecology
No

Oral health
No

Palliative care
No

Perioperative care
No

Physiotherapy
No

Pregnancy and childbirth
No

Public health (including social determinants of health)
No

Rehabilitation
No

Respiratory disorders
No

Service delivery
No

Skin disorders
No

Social care
No

Surgery
No

Tropical Medicine
No

Urological
No

Wounds, injuries and accidents
No

Violence and abuse
No

31. Language.

Select each language individually to add it to the list below, use the bin icon to remove any added in error.
English

There is an English language summary.

32. Country.

Select the country in which the review is being carried out from the drop down list. For multi-national collaborations select all the countries involved.
Brazil

33. Other registration details.

Give the name of any organisation where the systematic review title or protocol is registered (such as with The Campbell Collaboration, or The Joanna Briggs Institute) together with any unique identification number assigned. (N.B. Registration details for Cochrane protocols will be automatically entered). If extracted data will be stored and made available through a repository such as the Systematic Review Data Repository (SRDR), details and a link should be included here. If none, leave blank.

34. Reference and/or URL for published protocol.

Give the citation and link for the published protocol, if there is one

Give the link to the published protocol.

Alternatively, upload your published protocol to CRD in pdf format. Please note that by doing so you are consenting to the file being made publicly accessible.

Yes I give permission for this file to be made publicly available

Please note that the information required in the PROSPERO registration form must be completed in full even if access to a protocol is given.

35. Dissemination plans.

Give brief details of plans for communicating essential messages from the review to the appropriate audiences.

Do you intend to publish the review on completion?

Yes

36. Keywords.

Give words or phrases that best describe the review. Separate keywords with a semicolon or new line. Keywords will help users find the review in the Register (the words do not appear in the public record but are included in searches). Be as specific and precise as possible. Avoid acronyms and abbreviations unless these are in wide use.

37. Details of any existing review of the same topic by the same authors.

Give details of earlier versions of the systematic review if an update of an existing review is being registered, including full bibliographic reference if possible.

38. * Current review status.

Review status should be updated when the review is completed and when it is published.

Please provide anticipated publication date

Review_Completed_not_published

39. Any additional information.

Provide any other information the review team feel is relevant to the registration of the review.

40. Details of final report/publication(s).

This field should be left empty until details of the completed review are available.

Give the link to the published review.

ANEXO A – ESCALA DE QUALIDADE NEWCASTLE-OTTAWA ADAPTADA PARA ESTUDOS TRANSVERSAIS

Newcastle-Ottawa Scale adapted for cross-sectional studies

Selection: (Maximum 5 stars)

1) Representativeness of the sample:
- a) Truly representative of the average in the target population. * (all subjects or random sampling)
- b) Somewhat representative of the average in the target population. * (non-random sampling)
- c) Selected group of users.
- d) No description of the sampling strategy.

2) Sample size:
- a) Justified and satisfactory. *
- b) Not justified.

3) Non-respondents:
- a) Comparability between respondents and non-respondents characteristics is established, and the response rate is satisfactory. *
- b) The response rate is unsatisfactory, or the comparability between respondents and non-respondents is unsatisfactory.
- c) No description of the response rate or the characteristics of the responders and the non-responders.

4) Ascertainment of the exposure (risk factor):
- a) Validated measurement tool. **
- b) Non-validated measurement tool, but the tool is available or described.*
- c) No description of the measurement tool.

Comparability: (Maximum 2 stars)

1) The subjects in different outcome groups are comparable, based on the study design or analysis. Confounding factors are controlled.
- a) The study controls for the most important factor (select one). *
- b) The study control for any additional factor. *

Outcome: (Maximum 3 stars)

1) Assessment of the outcome:
- a) Independent blind assessment. **
- b) Record linkage. **
- c) Self report. *
- d) No description.

2) Statistical test:
- a) The statistical test used to analyze the data is clearly described and appropriate, and the measurement of the association is presented, including confidence intervals and the probability level (p value). *
- b) The statistical test is not appropriate, not described or incomplete.

This scale has been adapted from the Newcastle-Ottawa Quality Assessment Scale for cohort studies to perform a quality assessment of cross-sectional studies for the systematic review, "Are Healthcare Workers' Intentions to Vaccinate Related to their Knowledge, Beliefs and Attitudes? A Systematic Review".

We have not selected one factor that is the most important for comparability, because the variables are not the same in each study. Thus, the principal factor should be identified for each study.

In our scale, we have specifically assigned one star for self-reported outcomes, because our study measures the intention to vaccinate. Two stars are given to the studies that assess the outcome with independent blind observers or with vaccination records, because these methods measure the practice of vaccination, which is the result of true intention.

ANEXO B - NORMAS PARA PUBLICAÇÃO DA REVISTA "INTERNATIONAL JOURNAL OF PAEDIATRIC DENTISTRY"

The International Journal of Paediatric Dentistry

Author Guidelines

Content of Author Guidelines: 1. General, 2. Ethical Guidelines, 3. Manuscript Submission Procedure, 4. Manuscript Types Accepted, 5. Manuscript Format and Structure, 6. After Acceptance.

Relevant Documents: Sample Manuscript

Useful Websites: Submission Site, Articles published in *International Journal of Paediatric Dentistry*, Author Services, Wiley-Blackwell's Ethical Guidelines, Guidelines for Figures.

CrossCheck
The journal to which you are submitting your manuscript employs a plagiarism detection system. By submitting your manuscript to this journal you accept that your manuscript may be screened for plagiarism against previously published works.

1. GENERAL

International Journal of Paediatric Dentistry publishes papers on all aspects of paediatric dentistry including: growth and development, behaviour management, prevention, restorative treatment and issue relating to medically compromised children or those with disabilities. This peer-reviewed journal features scientific articles, reviews, clinical techniques, brief clinical reports, short communications and abstracts of current paediatric dental research. Analytical studies with a scientific novelty value are preferred to descriptive studies.

Please read the instructions below carefully for details on the submission of manuscripts, the journal's requirements and standards as well as information concerning the procedure after acceptance of a manuscript for publication in *International Journal of Paediatric Dentistry*. Authors are encouraged to visit Wiley-Blackwell Author Services for further information on the preparation and submission of articles and figures.

In June 2007, the Editors gave a presentation on How to write a successful paper for the *International Journal of Paediatric Dentistry*.

2. ETHICAL GUIDELINES

Submission is considered on the conditions that papers are previously unpublished, and are not offered simultaneously elsewhere; that authors have read and approved the content, and all authors have also declared all competing interests; and that the work complies with the Ethical Policies of the Journal and has been conducted under internationally accepted ethical standards after relevant ethical review.

3. CONFLICT OF INTEREST AND SOURCE FUNDING
Journal of Oral Rehabilitation requires that all authors (both the corresponding author and co-authors) disclose any potential sources of conflict of interest. Any interest or relationship, financial or otherwise that might be perceived as influencing an author's objectivity is considered a potential source of conflict of interest. These must be disclosed when directly relevant or indirectly related to the work that the authors describe in their manuscript. Potential sources of conflict of interest include but are not limited to patent or stock ownership, membership of a company board of directors, membership of an advisory board or committee for a company, and consultancy for or receipt of speaker's fees from a company. If authors are unsure whether a past or present affiliation or relationship should be disclosed in the manuscript, please contact the editorial office at IJPDedoffice@wiley.com. The exis-

tence of a conflict of interest does not preclude publication in this journal.

The above policies are in accordance with the Uniform Requirements for Manuscripts Submitted to Biomedical Journals produced by the International Committee of Medical Journal Editors (http://www.icmje.org/). It is the responsibility of the corresponding author to have all authors of a manuscript fill out a conflict of interest disclosure form, and to upload all forms together with the manuscript on submission. The disclosure statement should be included under Acknowledgements. Please find the form below:

Conflict of Interest Disclosure Form

4. MANUSCRIPT SUBMISSION PROCEDURE

Articles for the *International Journal of Paediatric Dentistry* should be submitted electronically via an online submission site. Full instructions and support are available on the site and a user ID and password can be obtained on the first visit. Support is available by phone (+1 434 817 2040 ext. 167) or here. If you cannot submit online, please contact Daricel Borja in the Editorial Office by e-mail IJPDedoffice@wiley.com.

4.1. Getting Started

Launch your web browser (supported browsers include Internet Explorer 5.5 or higher, Safari 1.2.4, or Firefox 1.0.4 or higher) and go to the journal's online submission site: http://mc.manuscriptcentral.com/ijpd
*Log-in or, if you are a new user, click on 'register here'.
*If you are registering as a new user.
- After clicking on 'Create Account', enter your name and e-mail information and click 'Next'. Your e-mail information is very important.
- Enter your institution and address information as appropriate, and then click 'Next.'
- Enter a user ID and password of your choice (we recommend using your e-mail address as your user ID), and then select your area of expertise. Click 'Finish'.
*If you are already registered, but have forgotten your log in details, enter your e-mail address under 'Password Help'. The system will send you an automatic user ID and a new temporary password.
*Log-in and select 'Author Center'.

4.2. Submitting Your Manuscript

After you have logged into your 'Author Center', submit your manuscript by clicking on the submission link under 'Author Resources'.
* Enter data and answer questions as appropriate.
* You may copy and paste directly from your manuscript and you may upload your pre-prepared covering letter.
Please note that a separate *Title Page* must be submitted as part of the submission process as 'Title Page' and should contain the following:

• Word count (excluding tables)
• Authors' names, professional and academic qualifications, positions and places of work. They must all have actively contributed to the overall design and execution of the study/paper and should be listed in order of importance of their contribution
• Corresponding author address, and telephone and fax numbers and email address

*Click the 'Next' button on each screen to save your work and advance to the next screen.
*You are required to upload your files.
- Click on the 'Browse' button and locate the file on your computer.
- Select the designation of each file in the drop down next to the Browse button.
- When you have selected all files you wish to upload, click the 'Upload Files' button.
* Review your submission (in HTML and PDF format) before completing your submission by sending it to the Journal. Click the 'Submit' button when you are finished reviewing.

4.3. Manuscript Files Accepted
Manuscripts should be uploaded as Word (.doc) or Rich Text Format (.rtf) files (not write-protected) plus separate figure files. GIF, JPEG, PICT or Bitmap files are acceptable for submission, but only high-resolution TIF or EPS files are suitable for printing. The files will be automatically converted to HTML and a PDF document on upload and will be used for the review process. The text file must contain the entire manuscript including title page, abstract, text, references, tables, and figure legends, but no embedded figures. In the text, please reference figures as for instance 'Figure 1', 'Figure 2' to match the tag name you choose for the individual figure files uploaded. Manuscripts should be formatted as described in the Author Guidelines below. Please note that any manuscripts uploaded as Word 2007 (.docx) is now accepted by IPD. As such manuscripts can be submitted in both .doc and .docx file types.

4.4. Review Process
The review process is entirely electronic-based and therefore facilitates faster reviewing of manuscripts. Manuscripts will be reviewed by experts in the field (generally two reviewers), and the Editor-in-Chief makes a final decision. aims to forward reviewers´ comments and to inform the corresponding author of the result of the review process. Manuscripts will be considered for 'fast-track publication' under special circumstances after consultation with the Editor-in-Chief.

4.5. Suggest a Reviewer
International Journal of Paediatric Dentistry attempts to keep the review process as short as possible to enable rapid publication of new scientific data. In order to facilitate this process, please suggest the names and current email addresses of a potential international reviewer whom you consider capable of reviewing your manuscript and their area of expertise. In addition to your choice the journal editor will choose one or two reviewers as well.

4.6. Suspension of Submission Mid-way in the Submission Process
You may suspend a submission at any phase before clicking the 'Submit' button and save it to submit later. The manuscript can then be located under 'Unsubmitted Manuscripts' and you can click on 'Continue Submission' to continue your submission when you choose to.

4.7. E-mail Confirmation of Submission
After submission you will receive an e-mail to confirm receipt of your manuscript. If you do not receive the confirmation e-mail after 24 hours, please check your e-mail address carefully in the system. If the e-mail address is correct please contact your IT department. The error may be caused by some sort of spam filtering on your e-mail server. Also, the e-mails should be received if the IT department adds our e-mail server (uranus.scholarone.com) to their whitelist.

4.8. Manuscript Status
You can access ScholarOne Manuscripts any time to check your 'Author Center' for the status of your manuscript. The Journal will inform you by e-mail once a decision has been made.

4.9. Submission of Revised Manuscripts
Revised manuscripts must be uploaded within 2 months of authors being notified of conditional acceptance pending satisfactory revision. Locate your manuscript under 'Manuscripts with Decisions' and click on 'Submit a Revision' to submit your revised manuscript. Please remember to delete any old files uploaded when you upload your revised manuscript. All revisions must be accompanied by a cover letter to the editor. The letter must a) detail on a point-by-point basis the author's response to each of the referee's comments, and b) a revised manuscript highlighting exactly what has been changed in the manuscript after revision.

4.10 Online Open
OnlineOpen is available to authors of primary research articles who wish to make their article available to non-subscribers on publication, or whose funding agency requires grantees to archive the final version of their article.

With OnlineOpen, the author, the author's funding agency, or the author's institution pays a fee to ensure that the article is made available to non-subscribers upon publication via Wiley Online Library, as well as deposited in the funding agency's preferred archive.

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Prior to acceptance there is no requirement to inform an Editorial Office that you intend to publish your paper OnlineOpen if you do not wish to. All OnlineOpen articles are treated in the same way as any other article. They go through the journal's standard peer-review process and will be accepted or rejected based on their own merit.

5. MANUSCRIPT TYPES ACCEPTED

Original Articles: Divided into: Summary, Introduction, Material and methods, Results, Discussion, Bullet points, Acknowledgements, References, Figure legends, Tables and Figures arranged in this order. The summary should be structured using the following subheadings: Background, Hypothesis or Aim, Design, Results, and Conclusions and should be less than 200 words. A brief description, in bullet form, should be included at the end of the paper and should describe Why this paper is important to paediatric dentists.

Review Articles: may be invited by the Editor.

Short Communications: should contain important, new, definitive information of sufficient significance to warrant publication. They should not be divided into different parts and summaries are not required.

Clinical Techniques: This type of publication is best suited to describe significant improvements in clinical practice such as introduction of new technology or practical approaches to recognised clinical challenges.

Brief Clinical Reports/Case Reports: Short papers not exceeding 800 words, including a maximum of three illustrations and five references may be accepted for publication if they serve to promote communication between clinicians and researchers. If the paper describes a genetic disorder, the OMIM unique six-digit number should be provided for online cross reference (Online Mendelian Inheritance in Man).

A paper submitted as a Brief Clinical/Case Report should include the following:

- a short **Introduction** (avoid lengthy reviews of literature);
- the **Case report** itself (a brief description of the patient/s, presenting condition, any special investigations and outcomes);
- a **Discussion** which should highlight specific aspects of the case(s), explain/interpret the main findings and provide a scientific appraisal of any previously reported work in the field.
- Please provide up to 3 bullet points for your manuscript under the heading: 1. Why this clinical report is important to paediatric dentists. Bullet points should be added to the end of your manuscript, before the references.

Letters to the Editor: Should be sent directly to the editor for consideration in the journal.

6. MANUSCRIPT FORMAT AND STRUCTURE

6.1. Format

Language: The language of publication is English. UK and US spelling are both acceptable but the spelling must be consistent within the manuscript. The journal's preferred choice is UK spelling. Authors for whom English is a

second language must have their manuscript professionally edited by an English speaking person before submission to make sure the English is of high quality. It is preferred that manuscript is professionally edited. A list of independent suppliers of editing services can be found at http://authorservices.wiley.com/bauthor/english_language.asp. All services are paid for and arranged by the author, and use of one of these services does not guarantee acceptance or preference for publication

6.2. Structure

The whole manuscript should be double-spaced, paginated, and submitted in correct English. The beginning of each paragraph should be properly marked with an indent.

Original Articles (Research Articles): should normally be divided into: Summary, Introduction, Material and methods, Results, Discussion, Bullet points, Acknowledgements, References, Figure legends, Tables and Figures arranged in this order.

Please include a statement of author contributions, e.g. Author contributions: A.S. and K.J. conceived the ideas; K.J. and R.L.M. collected the data; R.L.M. and P.A.K. analysed the data; and A.S. and K.J. led the writing.

Summary should be structured using the following subheadings: Background, Hypothesis or Aim, Design, Results, and Conclusions.

Introduction should be brief and end with a statement of the aim of the study or hypotheses tested. Describe and cite only the most relevant earlier studies. Avoid presentation of an extensive review of the field.

Material and methods should be clearly described and provide enough detail so that the observations can be critically evaluated and, if necessary repeated. Use section subheadings in a logical order to title each category or method. Use this order also in the results section. Authors should have considered the ethical aspects of their research and should ensure that the project was approved by an appropriate ethical committee, which should be stated. Type of statistical analysis must be described clearly and carefully.

(i) Experimental Subjects: Experimentation involving human subjects will only be published if such research has been conducted in full accordance with ethical principles, including the World Medical Association Declaration of Helsinki (version 2008) and the additional requirements, if any, of the country where the research has been carried out. Manuscripts must be accompanied by a statement that the experiments were undertaken with the understanding and written consent of each subject and according to the above mentioned principles. A statement regarding the fact that the study has been independently reviewed and approved by an ethical board should also be included. Editors reserve the right to reject papers if there are doubts as to whether appropriate procedures have been used.

(ii) Clinical trials should be reported using the CONSORT guidelines available at www.consort-statement.org. A CONSORT checklist should also be included in the submission material.
International Journal of Paediatric Dentistry encourages authors submitting manuscripts reporting from a clinical trial to register the trials in any of the following free, public clinical trials registries: www.clinicaltrials.gov, http://clinicaltrials.ifpma.org/clinicaltrials/, http://isrctn.org/. The clinical trial registration number and name of the trial register will then be published with the paper.

***(iii)DNA Sequences and Crystallographic Structure Determinations*:** Papers reporting protein or DNA sequences and crystallographic structure determinations will not be accepted without a Genbank or Brookhaven accession number, respectively. Other supporting data sets must be made available on the publication date from the authors directly.

Results should clearly and concisely report the findings, and division using subheadings is encouraged. Double

documentation of data in text, tables or figures is not acceptable. Tables and figures should not include data that can be given in the text in one or two sentences.

Discussion section presents the interpretation of the findings. This is the only proper section for subjective comments and reference to previous literature. Avoid repetition of results, do not use subheadings or reference to tables in the results section.

Bullet Points should include one heading:
*Why this paper is important to paediatric dentists.
Please provide maximum 3 bullets per heading.

Review Articles: may be invited by the Editor. Review articles for the *International Journal of Paediatric Dentistry* should include: a) description of search strategy of relevant literature (search terms and databases), b) inclusion criteria (language, type of studies i.e. randomized controlled trial or other, duration of studies and chosen endpoints, c) evaluation of papers and level of evidence. For examples see:
Twetman S, Axelsson S, Dahlgren H et al. Caries-preventive effect of fluoride toothpaste: a systematic review. Acta Odontologica Scandivaica 2003; 61: 347-355.
Paulsson L, Bondemark L, Söderfeldt B. A systematic review of the consequences of premature birth on palatal morphology, dental occlusion, tooth-crown dimensions, and tooth maturity and eruption. Angle Orthodontist 2004; 74: 269-279.

Clinical Techniques: This type of publication is best suited to describe significant improvements in clinical practice such as introduction of new technology or practical approaches to recognised clinical challenges. They should conform to highest scientific and clinical practice standards.

Short Communications: Brief scientific articles or short case reports may be submitted, which should be no longer than three pages of double spaced text, and include a maximum of three ilustrations. They should contain important, new, definitive information of sufficient significance to warrant publication. They should not be divided into different parts and summaries are not required.

Acknowledgements: Under acknowledgements please specify contributors to the article other than the authors accredited. Please also include specifications of the source of funding for the study and any potential conflict of interests if appropriate. Suppliers of materials should be named and their location (town, state/county, country) included.

Supplementary data
Supporting material that is too lengthy for inclusion in the full text of the manuscript, but would nevertheless benefit the reader, can be made available by the publisher as online-only content, linked to the online manuscript. The material should not be essential to understanding the conclusions of the paper, but should contain data that is additional or complementary and directly relevant to the article content. Such information might include the study protocols, more detailed methods, extended data sets/data analysis, or additional figures (including). All material to be considered as supplementary data must be uploaded as such with the manuscript for peer review. It cannot be altered or replaced after the paper has been accepted for publication. Please indicate clearly the material intended as Supplementary Data upon submission. Also ensure that the Supplementary Data is referred to in the main manuscript. Please label these supplementary figures/tables as S1, S2, S3, etc.

Full details on how to submit supporting information, can be found at http://authorservices.wiley.com/bauthor/suppinfo.asp

6.3. References
A maximum of 30 references should be numbered consecutively in the order in which they appear in the text (Van-

couver System). They should be identified in the text by superscripted Arabic numbers and listed at the end of the paper in numerical order. Identify references in text, tables and legends. Check and ensure that all listed references are cited in the text. Non-refereed material and, if possible, non-English publications should be avoided. Congress abstracts, unaccepted papers, unpublished observations, and personal communications may not be placed in the reference list. References to unpublished findings and to personal communication (provided that explicit consent has been given by the sources) may be inserted in parenthesis in the text. Journal and book references should be set out as in the following examples:

1. Kronfol NM. Perspectives on the health care system of the United Arab Emirates. East Mediter Health J. 1999; 5: 149-167.
2. Ministry of Health, Department of Planning. Annual Statistical Report. Abu Dhabi: Ministry of Health, 2001.
3. Al-Mughery AS, Attwood D, Blinkhorn A. Dental health of 5-year-old children in Abu Dhabi, United Arab Emirates. Community Dent Oral Epidemiol 1991; 19: 308-309.
4. Al-Hosani E, Rugg-Gunn A. Combination of low parental educational attainment and high parental income related to high caries experience in preschool children in Abu Dhabi. Community Dent Oral Epidemiol 1998; 26: 31-36.

If more than 6 authors please, cite the three first and then et al. When citing a web site, list the authors and title if known, then the URL and the date it was accessed (in parenthesis). Include among the references papers accepted but not yet published; designate the journal and add (in press). Please ensure that all journal titles are given in abbreviated form.

We recommend the use of a tool such as Reference Manager for reference management and formatting. Reference Manager reference styles can be searched for here: www.refman.com/support/rmstyles.asp.

6.4. Illustrations and Tables

Tables: should be numbered consecutively with Arabic numerals and should have an explanatory title. Each table should be typed on a separate page with regard to the proportion of the printed column/page and contain only horizontal lines

Figures and illustrations: All figures should be submitted electronically with the manuscript via ScholarOne Manuscripts (formerly known as Manuscript Central). Each figure should have a legend and all legends should be typed together on a separate sheet and numbered accordingly with Arabic numerals. Avoid 3-D bar charts.

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18-Jun-2018

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