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**Crianças e adolescentes com transtornos do neurodesenvolvimento e a evidência científica em odontologia: uma coletânea de revisões**

Florianópolis

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Orientador: Profa. Michele da Silva Bolan, Dr<sup>a</sup>.

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Pedro Vitali Kammer

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O presente trabalho em nível de mestrado foi avaliado e aprovado por banca examinadora composta pelos seguintes membros:

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Certificamos que esta é a **versão original e final** do trabalho de conclusão que foi julgado adequado para obtenção do título de mestre em Clínicas Odontológicas.

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Orientador(a)

Florianópolis, 2022.



Este trabalho é dedicado aos meus pais.

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## RESUMO

A Odontologia para pacientes com necessidades especiais é uma área ampla e que abrange indivíduos com qualquer condição limitante, seja ela emocional, comportamental, cognitiva, de desenvolvimento, mental ou física. Evidências indicam que crianças e adultos sem deficiência experienciam as mesmas condições bucais que seus pares não deficientes, embora pessoas com deficiência tenham desfechos piores. Dessa forma, o objetivo deste trabalho foi conduzir uma série de revisões relacionadas a crianças e adolescentes com transtornos do neurodesenvolvimento (TN) e a evidência disponível na Odontologia. Primeiramente, uma revisão bibliométrica (RB) foi conduzida para elaborar um levantamento dos 100 artigos mais citados referentes a crianças e adolescente com TN na odontologia. Posteriormente, uma revisão sistemática (RS) sobre a prevalência de bruxismo/ranger dos dentes nesse grupo de pacientes foi realizada. Por fim, uma revisão de escopo (RE) com a finalidade de mapear a literatura sobre qualidade de vida relacionada a saúde bucal foi elaborada. Em relação a RB, a maioria dos estudos incluídos foram observacionais, focando na epidemiologia de condições bucais e referente a pessoas com síndrome de Down e transtorno do espectro do Autismo. O número de citações variou de 30 a 106 por estudo. Em relação a RS, 77 estudos foram incluídos e a prevalência de bruxismo oscilou de acordo com a deficiência e os resultados apresentaram alta heterogeneidade. Por último, dos 15 estudos incluídos na RE, oito foram do Brasil, sobre pessoas com Paralisia Cerebral e utilizaram o P-CPQ para avaliação da qualidade de vida relacionada a saúde bucal. Os resultados desses trabalhos não são importantes somente com desenvolvimento científico e clínico, mas também para garantir uma odontologia inclusiva e baseada em evidências para os paciente, garantindo aos cirurgiões—dentistas acesso a diferentes artigos que sintetizam a vasta literatura disponível atualmente.

**Palavras-chave:** Assistência Odontológica para Pessoas com Deficiências. Odontologia Baseada em Evidências. Assistência Odontológica para Crianças.

## ABSTRACT

Dentistry for patients with special needs is a broad area that encompasses individuals with any limiting condition, be it emotional, behavioral, cognitive, developmental, mental or physical that requires medical treatment. Evidence indicates that children and adults without disabilities experience the same oral conditions as their non-disabled peers, although people with disabilities have worse outcomes. Thus, the objective of this work was to conduct a series of reviews related to children and adolescents with neurodevelopmental disorders (ND) and dentistry. First, a bibliometric review (BR) was conducted to create a survey of the 100 most cited articles referring to children and adolescents with ND in dentistry. Subsequently, a systematic review (SR) on the prevalence of bruxism/teeth grinding in this group of patients was performed. Finally, a scoping review (ScR) with the purpose of mapping the literature on quality of life related to oral health was elaborated. Regarding BR, most of the studies included were observational, focusing on the epidemiology of oral conditions and referring to people with Down syndrome and Autism Spectrum Disorder. The number of citations ranged from 30 to 106 per study. Regarding the SR, 77 studies were included and the prevalence of bruxism varied according to the disability and the results showed high heterogeneity. Finally, of the 15 studies included, eight were from Brazil, about people with Cerebral Palsy and used the P-CPQ to assess the quality of life related to oral health in the ScR. The results of these works are not only important for scientific and clinical development, but also for ensuring an inclusive and evidence-based dentistry for patients, guaranteeing dentists access to different articles that synthesize the vast literature currently available.

**Keywords:** Dental Care for Disabled. Evidence-Based Dentistry. Dental Care for Children.

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## **LISTA DE ABREVIATURAS E SIGLAS**

AAPD American Academy of Pediatric Dentistry

BS Bruxismo do sono

BV Bruxismo em vigília

RS Revisões sistemáticas

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## 1 INTRODUÇÃO

Deficiências do neurodesenvolvimento são um grupo de condições que ocorrem durante o período de desenvolvimento e comprometem a aquisição e execução de funções específicas intelectuais, motoras e sociais (BOULET; BOYLE; SCHIEVE, 2009). As condições mais comuns são o transtorno do déficit de atenção com hiperatividade, transtorno do espectro autista e outras condições associadas a deficiências intelectuais (ZABLOTSKY; BLACK; MAENNER; SCHIEVE et al., 2019). Uma em cada seis crianças entre 3 e 17 anos são afetadas por essas condições nos Estados Unidos. Além disso, houve um aumento de 16,2% para 17,8% na prevalência de deficiências do desenvolvimento em crianças entre os anos de 2009-2011 e 2015-2017 (ZABLOTSKY; BLACK; MAENNER; SCHIEVE et al., 2019).

De acordo com a American Academy of Pediatric Dentistry (AAPD), a odontologia para pacientes com necessidades especiais é uma área ampla que abrange indivíduos com qualquer condição emocional limitante, comportamental, cognitiva, de desenvolvimento, mental ou física (AAPD, 2020). Apesar de haver conflito na literatura, evidências apontam que crianças e adultos sem deficiência experienciam as mesmas condições bucais que seus pares não deficientes, embora pessoas com deficiência tenham apresentado desfechos piores (SCAMBLER; CURTIS, 2019). Indivíduos com deficiência apresentam taxas de cárie dentária semelhantes quando comparados com a população sem deficiência, porém, possuem menos chances de tratar a cárie e, quando tratados, esses pacientes experienciam mais extrações do que restaurações (CUMELLA; RANSFORD; LYONS; BURNHAM, 2000). Essa diferença pode sugerir que o problema pode estar na odontologia e não na própria deficiência. Scully et al. descrevem quatro categorias de barreiras que impedem o acesso aos cuidados de saúde bucal em indivíduos com deficiência: individual, odontológica, social e barreiras governamentais (SCULLY; DIOS; KUMAR, 2006). Pessoas com deficiência representam um grupo importante e crescente no mundo, com quase um bilhão de adultos convivendo com algum tipo de deficiência (ORGANISATION., 2004; ORGANIZATION, 2008), é necessário prevenir e combater as desigualdades no acesso à saúde.

Baseado nisso, realizar uma investigação da literatura sobre um determinado tema pode auxiliar a encontrar lacunas que possam auxiliar no desenvolvimento de novas pesquisas e intervenções para melhorar o acesso à saúde desses indivíduos. Para isso,

pesquisadores podem realizar uma análise por meio da bibliometria. A análise bibliométrica usa dados quantitativos (número de citações, o grupo de pesquisadores, uma área específica e instituições) para avaliar os parâmetros acadêmicos. Esses dados podem ser utilizados pela comunidade científica para avaliar quais periódicos, artigos e autores podem ser mais úteis e proeminentes na busca em bases de dados (CHOUDHRI; SIDDIQUI; KHAN; COHEN, 2015). Além disso, estudos bibliométricos podem auxiliar na identificação de lacunas de pesquisa e auxiliar no direcionamento de futuras pesquisas.

Recentemente, pesquisas que avaliam condições e doenças orais em pacientes com deficiência vem ganhando destaque na literatura. Em específico, estudos que avaliam o bruxismo em crianças e adolescentes com transtornos do neurodesenvolvimento. De acordo com a mais recente proposta de consenso internacional, o bruxismo é um comportamento da atividade da musculatura mastigatória que é classificado dependendo de sua manifestação circadiana, em bruxismo do sono (BS) ou bruxismo em vigília (BV) (LOBBEZOO; AHLBERG; RAPHAEL; WETSELAAR et al., 2018). É importante ressaltar que, independentemente da manifestação circadiana, o bruxismo não é caracterizado como uma desordem em indivíduos considerados saudáveis, mas sim, como um comportamento que pode atuar como um fator de risco ou de proteção dependendo do desfecho clínico (LOBBEZOO; AHLBERG; RAPHAEL; WETSELAAR et al., 2018).

O BV é definido como a atividade da musculatura mastigatória enquanto o indivíduo está acordado, sendo caracterizado pelo contato dental repetitivo ou prologado e/ou pelo “forçamento” da mandíbula em determinada posição ou movimento (LOBBEZOO; AHLBERG; RAPHAEL; WETSELAAR et al., 2018). A definição de BS é similar, porém, a atividade da musculatura mastigatória ocorre durante o sono, sendo essa caracterizada em rítmica ou não-rítmica (LOBBEZOO; AHLBERG; RAPHAEL; WETSELAAR et al., 2018).

Devido à diversidade de métodos utilizados para a avaliação do bruxismo, um sistema de gradação foi proposto. Casos de bruxismo baseados apenas em relato de pacientes são definidos como possível BS/BV. Casos nos quais a avaliação é baseada em exame clínico, com ou sem o relato do paciente, são definidos como provável BS/BV. Por último, casos que são avaliados com instrumentos, como a polissonografia, independentemente do relato do paciente e/ou realização de exame clínico, são classificados como BS/BV definitivos (LOBBEZOO; AHLBERG; RAPHAEL; WETSELAAR et al., 2018).

Em revisões sistemáticas (RS) que avaliaram a prevalência de bruxismo em adultos, as taxas variaram de 1,1% a 15,3% para BS e 22,1% a 31% para BV (MANFREDINI; RESTREPO; DIAZ-SERRANO; WINOCUR et al., 2013). Em crianças e adolescentes a prevalência foi consideravelmente maior, variando de 3,5% a 49,6%, de acordo com duas RS que avaliaram a prevalência do BS (MACHADO; DAL-FABBRO; CUNALI; KAIZER, 2014; MANFREDINI; WINOCUR; GUARDA-NARDINI; PAESANI et al., 2013). É proposto na literatura que a prevalência do bruxismo tende a diminuir com a idade, e, conseqüentemente, uma maior ocorrência em populações pediátricas é esperada (MACHADO; DAL-FABBRO; CUNALI; KAIZER, 2014; MANFREDINI; WINOCUR; GUARDA-NARDINI; PAESANI et al., 2013). Por ser mais frequente em crianças, o acompanhamento de indivíduos com bruxismo é de extrema importância, uma vez que esse período é marcado pelo crescimento e desenvolvimento do corpo (GUO; WANG; LI; MA et al., 2017).

É importante ressaltar que não existe até o momento um consenso sobre a etiologia do bruxismo, porém, acredita-se que sua origem seja multifatorial, compreendendo fatores exógenos, psicossociais e fisiológicos (LAVIGNE; KHOURY; ABE; YAMAGUCHI et al., 2008). Além disso, apesar da evidência limitada, é proposto que diferentes fatores influenciem o desenvolvimento do bruxismo de acordo com a manifestação circadiana, sendo o BV influenciado por aspectos psicológicos e o BS devido a ativação do sistema nervoso central ou autônomo (LAVIGNE; KHOURY; ABE; YAMAGUCHI et al., 2008; MANFREDINI; LOBBEZOO, 2009). Em relação aos fatores de risco para o bruxismo, diversas RS foram conduzidas (MELO; DUARTE; PAULETTO; PORPORATTI et al., 2019), dentre elas, Guo e colaboradores reportaram que respiração bucal, ronco, tempo de sono inadequado, hipersalivação e posição do estômago durante o sono são fatores de risco para o bruxismo em crianças (GUO; WANG; LI; MA et al., 2017).

Apesar de dados limitados, a prevalência do bruxismo parece ser mais elevada em indivíduos com deficiências quando comparados a população em geral, especialmente em indivíduos com síndrome de Down, com transtorno do espectro do autismo ou deficiência intelectual severa. Vale ressaltar que diversos tratamentos para o controle do bruxismo em indivíduos com deficiência existem na literatura, porém a evidência disponível é insuficiente para comprovar a efetividade das intervenções avaliadas (LANG; WHITE; MACHALICEK; RISPOLI et al., 2009).

No que tange particularmente a prevalência de bruxismo em populações com deficiência do neurodesenvolvimento, estudos têm demonstrado taxas variáveis. Em uma amostra de crianças brasileiras com paralisia cerebral, a prevalência de bruxismo observada foi de 69,4% (PERES; RIBEIRO; JULIANO; CÉSAR et al., 2007). Já em crianças com síndrome de Down, a prevalência foi de 42% (LÓPEZ-PÉREZ; LÓPEZ-MORALES; BORGES-YÁÑEZ; MAUPOMÉ et al., 2007). Um estudo indicou que a prevalência de BS foi similar entre crianças com e sem deficiência intelectual (síndrome de Down e paralisia cerebral), sendo de aproximadamente 24% (MIAMOTO; PEREIRA; RAMOS-JORGE; MARQUES, 2011). Em uma RS que avaliou a saúde oral de crianças com transtorno do espectro do autismo, foram encontrados resultados inconclusivos em relação à diferença entre a prevalência de bruxismo em crianças com e sem o transtorno do espectro (LAM; DU; PENG; MCGRATH et al., 2020).

Estudos que avaliam a prevalência de determinadas condições identificam o número de indivíduos com a doença em um único período. Esses estudos são essenciais para tomadores de decisões, entidades públicas e profissionais da saúde terem uma medida da ocorrência de determinada condição em uma população. Além disso, esses dados podem ser acessados por sistemas de saúde, auxiliando o desenvolvimento de um planejamento adequado para garantir recursos suficientes para o manejo dessas condições (MUNN; MOOLA; RIITANO; LISY, 2014).

Devido à vasta e heterogênea literatura, por vezes torna-se inviável uma análise compreensiva por parte de clínicos e agências governamentais. Nesse contexto, RS são um recurso valioso, uma vez que esse tipo de estudo tem a função de sumarizar e avaliar criticamente o corpo da evidência disponível para determinado tópico, facilitando, portanto, o acesso à informação de qualidade por entidades governamentais e profissionais da saúde (MUNN; MOOLA; RIITANO; LISY, 2014).

A construção de conhecimento científico foi pautada, durante muitos anos, principalmente na perspectiva de encontrar respostas para o clínico, como desenvolvimento de materiais e intervenções para tratamentos. Contudo, com a popularização de conceitos da saúde baseada em evidências e o reconhecimento da importância de desfechos centrados nos pacientes, esse paradigma vem sendo alterado. Um exemplo disso é a avaliação da qualidade de vida relacionada a saúde bucal, um desfecho que busca avaliar o impacto da saúde oral, ou de intervenções odontológicas, no cotidiano do paciente.

Desde 1995, a Organização Mundial de Saúde definiu a qualidade de vida como a percepção dos indivíduos sobre suas posições na vida no contexto da cultura e valores do sistema que estão inseridos. A qualidade de vida relacionada a saúde bucal, por sua vez, refere-se ao papel que doenças e condições da cavidade oral exercem na qualidade de vida do indivíduo, considerando aspectos subjetivos como bem-estar socioemocional, bem-estar funcional e sintomatologia oral (BRODER; WILSON-GENDERSON; SISCHO; NORMAN, 2014).

Diversos estudos avaliaram e sintetizaram a evidência disponível sobre o impacto geral e de condições específicas (como bruxismo e cárie) na qualidade de vida relacionada a saúde bucal de crianças (ABANTO; CARVALHO; BÖNECKER; ORTEGA et al., 2012; AKHTER; HASSAN; MARTIN; MUHIT et al., 2019; CANCIO; FAKER; BENDO; PAIVA et al., 2018; CARDOSO; DE MEDEIROS; GOMES; MARTINS et al., 2018; DA SL ALVARENGA; SILVA; DA SILVA; DE ARAUJO et al., 2020; DE ALMEIDA; FERNANDES; ANDRADE; ALMEIDA et al., 2021; MALTA; GUERREIRO; DORNELLES; MARQUES et al., 2020). Porém, a literatura relacionada a indivíduos com deficiência, apesar de vasta, foi pouco explorada. Diversos estudos que avaliaram crianças com deficiências indicam que a habilidade de comunicação, condições médicas, severidade de cárie e fatores socioeconômicos podem estar relacionados a um impacto negativo da qualidade de vida relacionada a saúde bucal desses indivíduos e suas famílias (BAIJU; PETER; VARGHESE; SIVARAM, 2017; LABARRERE; WOODS; HARDIN; CAMPANA et al., 2011; SISCHO; BRODER, 2011).

Apesar de ser o desfecho centrado no paciente mais importante na pesquisa odontológica, existem diversas preocupações referente a validade das medidas sobre a qualidade de vida relacionada a saúde bucal (KRAGT; WOLVIUS; RAAT; JADDOE et al., 2017). Um dos motivos é a dificuldade do desenvolvimento de medidas para avaliar a qualidade de vida relacionada a saúde bucal de crianças, por conta da habilidade cognitiva desses indivíduos serem imaturas e em constante mudança (BRODER; WILSON-GENDERSON; SISCHO, 2012). Isso acentua a necessidade de avaliar as ferramentas e domínios utilizados por pesquisas que analisam a qualidade de vida relacionada a saúde bucal em crianças e adolescente com deficiência. Por conta disso, mapear a literatura disponível e identificar e avaliar as ferramentas utilizadas pode auxiliar pesquisas futuras e clínicos que buscam avaliar desfechos centrados no paciente.

Dessa forma, o objetivo deste trabalho foi conduzir revisões relacionados a crianças e adolescentes com transtornos do neurodesenvolvimento e a odontologia. A execução desse trabalho é de importância não somente com desenvolvimento científico e clínico, mas também garantir uma visão centrada no paciente, baseada na melhor evidência científica disponível e assegurar que todos os pacientes com deficiência tenham acesso a uma odontologia inclusiva e crítica.

## 1.1 OBJETIVOS

### 1.1.1 Objetivo Geral

O presente trabalho desenvolveu três revisões sobre crianças e adolescentes com transtornos do neurodesenvolvimento e odontologia afim de sintetizar a evidência disponível. Foram conduzidos diferentes tipos de revisões para diferentes perguntas. Os objetivos específicos deste projeto estão divididos de acordo com a pergunta proposta para cada metodologia.

### 1.1.2 Objetivos Específicos

#### *1.1.2.1 Revisão bibliométrica:*

- Investigar os 100 artigos mais citados na área de pacientes com transtornos do neurodesenvolvimento na odontologia;
- Caracterizar o tipo de delineamento de pesquisa, o tipo de deficiência e a área de conhecimento específica da odontologia dos artigos incluídos.

#### *1.1.2.2 Revisão sistemática:*

- Sumarizar e realizar uma avaliação crítica dos estudos publicados que avaliaram a prevalência de bruxismo de sono e bruxismo em vigília em crianças e adolescente com transtornos do neurodesenvolvimento;
- Avaliar a taxa de prevalência do bruxismo em crianças e adolescentes com transtornos do neurodesenvolvimento (ex. Síndrome de Down, Transtorno do Espectro do Autismo, entre outras);
- Classificar a detecção do bruxismo de acordo com o método de avaliação (possível, provável e definitivo).

### *1.1.2.3 Revisão de escopo:*

- Mapear a literatura de estudos que avaliam a qualidade de vida relacionada a saúde bucal de indivíduos com transtorno do espectro do Autismo, Síndrome de Down e Paralisia Cerebral;
- Mapear os questionários utilizados para avaliar a qualidade de vida relacionada a saúde bucal de indivíduos com deficiência;
- Identificar possíveis lacunas para pesquisas que avaliam a qualidade de vida relacionada a saúde bucal em indivíduos com deficiência.

## **2 ARTIGOS**

### **2.1 REVISÃO BIBLIOMÉTRICA**

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## ARTICLE

WILEY

# The 100 most-cited papers in dentistry for individuals with neurodevelopmental disorders: Bibliometric profile of scientific research

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**Abstract**

**Aim:** To conduct a bibliometric analysis of the top 100 most-cited papers in dentistry for individuals with neurodevelopmental disorders.

**Methods and Results:** A search strategy was constructed and conducted at the Web of Science in the category of “Dentistry, Oral Surgery, and Medicine”. The following information was extracted from each paper: title, authorship, year of publication, title of the journal, study subject, study design, age range of sample participants, type of disability, institution, country and continent, number of citations and citation density. Google Scholar and Scopus were used to crosscheck the number of citations of the most-cited papers. The VOSviewer software was used to generate bibliometric network maps. The papers received 4453 citations in Web of Science, ranging from 30 to 106 citations. Most papers were published by the USA (35%), had an observational design (78%) and the main subject was epidemiology (31%). Most studies focused on individuals with Down syndrome (34%) and Autism Spectrum Disorder (18%) and were published in the Journal of Periodontology (10%) and the Pediatric Dentistry Journal (7%).

**Conclusion:** Most of the studies included in this review were characterized as epidemiological studies. Future research should focus on behavior guidance, dental education, and access to dental services.

**KEYWORDS**

Autism Spectrum Disorder, dental care for people with disabilities, dentistry, down syndrome, people with disabilities

## 1 | INTRODUCTION

Special care dentistry (SCD) is a wide area that comprehends individuals with any behavioral, cognitive, developmental, emotional, mental, or physical impairment or limiting condition that demands medical management according to the American Academy of Pedi-

atric Dentistry (AAPD).<sup>1</sup> Evidence shows that children and adults without disabilities experience the same oral conditions that they non-disable peers, although people with disabilities presented poorer outcomes.<sup>2</sup> People with learning disabilities experience similar dental caries rates compared to the general population although they have less chance to treat the decay, and when treated these

patients experienced more extractions than fillings.<sup>3</sup> This difference may suggest that the problem may be in the oral health care and not in the disability itself.

Scully et al. describe four categories of barriers that prevent access to oral health care in individuals with a disability: individual, dental profession, societal and governmental barriers.<sup>4</sup> Moreover, dental care and facial appearance perception of individuals with disabilities need to be evaluated. The authors of a scoping review found no article about how individuals with intellectual disabilities perceived their appearance.<sup>5</sup> This gap in the literature needs to be further explored to improve the quality of life of these individuals. Since people with disabilities represent an important and growing group of individuals in the world, with almost a billion adults living with some type of disability<sup>6,7</sup> it is required that research and education on this topic need to grow and focus on how to prevent and combat inequalities on health access.

The research activity within a particular field can be evaluated through bibliometrics. Bibliometric analysis uses quantitative data (e.g., number of citations, the group of researchers, a specific field, and institutions) to evaluate academic parameters. In addition, these parameters can be used for both clinical and scientific communities to evaluate which journals, papers, and authors that can be most useful and prominent when searching scientific databases.<sup>8</sup> Moreover, bibliometric studies can help assist the identification of research gaps and most discussed topics.

This paper aimed to conduct a bibliometric analysis of the 100 most-cited papers in dentistry for individuals with neurodevelopmental disorders, focusing on the characterization of the type of research conducted, type of disability studied, and the knowledge produced in this field as well as promote insights for future research to aid dental and health professionals and scientists.

## 2 | MATERIAL AND METHODS

An electronic search was carried out on October 21, 2020 at the Web of Science (WoS) using the category “Dentistry, Oral Surgery & Medicine” to retrieve the 100 most-cited papers related to dentistry for individuals with neurodevelopmental disorders. The search strategy (Supporting information 1) contained keywords related to disable persons and specific neurodevelopmental disabilities or developmental anomalies according to the ICD-11 (<https://icd.who.int/en>).

All results were organized by decreasing order of the number of citations according to the WoS Core Collection database (WoS-CC). Two researchers performed the selection of the 100 most-cited papers based on the title and

abstract and reading the full-texts if necessary (Pedro Vitali Kammer and Juliana Moro). If any disagreements arose, a third author was consulted to achieve an agreement (Carla Miranda Santana). In the case of a tie, the position was based on the paper with the highest citation density (mean number of citations received per year). The number of citations was also retrieved from Scopus ([www.scopus.com](http://www.scopus.com)) and Google Scholar (<https://scholar.google.com>) databases for comparisons. Papers that only evaluated birth defects (i.e., patients with cleft palate) were excluded. No restrictions of time of publication, language, and age of participants were applied.

After selection, the full text of the 100 most-cited papers was retrieved and the following information was collected: paper title, authorship, year of publication, title of the journal, study subject, study design, age range of sample participants, type of disability, study language, institution, country and continent (based on the affiliation of the correspondent author), number of citations and citation density (WoS-CC, Scopus and Google Scholar databases). All collected data were cross-checked between the authors (Pedro Vitali Kammer and Juliana Moro) to ensure reliability.

The study subject was classified as periodontics (gingival and periodontal disease), epidemiology, dental care/health services (e.g., access to dental care), orthodontics (e.g., cephalometric analysis and facial features), behavioral management, education (e.g., dental education) and others (studies that only appeared once such as psychology and dental implants).

Study type was classified as observational (cross-sectional, cohort, and case-control studies), review (literature review and systematic reviews), interventional (crossover studies), and qualitative. The age range of participants in the studies was classified as children (0 to 11 years old), adolescents (12 to 18 years old), and adults (+19 years old).

A descriptive analysis of the data was carried out. The Visualization of Similarities viewer software—VOSviewer (Centre for Science and Technology Studies, University of Leiden) was used to generate a bibliometric network map between the name of the authors, keywords, country, and institution. In the co-authorship map, all authors are introduced as a unit and grouped based on the number of papers published together. The keywords map was based on authors' keywords, all authors' keywords were analyzed and compared to the year of publication. Nodes are created and a network of clusters (a cluster is a group of similar nodes) based on the information included in the VOSviewer. Higher occurrences of each unit of analysis generate larger numbers of clusters, and each cluster is represented by a color. The number of studies and citations across the world was exemplified using a world map generated using the MapChart website (<https://mapchart.net/>).



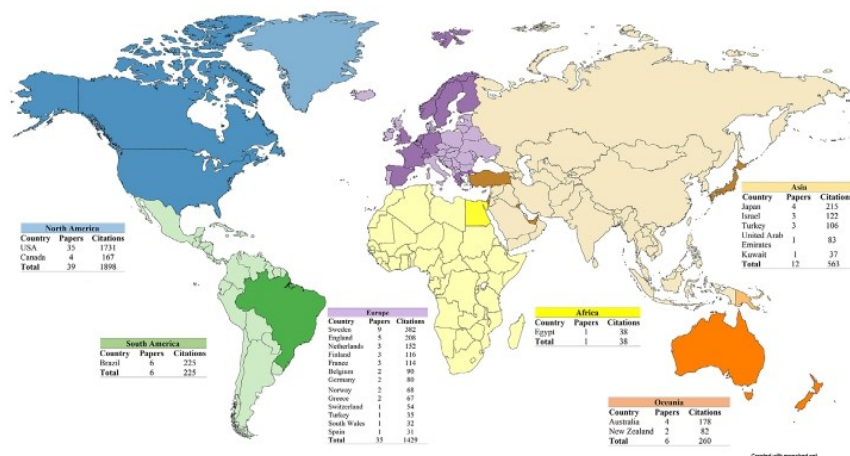


FIGURE 1 Worldwide distribution of the 100 most cited papers in dentistry for individuals with neurodevelopmental disorders

### 3 | RESULTS

Altogether, the 100 most-cited papers received 4453 (mean: 44.53) citations in the WoS-CC, 4807 citations in Scopus, and 10,106 citations in Google Scholar. Papers were published between 1965 and 2017 and most of them were published in 2005, 2008, and 2010. The paper with the highest number of citations was a literature review entitled: "Down syndrome: a review of the literature" published by Desai (1997) in the journal of Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology in 1997 with 106 citations in the WoS-CC. The top three papers with the highest citation density were published in 2017 (Density: 10.00), 2011 (Density: 9.22), and 2011 (Density: 8.89). The full list is available at Supporting information 2.

A total of 294 authors was identified among the papers. Seven authors contributed with three papers each: Atsuo Amano (164 citations), Shigeyuki Hamada (164 citations), Ichijiro Morisaki (164 citations), Barbara Sheller (125 citations), Jennifer Marshall (125 citations), Goran Dahllof (117 citations), and Marita Rohr Inglehart (106 citations). Figure S1 displays a heat map of authors.

All continents had at least one paper in the top 100 list (excluding Antarctica). The countries with the highest number of papers were the USA (35 papers; 1731 citations), Sweden (nine papers; 382 citations), and Brazil (six papers; 225 citations). Altogether, North America and Europe had 74% of 100 most-cited papers. The full list is displayed in Figure 1.

The institutions with most papers were Tufts University, USA (four papers; 283 citations), Karolinska Institute, Sweden (four papers; 190 citations), University of São Paulo, Brazil (four papers; 135 citations), Osaka University, Japan (three papers; 164 citations), and University of Groningen,

Netherlands (three papers; 152 citations). A heat map of the institutions with most papers is displayed in Figure S2. It is visible that most institutions work individually since each node are separately.

A total of 213 authors' keyword was identified. The most frequent keywords were oral health (9), autism (7), down syndrome (6), dental caries (6), children (6), caries (5), dental care for disabled (5), dental education (5), down's syndrome (5) and periodontal disease (5). Figure 2 present a network analysis of the co-occurrence of the keywords across the years showing the switch of patterns throughout the years.

Most papers had an observational design (78%), with epidemiology (31%) and periodontics (20%) as main subjects. Children and adolescents (26%) were the most frequent group of subjects. Most papers were published in the Journal of Periodontology (10%) and the Journal of the American Dental Association (JADA) (7%). Down syndrome was the most studied condition (34 papers; 1575 citations), followed by Autism spectrum disorder (18 papers; 777 citations), studies with mixed disabilities (14 papers; 725 citations), Intellectual and/or developmental disability (seven papers; 306 citations) and Cerebral Palsy (seven papers; 299 citations) (Table 1). All extracted data of the 100 most-cited papers are available in Supporting information 3.

### 4 | DISCUSSION

This study used bibliometric parameters to evaluate the 100 most-cited papers in dentistry for individuals with neurodevelopmental disorders. Our main findings demonstrate that this is a subject with global interest, although it needs to be more explored. The most-cited papers are characterized mainly as epidemiological studies with obser-

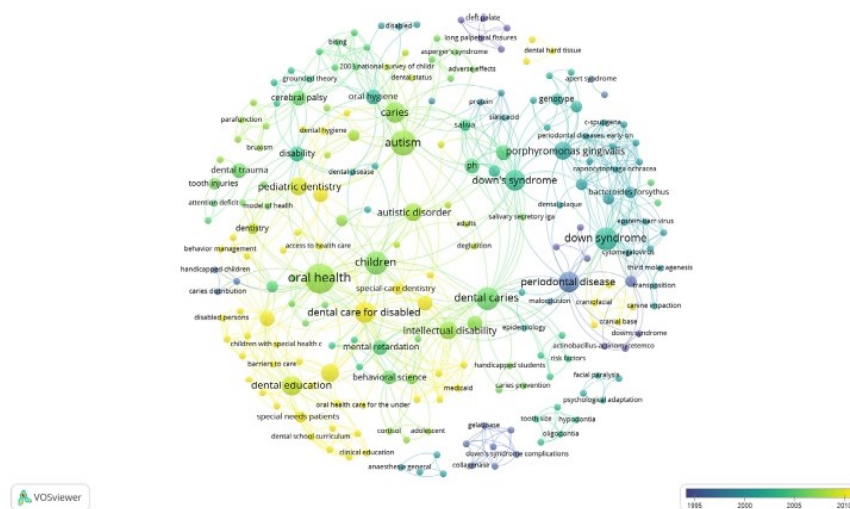


FIGURE 2 Network analysis of authors' keywords according to year of publication

vational design, with most papers focusing on individuals with Down syndrome and Autism Spectrum Disorder. Additionally, it was noted a change in the pattern of research over the years (based on authors' keywords), focusing on health education and access to dental care.

Number of citations and citation density were significantly lower than some bibliometric analysis in other areas of dentistry.<sup>9–12</sup> When bibliometric studies assessed specific fields, the number of citations was more comparable, such as in the 100 most-cited papers in regenerative endodontics (range from 17 to 309 citations in WoS, mean 59.19).<sup>13</sup> This may be explained by the fact that dentistry for individuals with neurodevelopmental disorders is a restricted field and only recently it has been recognized as an academic discipline.<sup>14</sup> The study conducted by Faulks et al.—which appears in the list of most-cited papers—linked the current state of education in the field, and although there is limited documentation, this topic seems to be poorly explored in undergraduate and postgraduate education.<sup>14</sup> In Italy, although students had clinical training for individuals with intellectual disability, most dental students rated the training as inadequate.<sup>15</sup>

The majority of the most-cited papers had an observational design and only a minority had an interventional design. This may indicate an evidence gap in the literature. When analyzing the four studies with an interventional design, it was observed that none was a controlled trial. Therefore, controlled trials are needed to evaluate behavioral management techniques, modified dental interventions for people with disabilities, and other interventions not evaluated in a proper and controlled way. The same low level of evidence was observed in review papers, as only one had a systematic approach, indicating that it may be needed that future research focus in synthesize

the available evidence and evaluate the quality of these papers.

The Journal of Periodontology and the JADA published most papers on the list, while the American Academy of Pediatric Dentistry had more papers published in both of its journals. An interesting finding was that most papers published in the Journal of Periodontology were before the 2000s and focused on Down syndrome patients,<sup>16–20</sup> while the majority of papers published in the JADA were after 2004 and had a wide variety of subjects.<sup>21–26</sup> Moreover, most papers presented data about epidemiology, mainly related to oral health status and prevalence of dental trauma. As for the disability studied, Down syndrome and autism spectrum disorder were the most frequent. Research on Down syndrome was mainly conducted in older years and explored the periodontal status of these patients since they present an early and more severe onset of periodontitis than individuals without systemic involvement.<sup>27,28</sup> While research on Autism Spectrum Disorder is an 'ongoing' theme in scientific literature and this neurodevelopmental disorder may have a growing prevalence across the world.<sup>29</sup>

All continents had at least one paper on the list (excluding Antarctica). This finding differs from most bibliometric reviews<sup>10,11,13</sup> and highlights the value of this thematic at a global level. This demonstrates that research on individuals with neurodevelopmental disorders is not only important scientifically but also in a social perspective. The USA had the greatest number of papers and number of citations, followed by Sweden, Brazil, and Japan. These findings are similar to other bibliometric reviews.<sup>9,11,12</sup> Concerning the institutions and authors with most papers, this information may indicate places that have SCD as a recognized specialty and the existence of postgraduate programs related



**TABLE 1** Study characteristics: Type, subject, age group and publisher

	Number of papers	Citation countWoS-CC (%)
<b>Study type</b>		
Observational	78	3400 (76.35)
Review	14	685 (15.38)
Interventional	3	217 (4.88)
Qualitative	2	68 (1.53)
NR	2	83 (1.86)
<b>Subject</b>		
Epidemiology	31	1347 (30.525)
Periodontics	20	980 (22.01)
Orthodontics	20	908 (20.39)
Behavioral management	9	374 (8.40)
Dental care/Health services	9	417 (9.36)
Education	5	184 (4.13)
Others	5	203 (4.56)
NR	1	40 (0.90)
<b>Age group</b>		
Children and adolescents	26	1126 (25.29)
Children, adolescents and Adults	23	1010 (22.68)
Adults	14	652 (14.64)
Children	7	274 (6.15)
Adolescents	4	163 (3.66)
Adolescents and adults	4	192 (4.31)
NA	13	652 (14.64)
NR	9	384 (8.62)
<b>Top-5 journals</b>		
Journal of Periodontology	10	432 (9.70)
Journal of the American Dental Association	7	376 (8.44)
Pediatric Dentistry	7	312 (7.01)
European Journal of Oral Sciences	5	225 (5.05)
International Journal of Paediatric Dentistry	5	189 (4.24)
<b>Disability</b>		
Down syndrome	34	1575 (35.37)
Autism spectrum disorder	18	777 (17.45)
Mixed disabilities	15	761 (17.09)
Intellectual and/or Developmental disability	7	306 (6.87)
Cerebral Palsy	7	299 (6.71)
ADHD	6	242 (5.43)
Patients with special needs	5	188 (4.22)
Dental students, dentists and professors	3	101 (2.27)

(Continues)

**TABLE 1** (Continued)

	Number of papers	Citation countWoS-CC (%)
Williams syndrome	2	68 (1.53)
Kabuki syndrome	1	54 (1.21)
Moebius syndrome	1	45 (1.01)
Apert syndrome	1	37 (0.83)

Abbreviations: NA, not applicable (review studies); NR, not reported (studies which full text was not available or data was not available).

to this topic. In the study conducted by Faulks et al. in 2012, only Australia, Brazil, New Zealand, and the UK had SCD had some recognized postgraduate programs, while countries such as the USA, Japan, the Netherlands, and Ireland were in the process of recognizing.<sup>14</sup>

It is evident the switch of pattern over the years in research based on authors' keywords. In older papers, keywords are mainly focused on Down syndrome and a network of keywords related to periodontics. In recent years, the research focus changed to subjects related to dental care for disabled people and dental education. In this present study, 9% were about "access to dental care and health services" while 5% focused on "education". This may represent the end of a model of research where people with disabilities were considered the "problem" and were responsible for the lack of access to use dental services.<sup>2</sup> These changes also have an impact in education since professors tend to use an evidence-based approach and thus, they may maintain knowledge and attitudes that could preserve barriers faced by these patients to access dental care.<sup>2</sup>

This study has some limitations. First, information was extracted only in journals in the category of "Dentistry, Oral Surgery & Medicine" in the WoS-CC. This approach may eliminate the identification of prominent articles that focuses on dental care in individuals with neurodevelopmental disability and were published in other journals. Also, different papers could appear in the list of the 100 most-cited papers if other databases were used. Each database has its methods for evaluating and record citation count, although WoS and Scopus retrieve more papers from selected peer-reviewed journals, while Google Scholar includes books, online journals on "non-academic" literature.<sup>30,31</sup> Also, SCD is a broad area that englobes a wide variety of conditions and this bibliometric review focus only on papers that were related to individuals with neurodevelopmental disorders and other developmental conditions.

Although the number of citations does not evaluate the quality of the papers, they represent an important guide to retrieve papers that influenced and continue influencing

the field and could be a good starting point to individuals interesting in reading about the subject.

To the best of our knowledge, this is the first study that evaluated bibliometric parameters on dentistry for people with neurodevelopmental disorders. Analyzing the bibliometric profile of the literature we retrieved papers dates back to 1960s were outdated terminology and concepts were used. This was visible in our results when authors' keywords were analyzed. Additionally, research outcomes were mainly "technical" and not focused on patient-centered outcomes. These findings may indicate that future research should focus on searching for better ways to teach dental students SCD to prevent and combat inequalities in oral health access alongside to ensure inclusivity of people with disabilities in dental research.

## 5 | CONCLUSION

Research focusing on dentistry for people with disability is a subject with global interest and it needs to be further explored. When analyzing the 100 most-cited papers focusing on people with neurodevelopmental disorders most papers had an observational design focusing on epidemiological data, Periodontics, and Orthodontics. Additionally, it was noted a change in the pattern of research over the years based on authors' keywords changing from "periodontics" and "Down syndrome" to keywords focusing on "health education" and "access to dental care". Moreover, few studies had an interventional design, and none was a controlled trial. Also, no systematic review appeared in the most-cited papers. Altogether, these findings may indicate a research gap. Future work should synthesize and evaluate the quality of available evidence, evaluate interventions based on controlled and randomized trials, and conduct evidence-based research to remove barriers and provide equitable access to dental care and education to all people.

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## AUTHOR CONTRIBUTIONS

Pedro Vitali **Kammer** contributed to the acquisition of data; analysis and interpretation of data; drafting the article and revising it critically for important intellectual content; and final approval of the version to be published. Juliana **Moro** contributed to the acquisition of data, drafted the article, and final approval of the version to be published. Paulo Antônio **Martins-Júnior**, Michele

**Bolan**, and Mariane **Cardoso** contributed to the conception and design of the work, revised it critically for important intellectual content, and final approval of the version to be published. Carla Miranda **Santana** contributed to the conception and design of the work; acquisition of data; analysis and interpretation of data; drafting the article and revising it critically for important intellectual content; and final approval of the version to be published.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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#### SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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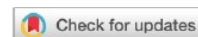
### **2.1.1 Material Suplementar**

O material complementar deste artigo encontra-se disponível como ANEXO A – Estratégia de busca, ANEXO B – Figura complementar 1, ANEXO C – Figura complementar 2 e ANEXO D – Os 100 artigos mais citados.



## 2.2 REVISÃO SISTEMÁTICA

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## REVIEW

JOURNAL OF ORAL  
REHABILITATION

WILEY

# Prevalence of tooth grinding in children and adolescents with neurodevelopmental disorders: A systematic review and meta-analysis

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**Abstract**

**Aim:** To conduct a systematic review and meta-analysis on the prevalence of tooth grinding and/or clenching (TGC) in children and adolescents with a neurodevelopmental disorder or other developmental condition.

**Methods:** A search was performed in seven databases, two sources of grey literature and reference lists of included studies. Risk of bias was assessed using the Joanna Briggs Institute Critical Appraisal Checklist for Studies Reporting Prevalence Data. We used random-effects models with Freeman–Tukey double arcsine transformation for the meta-analyses.

**Results:** After selection, 77 of the 2240 studies met inclusion criteria and were categorised by disability and type of TGC (reported, clinically observed and definitive). The pooled prevalence of reported TGC in individuals with attention-deficit hyperactivity disorder was 57.6% (95% CI [confidence interval]: 49.5–65.6), 50.4% (95% CI: 35.5–65.4) in individuals with autism spectrum disorder, 67% (95% CI: 59.2–74.8) in cerebral palsy and 68.2% (95% CI: 59.8–76.6) in Down syndrome. Pooled prevalence of clinically observed TGC was 57.5% (95% CI: 31.6–83.4) in autism spectrum disorder and 71.9% (95% CI: 52.4–91.4) in cerebral palsy. Individuals with attention-deficit hyperactivity disorder presented 39.8% (95% CI: 24–55.6) of definitive TGC.

**Conclusion:** Prevalence of reported, clinically observed, and definitive TGC varies according to disabilities, although due to high heterogeneity the result should be interpreted with caution. Variations exist mainly due to sampling bias and the use of non-validated methods to assess TGC. CRD42020212640.

## 1 | INTRODUCTION

Bruxism is a jaw-muscle activity characterised by grinding or clenching of the teeth and/or thrusting or bracing of the mandible and can be divided into sleep bruxism and awake bruxism.<sup>1</sup> Etiologically, sleep and awake bruxism have different risk factors although they share biologic, exogenous and psychologic features. Although limited, evidence shows that the central nervous system

is related to sleep bruxism and psychological aspects are involved in the presence of awake bruxism.<sup>2,3</sup> Medications and addictive substances are among exogenous risk factors that can potentially aggravate or attenuate the presence of bruxism.<sup>4,5</sup> Based on this information, grinding or clenching of the teeth and/or thrusting or bracing the mandible in individuals with neurodevelopmental disorders are not considered bruxism since the aetiology and risk factors may differ in neurodivergent individuals. This is relevant

since many studies that investigate tooth grinding in individuals with neurodevelopmental disabilities classify this motor activity as bruxism. As stated in the international consensus of bruxism, the jaw-muscle activity characterised by grinding or clenching of the teeth and /or thrusting or bracing of the mandible is only catheterised as bruxism and not as a sleep or movement disorder in otherwise healthy individuals.<sup>1</sup>

According to the International Statistical Classification of Diseases and Related Health Problems (ICD-11), neurodevelopmental disorders constitute a range of cognitive and behavioural disorders that arise during the developmental period. These disorders involve difficulties in the acquisition and execution of social, motor, language or intellectual functions.<sup>6</sup> Common examples of neurodevelopmental disorders include intellectual disability, autism spectrum disorder (ASD) and attention-deficit hyperactivity disorder (ADHD).<sup>7</sup> Studies involving children and adolescents with disabilities agree that these populations experience more sleep disturbances<sup>8,9</sup> and poorer oral health outcomes than children without disabilities.<sup>10</sup> The evidence is less clear regarding their experience of tooth grinding, specifically. The prevalence of tooth grinding and/or clenching has been found to vary from 69.4% among samples of individuals with cerebral palsy to<sup>11</sup> 42% of children with Down syndrome.<sup>12</sup> Still, other research comparing children with Down syndrome and cerebral palsy to children without disability found a similar prevalence between the groups, around 24%.<sup>13</sup> Hence, the prevalence of tooth grinding and/or clenching in individuals with neurodevelopmental disorders can vary significantly, and there is no consensus whether these individuals present similar rates of tooth grinding and/or clenching compared to their non-disabled peers.

Although many studies evaluated the oral health status of children and adolescents with disabilities, to the best of our knowledge, no systematic review was published evaluating and summarising the prevalence of tooth grinding and/or clenching in children and adolescents with neurodevelopmental and/or other developmental anomalies. Moreover, the knowledge of an accurate measure of the prevalence of tooth grinding and/or clenching may assist policymakers and health professionals in planning public health initiatives, management of health services, evaluate trends over time and treat young people accordingly.<sup>14</sup>

Thus, this study aimed to systematically review the evidence of the prevalence of tooth grinding and/or clenching in children and adolescents with neurodevelopmental disorder and other developmental anomalies.

## 2 | METHODS

This review followed the guidance of the Joanna Briggs Institute Manual for Evidence Synthesis for conducting systematic reviews of Prevalence and Incidence Data.<sup>14</sup> We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) reporting guidelines of 2020.<sup>15</sup>

### 2.1 | Protocol and registration

A protocol was registered in the International Prospective Register of Systematic Reviews (CRD42020212640).

### 2.2 | Eligibility criteria

The inclusion of studies in our systematic review followed the PECO question (Population, Exposure, Comparison and Outcome) of what the prevalence of tooth grinding and/or clenching in children and adolescents with neurodevelopmental disorder and/or other developmental conditions are. We included observational studies that brought prevalence data of the presence of sleep and/or awake tooth grinding and/or clenching in children and adolescents under 18 years old with neurodevelopmental and/or other developmental conditions.

Only studies with separated data of children and adolescents were included, if not, the correspondent author was contacted at least three times to obtain separate data. Since there are no definitions for categorising tooth grinding and/or clenching in individuals with neurodevelopmental disorders, we adapted our methodology following the International consensus of bruxism, where both instrumental (electromyography and/or polysomnography) and non-instrumental methods (self-report, proxy report and/or clinical inspection) are acceptable for bruxism/tooth grinding and/or clenching assessment. Tooth grinding and/or clenching assessment was categorised as reported tooth grinding and/or clenching (self-report, proxy report/parent report and questionnaires), clinically observed tooth grinding and/or clenching (self-report, proxy report/parent report and/or clinical inspection), and definitive tooth grinding and/or clenching (electromyography and/or polysomnography).<sup>1</sup> Moreover, sleep tooth grinding and/or clenching was characterised as occurring during sleep and is defined as a masticatory muscle activity that can be characterised as non-rhythmic (tonic) and rhythmic (phasic). Awake tooth grinding and/or clenching occurs during wakefulness and is characterised by sustained or repetitive tooth contact and/or by bracing or thrusting of the mandible.<sup>1</sup>

Studies that only investigated the adult population or data of children and adolescents that could not be extracted separately were excluded. Experimental studies, reviews, case series with less than ten individuals, case reports, protocols, personal opinions, posters, conference abstracts, letters and laboratory research were excluded.

There were no restrictions to sex, language or publication time.

### 2.3 | Information sources

Searches were performed in the following electronic databases: CINAHL EBSCO, Dentistry & Oral Sciences Source EBSCO, Embase, Latin American and Caribbean Health Sciences (LILACS), MEDLINE



via PubMed, PsycINFO, Scopus and Web of Science. Additional searches were conducted by searching grey literature in Google Scholar (the first 200 results) and Open Grey. All references of the included studies were reviewed for additional content, and attempts to contact authors were made to clarify published information.

One author (PVK) developed the search strategies with an information specialist from the University Library at the Federal University of Santa Catarina, which were then peer-reviewed by all authors. The searches contain free-text terms with spelling variants, acronyms and synonyms, and controlled vocabulary terms (e.g., MeSH, Emtree) of the population and exposure. There were no publication time limits or language restrictions. All strategies are available in Supplementary file 1.

## 2.4 | Selection process

All references identified in the database searches were exported to a reference manager software (Endnote X7, Clarivate Analytics®), where duplicates were removed. Two authors (PVK and JSM) performed the screening of all retrieved references, independently and in duplicate, first by using the online software Rayyan<sup>16</sup> to identify potentially eligible studies by the title and abstracts and then by reading the full text. Any disagreement was resolved through a consensus or involving other authors (JPS and CM).

## 2.5 | Data items

Outcomes of interest were prevalence of sleep and/or awake tooth grinding and/or clenching, the prevalence of tooth grinding and/or clenching according to individual disorder (e.g., attention-deficit hyperactivity disorder, autism spectrum disorder, cerebral palsy and Down syndrome), and prevalence according to the method used to assess tooth grinding and/or clenching (reported, clinically observed and definitive tooth grinding and/or clenching). As a secondary outcome, it was investigated if children and adolescents with disabilities are more likely to present tooth grinding and/or clenching than their peers without disabilities.

## 2.6 | Data collection process

Two calibrated authors (PVK and JSM) independently collected and cross-checked data from selected studies using a designed data extraction sheet, which was piloted and reviewed by three authors (JPS, CM and MB). The authors collected data related to study details (title, authors, year of publication, country and journal which the article was published), methods (setting, study design, subject characteristics [sample size, age, sex, country/location, use of medications, and other relevant characteristics], patient disability (Neurodevelopmental disorders and/or other developmental anomalies included in our review were classified according to

the International Statistical Classification of Diseases and Related Health Problems [ICD-11]), diagnosis method of patient disability, type of approach used to assess tooth grinding and/or clenching, ethical approval, method of data analysis), and results (prevalence of sleep and/or awake tooth grinding and/or clenching [n/N - %], proportion and 95% confidence intervals, other important results, and study conclusion).

## 2.7 | Assessment of risk of bias of included studies

Two authors performed (PVK and JSM) the risk-of-bias assessment of included studies independently and in duplicate, using the Joanna Briggs Institute Critical Appraisal Checklist for Studies Reporting Prevalence Data.<sup>17</sup> The domains of the tool assess bias from the following headings: appropriate sample frame for the target population, how study participants were recruited, adequate sample size, description of study subjects and setting, coverage bias, classification bias, the validity of outcome measurement instrument, statistical analysis and management of response rate. Following the tool guidance, each question was rated as 'yes' (high risk of bias), 'no' (low risk of bias), 'unclear' or 'not applicable'. We piloted the tool on the first then included studies to improve reliability. Any disagreements were resolved through consensus or by involving other authors (JPS and CM).

## 2.8 | Summary measures

The prevalence of tooth grinding and/or clenching was expressed by absolute or relative frequency and its 95% confidence intervals (95% CI). Additional outcomes were the prevalence of tooth grinding and/or clenching according to patient disability and the method used to assess tooth grinding and/or clenching (reported, clinically observed and definitive). The association between tooth grinding and/or clenching and the presence of disability was expressed by odds ratio (OR).

## 2.9 | Synthesis of results

One author (PVK) summarised the characteristics of included studies based on the collected data to identify possible comparisons, determined what data were available for synthesis and whether descriptive reporting or statistical synthesis was appropriate. Descriptive reporting included the presentation of summary measures of each outcome in a forest plot or a table. Statistical synthesis was performed undertaking a meta-analysis using the Review Manager software 5.4 and the Jamovi 1.8.4 Software for meta-analysis of proportions. The robvis tool was used to create risk-of-bias plots using a colorblind-friendly colour scheme.<sup>18</sup> The restricted maximum-likelihood model estimation was used and the Freeman-Tukey double arcsine transformation proportion to calculate overall

proportions. Statistical heterogeneity was assessed using the  $I^2$ . To interpret the  $I^2$ , we considered: 0%–40% as might not be important; 30%–60% as moderate heterogeneity; 50%–90% substantial heterogeneity; and 75%–100% represent considerable heterogeneity.<sup>19</sup> A random-effect model was applied.

### 2.10 | Reporting bias assessment

Clinical heterogeneity across studies was determined by comparing sample characteristics. Methodological characteristics were evaluated by comparing different methods for tooth grinding and/or clenching assessment, risk of bias, and sample selection.

## 3 | RESULTS

### 3.1 | Study selection

We identified 3651 records through database searching (201 records from grey literature) and an additional 30 records from reference lists. After the removal of duplicates, two review authors (PVK and JSM) screened 2240 references by title and abstract for eligible studies. Subsequently, 116 full-text records were assessed for eligibility following the inclusion and exclusion criteria already outlined. We excluded 39 records for reasons listed in Supplementary file 2. Finally, 77 studies met the inclusion criteria and were included in this review (Figure 1).

### 3.2 | Study characteristics

The number of individuals in the 77 studies accounted for a total of 12 120 individuals, where 7130 have some type of disability and 4990 were individuals without disability, counted as controls. The number of individuals with disabilities in the included studies ranged from 10 to 369 (Mean:  $92.6 \pm 76.5$ ).

The studies were conducted in 28 different countries: Australia ( $n = 1$ ), Bolivia ( $n = 1$ ), Brazil ( $n = 14$ ), Chile ( $n = 1$ ), China ( $n = 1$ ), Czech Republic ( $n = 2$ ), Egypt ( $n = 2$ ), Finland ( $n = 1$ ), France ( $n = 3$ ), Germany ( $n = 1$ ), India ( $n = 3$ ), Iran ( $n = 2$ ), Iraq ( $n = 1$ ), Israel ( $n = 2$ ), Italy ( $n = 3$ ), Mexico ( $n = 1$ ), Pakistan ( $n = 1$ ), Poland ( $n = 3$ ), Portugal ( $n = 2$ ), Romania ( $n = 1$ ), Saudi Arabia ( $n = 2$ ), Spain ( $n = 4$ ), Switzerland ( $n = 1$ ), Taiwan ( $n = 4$ ), Turkey ( $n = 6$ ), United Kingdom ( $n = 5$ ), the United States ( $n = 8$ ) and Venezuela ( $n = 1$ ). Aside from studies written in English, one study was in Turkish, two in Polish, two in Spanish and one in Czech.

Thirty-two studies report data about sleep tooth grinding and/or clenching, none about only awake tooth grinding and/or clenching, six about both awake and sleep tooth grinding and/or clenching, and 47 did not specify the type of tooth grinding and/or clenching. Most studies report tooth grinding and/or clenching

as reported ( $n = 63$ ), followed by clinically observed ( $n = 19$ ) and definitive ( $n = 4$ ).

Fifty-eight studies report having ethical approval, six reported having just written consent of parents of the participants, and 12 were unclear on this issue.

### 3.3 | Characteristics of the participants

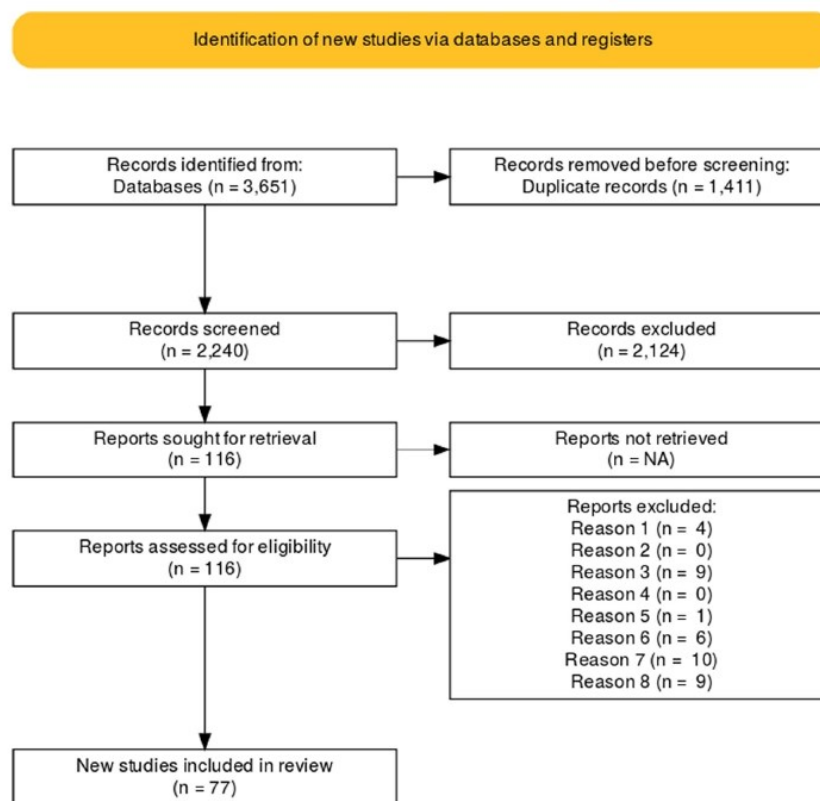
As for the individuals' disability in the included studies, 30 studies present data about individuals with ADHD, one about Angelman syndrome, 15 about autism spectrum disorder, 16 about cerebral palsy, ten about Down syndrome, one about vision and hearing-and-voice impairment, four about intellectual disability, one about Pallister-Killian syndrome, one about Prader-Willi syndrome, five about Rett syndrome and MECP2 duplication syndrome, and two about Williams syndrome.

The disability assessment method was reported by 43 studies. Nineteen used the DSM-IV, two use the DSM-V, seven used medical records, two the K-SADS scale, four the ICD-10, one the Conners scale, one the DSM-III-R, one the SNAP-IV scale, and six used a genetic or a laboratory test. Forty studies did not report diagnostic criteria or methods.

### 3.4 | Risk of bias within studies

A large proportion of studies were at high risk of bias in all questions of the JBI tool (Supplementary file 3). The first three questions assessed information about sample frame, participant recruitment and sample size. In most studies, these questions were at high risk of bias since the sample frame targets individuals in 'special schools' or at the psychiatry department of a hospital. About question number two, most studies had convenience samples and are not considered to provide a representative overview of the population. About question number three, most of the studies did not present a sample size calculation and/or had a small size. Question six assessed the validity of methods used to identification of tooth grinding and/or clenching; since we considered tooth grinding and/or clenching as reported, clinically observed or definitive, all types of questionnaires, clinical examination and polysomnography were acceptable if they were validated. Studies that did not use validated questionnaires or did not present training and agreement between examiners were considered at high risk of bias. Question seven evaluated if the condition was measured in a standard and reliable way for all participants. If question six was at high risk of bias, consequently, question seven was too since the measurement of the condition may not be reliable if non-validated methods are used. Not all studies present the same design and recruitment of participants, due to that, questions five and nine were applicable for survey studies to identify coverage bias and response rate.





**FIGURE 1** PRISMA flow diagram. Reason 1: Studies which did not evaluate children and adolescents under 18 years old with neurodevelopmental disabilities or other developmental condition; Reason 2: Studies in which the diagnosis was not confirmed as neurodevelopmental disability or other developmental conditions as listed in CDC/DSM or ICD; Reason 3: Studies in which the prevalence of tooth grinding and/or clenching was investigated only in an adult population (or data could not be extracted separately); Reason 4: Studies in animals; Reason 5: Studies in which the assessment of tooth grinding and/or clenching did not follow any criteria from consensus for bruxism diagnosis (Lobbezoo et. 2018); Reason 6: Studies in which quantitative data regarding the prevalence of tooth grinding and/or clenching in children or adolescents with neurodevelopmental disabilities or other developmental conditions were not reported; Reason 7: Experimental studies, reviews, case reports, case series with less than 10 individuals, protocols, short communications, personal opinions, letters, posters, conference abstracts and laboratory research; Reason 8: Full text not found

### 3.5 | Synthesis of results

Prevalence data and confidence intervals of individual studies are available in [Table 1](#).

#### 3.5.1 | ADHD: Prevalence of reported tooth grinding and/or clenching

The pooled prevalence of reported tooth grinding and/or clenching in individuals with ADHD was 58% (95% CI: 49.5–65.6;  $I^2$  91.6%; 24 studies; 1914 individuals). When assessing studies that evaluated sleep tooth grinding using the Children Sleep Questionnaire (CSQ) pooled prevalence was 62% (95% CI: 36.8–87.1;  $I^2$  91.8%; 4 studies; 207 individuals). Two studies assessed sleep tooth grinding and/or clenching with the Sleep Disturbance Questionnaire (SDQ) and

presented a prevalence ranging from 44.7%–51% (449 individuals). Studies that assessed sleep tooth grinding and/or clenching with the Pediatric Sleep Questionnaire (PSQ) presented a pooled prevalence of 51% (95% CI: 36.0–65.6;  $I^2$ : 83%; 4 studies; 259 individuals). Reported awake tooth grinding and/or clenching was assessed by two studies with the prevalence ranging from 15%–36.6% (110 individuals).

#### 3.5.2 | ADHD: Prevalence of clinically observed and definitive tooth grinding and/or clenching

Prevalence of clinically observed tooth grinding and/or clenching was assessed by two studies ranging from 5.5% to 55.8% (70 individuals). Pooled prevalence of definitive sleep tooth grinding and/or clenching was 39.8% (95% CI: 24.0 to 55.6;  $I^2$ : 75.7%; 4 studies; 181 individuals).

TABLE 1 Characteristics of included studies (n = 77)

Author (year)	Location	Disability	Disability assessment method	Tooth grinding and/or clenching assessment method	Type of tooth grinding and/or clenching evaluated	Prevalence % (n/N)	Prevalence in CG (n/N)
ADHD							
Reported tooth grinding and/or clenching							
Bhargava et al. (2005)	India	ADHD	DSM-IV	Questionnaires answered by the caregiver/parents (Children Sleep Questionnaire-parent version)	SGC	12.5% (4/32) [95% CI: 3.5–28.9]	10% (2/20)
Beghini et al. (2019)	Brazil	ADHD	NR	Questionnaire answered by the caregiver/parents and clinical examination	NS	25% (13/51) [95% CI: 14.3–39.6]	26% (13/50)
Bimstein et al. (2008)	USA	ADHD	NR	Dental records reported by parents	NS	43% (6/14) [95% CI: 17.6–71.1]	8% (8/103)
Chau et al. (2017)	China	ADHD	DSM-IV	Questionnaire answered by the caregiver/parents	NS	80.6% (25/31) [95% CI: 62.5–92.5]	48.4% (15/31)
Chiang et al. (2010)	Taiwan	ADHD	DSM-IV	Questionnaire answered by the caregiver/parents (Sleep Disturbance Questionnaire)	SGC	44.7% (136/304)* [95% CI: 39.0–50.5]	26.2% (67/257)
Chin et al. (2018)	Taiwan	ADHD	DSM-IV	Questionnaire answered by the caregiver/parents (Pediatric Sleep Questionnaire)	SGC	42.3% (30/71) [95% CI: 30.6–54.5]	NA
Corkum et al. (1999)	USA	ADHD	DSM-IV	Questionnaire answered by the caregiver/parents (Child Sleep Questionnaire-Parent Version)	SGC	63.4% (64/101)* [95% CI: 53.1–72.7]	16.2% (6/36)
Ertuğrul et al. (2018)	Turkey	ADHD	Medical records	Questionnaire answered by the caregiver/parents	SGC and AGC	SGC: 27.5% (22/80) [95% CI: 18.1–38.6] AGC: 15% (12/80) [95% CI: 7.9–24.7]	SGC: 12.5% (5/40) AGC: 2.5% (1/40)
Gau et al. (2009)	Taiwan	ADHD	DSM-IV	Questionnaire answered by the caregiver/parents (Sleep Disturbance Questionnaire)	SGC	51% (74/145) [95% CI: 42.6–59.4]	19.6% (36/185)
Ghanizadeh et al. (2008)	Iran	ADHD	K-SADS	Report by parents/caregiver	SGC	26.45% (32/121) [95% CI: 18.8–35.2]	NA
Ghanizadeh et al. (2010)	Iran	ADHD	K-SADS	Report by parents/caregiver	SGC	21.8% (41/188)* [95% CI: 16.1–28.4]	NA
Gomes et al. (2014)	Portugal	ADHD	ICD-10	Questionnaire answered by the caregiver/parents (Child Sleep – Waking Questionnaire)	SGC	16.7% (5/30) [95% CI: 5.6–34.7]	10% (3/30)
Maliki et al. (2004)	USA	ADHD	Medical records	Report by parents/caregiver	SGC and AGC	AGC: 36.7% (11/30) [95% CI: 19.9–56.1] SGC: 46.7% (14/30) [95% CI: 28.3–65.6]	AGC: 3.3% (1/30) SGC: 16.7% (5/30)

TABLE 1 (Continued)

Author (year)	Location	Disability	Disability assessment method	Tooth grinding and/or clenching assessment method	Type of tooth grinding and/or clenching evaluated	Prevalence % (n/N)	Prevalence in CG (n/N)
Neves et al. (2007)	Brazil	ADHD	NR	Questionnaire answered by the caregiver/parents	SGC	2% (1/50) [95% CI: 0.0–10.6]	NA
O'Brien et al. (2003)	USA	ADHD	Conners' Parent Rating Scale	Questionnaires answered by the caregiver/parents	SGC	29.6% (21/71) [95% CI: 19.3–41.5]	13% (5/39)
Prihodova et al. (2010)	Czech Republic	ADHD	DSM-IV	Questionnaires answered by the caregiver/parents	SGC	9.7% (3/31) [95% CI: 2.0–25.7]	7.6% (2/26)
Ring et al. (1998)	Israel	ADHD	DSM-III-R	Questionnaires answered by the caregiver/parents (Sleep questionnaire by Barak, Achiron, et al., 1995)	SGC	15.4% (2/13) [95% CI: 1.9–45.4]	12.5% (2/16)
Rodopman-Arman et al. (2011)	Turkey	ADHD	NS	Questionnaires answered by the caregiver/parents (Children's Sleep Habits Questionnaire)	SGC	43.1% (19/44) [95% CI: 28.3–58.9]	17.1% (7/40)
Sabuncuoğlu et al. (2014)	Turkey	ADHD	DSM-IV	Questionnaire answered by the caregiver/parents	NS	30.5% (61/200) [95% CI: 24.2–37.3]	15% (27/175)
Silvestri et al. (2009)	Italy	ADHD	DSM-IV	Questionnaires answered by the caregiver/parents	SGC	19% (10/55) [95% CI: 9.0–30.9]	NA
Tomás-Vila et al. (2008)	Spain	ADHD	NR	Questionnaires answered by the caregiver/parents (Pediatric Sleep Questionnaire)	SGC	25.4% (17/67) [95% CI: 15.5–37.4]	NA
Tsai et al. (2012) <sup>a</sup>	Taiwan	ADHD <sup>b</sup>	DSM-IV	Questionnaire answered by the caregiver/parents (Sleep Habits Questionnaire)	SGC	25% (16/64) [95% CI: 15.0–37.3]	15.6% (10/64)
Velez-Galarraga et al. (2016)	Spain	ADHD	DSM-IV	Questionnaires answered by the caregiver/parents (Pediatric Sleep Questionnaire)	SGC	Without psychostimulant: 14% (7/50) [95% CI: 5.8–26.7]	13% (135/1036)
Wiggs et al. (2005)	England	ADHD	Clinical diagnosis made by a senior child psychiatrist	Questionnaires answered by the caregiver/parents (Pediatric Sleep Questionnaire)	SGC	14.1% (10/71) [95% CI: 6.9–24.3]	NA
Clinically observed tooth grinding and/or clenching							
Armetta et al. (2006)	Bolivia	ADHD	SNAP-IV and the Attention-deficit hyperactivity disorder test (modified)	Clinical examination	NS	5.4% (2/36) [95% CI: 0.6–18.6]	NR
Ehlers et al. (2019)	Germany	ADHD	ICD-10	Clinical examination	NS	55.9% (19/34) [95% CI: 37.8–72.8]	55.6% (25/45)

(Continues)



TABLE 1 (Continued)

Author (year)	Location	Disability	Disability assessment method	Tooth grinding and/or clenching assessment method	Type of tooth grinding and/or clenching evaluated	Prevalence % (n/N)	Prevalence in CG (n/N)
Definitive tooth grinding and/or clenching							
Miano et al. (2016)	Switzerland	ADHD	Video-polysomnographic recording	Video-polysomnographic recording	SGC	6.7% (1/15) [95% CI: 0.1–31.9]	NA
Prihodova et al. (2010)	Czech Republic	ADHD	DSM-IV	Video-polysomnographic recording	SGC	6.4% (2/31) [95% CI: 0.7–21.4]	7.6% (2/26)
Prihodova et al. (2012)	Czech Republic	ADHD	NR	Video-polysomnographic recording	SGC	11.2% (9/80) [95% CI: 5.2–20.2]	NA
Silvestri et al. (2009)	Italy	ADHD	DSM-IV	Video-polysomnographic recording	SGC	PSG: 32.7% (18/55) [95% CI: 20.6–46.7]	NA
Angelman syndrome							
Reported tooth grinding and/or clenching							
Bruni et al. (2003)	Italy	Angelman syndrome	NS	Questionnaire answered by the caregiver/parents	SGC	18.2% (8/44) [95% CI: 8.1–32.7]	7.4% (66/893)
Autism spectrum disorder							
Reported tooth grinding and/or clenching							
Al-Sehalbany et al. (2017)	Saudi Arabia	ASD	NR	Questionnaire answered by the caregiver/parents (derived from the oral habits guidelines of the American Academy of Pediatric Dentistry)	SGC and AGC	SGC: 6% (9/150) [95% CI: 2.7–11.0] AGC: 38% (57/150) [95% CI: 30.2–46.2] Both: 10.7% (16/150) [95% CI: 6.2–16.7] All: 54.7% (82/150)	AGC: 2% (3/150) All: 2% (3/150)
Kuter et al. (2019)	Turkey	ASD	NR	Questionnaire answered by the caregiver/parents	NS	33% (62/187)* [95% CI: 26.4–40.3]	16.6% (24/122)
Mangione et al. (2019)	France	ASD	DSM-V	Dental records	NS	10.8% (9/83)* [95% CI: 5.0–19.5]	NA
Mirtala Orellana et al. (2019)	Chile	ASD	NR	Questionnaire answered by the caregiver/parents	NS	58.1% (68/117)* [95% CI: 48.6–67.1]	NA
Paavonen et al. (2008)	Finland	Asperger syndrome (ASD)	DSM-IV	Questionnaires answered by the caregiver/parents (Sleep Disturbance Scale for Children)	SGC	21.6% (11/52) [95% CI: 11.0–34.7]	6.6% (4/61)
Paraipan et al. (2014)	Romania	ASD	DSM-IV	Questionnaire answered by the caregiver/parents (Albany scale)	NS	20% (10/50) [95% CI: 10.0–33.7]	5% (2/40)
Tsai et al. (2012)*	Taiwan	ASD	DSM-IV	Questionnaire answered by the caregiver/parents (Sleep Habits Questionnaire)	SGC	21.9% (14/64) [95% CI: 12.5–33.9]	15.6% (10/64)

TABLE 1 (Continued)

Author (year)	Location	Disability	Disability assessment method	Tooth grinding and/or clenching assessment method	Type of tooth grinding and/or clenching evaluated	Prevalence % (n/N)	Prevalence in CG (n/N)
Clinically observed tooth grinding and/or clenching							
DeMattei et al. (2007)	USA	ASD	NR	Clinical examination	NS	100% (10/10) [95% CI: 69.1–100]	NA
ElKhatib et al. (2014)	Egypt	ASD	DSM-IVTR	Clinical examination	NS	38% (88/100) [95% CI: 28.4–48.2]	8% (8/100)
Manzano et al. (1999) <sup>a</sup>	Venezuela	ASD	NR	Clinical examination	NS	21.7% (5/23) [95% CI: 7.4–43.7]	NA
Onol et al. (2018)	Turkey	ASD	DSM-IV	Clinical examination	AGC and SGC	AGC: 22.2% (14/63) [95% CI: 12.7–34.4] SGC: 4.8% (3/63) [95% CI: 0.9–13.2] Both: 14.3% (9/63) [95% CI: 6.7–25.3]	AGC: 3.6% (4/111) SGC: 1.8% (2/111)
Sarnat et al. (2016)	Israel	ASD	NR	Clinical examination and Parental report	NS	20% (8/40) [95% CI: 9.0–35.6]	7% (3/42)
Suhaib et al. (2019)	Pakistan	ASD	NR	Clinical examination	NS	10.3% (6/58) [95% CI: 3.8–21.1]	0% (0/27)
Subramaniam Et al. (2011)	India	ASD	NR	Clinical examination	NS	4.7% (5/106) [95% CI: 1.5–10.6]	NA
Leiva Garcia et al. (2019)	Spain	ASD	DSM-IV	Clinical examination	NS	58% (29/51) <sup>a</sup> [95% CI: 42.2–70.6]	20.4% (19/93)
Cerebral palsy							
Reported tooth grinding and/or clenching							
Abando et al. (2014)	Brazil	Cerebral palsy	NR	Questionnaire answered by the caregiver	NS	51.7% (31/60) [95% CI: 38.3–64.7]	NA
Ahmed et al. (2018)	Iraq	Cerebral palsy		Medical records and parents report	NS	31% (31/100) [95% CI: 22.1–41.0]	NA
Botfi Rodrigues et al. (2015)	Brazil	Cerebral palsy	ICD-10	Parental report	NS	44.2% (42/95) [95% CI: 34.0–54.7]	NA
Elsayed et al. (2013)	Egypt	Cerebral palsy	Neurological assessment	Sleep Questionnaire	SGC	38% (38/100) <sup>a</sup> [95% CI: 28.4–48.2]	NA
Metgud et al. (2015)	India	Cerebral palsy	NR	Questionnaire answered by the caregiver/parents		54% (54/100) <sup>a</sup> [95% CI: 43.7–64.0]	NA
Miamoto et al. (2011) <sup>a</sup>	Brazil	Cerebral palsy <sup>a</sup>	NR	Questionnaire answered by the caregiver/parents and clinical examination	NS	23.3% (14/60) [95% CI: 13.3–36.0]	25% (15/60)

(Continues)

TABLE 1 (Continued)

Author (year)	Location	Disability	Disability assessment method	Tooth grinding and/or clenching assessment method	Type of tooth grinding and/or clenching evaluated	Prevalence % (n/N)	Prevalence in CG (n/N)
Ortega et al. (2014)	Brazil	Cerebral palsy	NR	Questionnaire answered by the caregiver/parents	AGC and SGC	AGC: 6.6% (9/137) [95% CI: 3.0–12.1] SGC: 17.5% (24/137) [95% CI: 11.5–24.9] Both: 39.4% (54/137) [95% CI: 31.1–48.1]	AGC: 2.4% (2/70) SGC: 25.7% (18/70) Both: 0% (0/70)
Peres et al. (2007)	Brazil	Cerebral palsy	Medical records	Report by parents/caregiver		57.0% (69/121) [95% CI: 47.7–65.9]	NA
Sumaya et al. (2014)	Saudi Arabia	Cerebral palsy	NR	Questionnaires answered by the caregiver/parents	NS	41.3% (26/63) [95% CI: 29.0–54.3]	13.1% (13/99)
Souza et al. (2015) <sup>a</sup>	Brazil	Cerebral palsy and intellectual disability	ICD	Report by parents/caregiver	NS	36.3% (134/369) <sup>a</sup> [95% CI: 31.3–41.4]	NA
Zarowski et al. (2008)	Poland	Cerebral palsy	NR	Questionnaire answered by the caregiver/parents	NS	32.8% (20/61) [95% CI: 21.3–46.0]	16% (48/300)
Clinically observed tooth grinding and/or clenching							
dos Santos et al. (2003)	Brazil	Cerebral palsy	Medical records	Clinical examination	NS	41.9% (26/62) <sup>b</sup> [95% CI: 29.5–55.1]	19.4% (13/67)
Manzano et al. (1999) <sup>a</sup>	Venezuela	Cerebral palsy	NR	Clinical examination	NS	25% (3/12) [95% CI: 5.4–57.1]	NA
Morales Chávez et al. (2008)	Spain	Cerebral palsy	NR	Clinical examination	NS	16.6% (5/30) [95% CI: 5.6–34.7]	NA
Peres et al. (2007)	Brazil	Cerebral palsy	Medical records	Clinical examination	NS	69.4% (84/121) [95% CI: 60.3–77.4]	NA
Rosenbaum et al. (1966)	USA	Cerebral palsy	NR	Clinical examination and Parental report	NS	44% (69/124) [95% CI: 38.1–53.6]	NR
Down syndrome							
Reported tooth grinding and/or clenching							
Areias et al. (2011)	Portugal	Down syndrome	NR	Questionnaire answered by the caregiver/parents	NS	23% (10/45) <sup>a</sup> [95% CI: 11.2–37.0]	2% (1/45)
Ashworth et al. (2013) <sup>a</sup>	UK	Down syndrome <sup>a</sup>	Trisomy of Chromosome 21	Questionnaire answered by the caregiver/parents (Children's Sleep Habits Questionnaire)	SGC	45% (9/20) <sup>a</sup> [95% CI: 23.0–68.4]	23% (11/47)
Breslin et al. (2011)	USA	Down syndrome	NR	Questionnaire answered by the caregiver/parents (Children's Sleep Habits Questionnaire)	SGC	34% (12/35) <sup>a</sup> [95% CI: 19.1–52.2]	NA

TABLE 1 (Continued)

Author (year)	Location	Disability	Disability assessment method	Tooth grinding and/or clenching assessment method	Type of tooth grinding and/or clenching evaluated	Prevalence % (n/N)	Prevalence in CG (n/N)
Carter et al. (2009)	UK	Down syndrome	NR	Questionnaire answered by the caregiver/parents (Children's Sleep Habits Questionnaire)	SGC	31.0% (18/58) <sup>a</sup> [95% CI: 19.5–44.5]	NA
Hennequin et al. (2000)	France	Down syndrome	NR	Questionnaires answered by the caregiver/parents (Oral Assessment–Down syndrome questionnaire [OADS])	NS	53.5% (54/101) [95% CI: 43.2–63.4]	10.2% (6/59)
López-Pérez et al. (2007)	Mexico	Down syndrome	NR	Questionnaire, intraoral examination and dental study casts.	NS	42% (24/57) [95% CI: 29.1–55.9]	NA
Miyamoto et al. (2011) <sup>a</sup>	Brazil	Down syndrome <sup>a</sup>	NR	Questionnaire answered by the caregiver/parents and clinical examination	NS	23.3% (14/60) [95% CI: 13.3–36.0]	25% (15/60)
Oliveira et al. (2008)	Brazil	Down syndrome	NR	Questionnaire answered by the caregiver/parents	NS	50% (56/112) [95% CI: 40.4–59.5]	NA
Ruy Carneiro et al. (2018)	Brazil	Down syndrome	NR	Questionnaire answered by the caregiver/parents	NS	51.79% (58/112) [95% CI: 42.1–61.3]	NA
Clinically observed tooth grinding and/or clenching							
Manzano et al. (1999) <sup>a</sup>	Venezuela	Down syndrome	NR	Clinical examination	NS	44.6% (29/65) [95% CI: 32.2–57.4]	NA
Vision and Hearing-and-voice impairment							
Clinically observed tooth grinding and/or clenching							
Manzano et al. (1999) <sup>a</sup>	Venezuela	Vision impairment and Hearing-and-voice impairment	NR	Clinical examination	NS	HC: 15.4% (4/26) [95% CI: 4.3–34.8] VI: 0% (0/7) [95% CI: 0.0–40.9]	NA
Intellectual disability							
Reported tooth grinding and/or clenching							
Castilho et al. (2016)	Brazil	Developmental disability	NR	Dental records	NS	36.1% (132/366) <sup>a</sup> [95% CI: 31.1–41.2]	NA
Castilho et al. (2017b)	Brazil	Developmental disability (Cerebral palsy)	NR	Report by parents/caregiver	NS	26.9% (46/171) [95% CI: 20.4–34.2] CP: 29.5% (44/149) <sup>a</sup> [95% CI: 22.3–37.5] Only females	NA
Gerreth et al. (2009)	Poland	Intellectual disability	NR	Questionnaire answered by the caregiver/parents	NS	14.8% (39/264) [95% CI: 10.7–19.6]	NA

(Continues)

TABLE 1 (Continued)

Author (year)	Location	Disability	Disability assessment method	Tooth grinding and/or clenching assessment method	Type of tooth grinding and/or clenching evaluated	Prevalence % (n/N) [95% CI: NA	Prevalence in CG (n/N)
Wiggs et al. (1996)	England	Intellectual disability	NR	Questionnaires answered by the caregiver/parents	SGC	15.3% (32/209) [95% CI: 10.7–20.9]	NA
Pallister–Killian syndrome							
Reported tooth grinding and/or clenching							
Bagattoni (2016)	Italy	Pallister–Killian syndrome	Documented cytogenetic diagnosis	Report by parents/caregiver	NS	47.4% (9/19) [95% CI: 24.4–71.1]	NA
Prader–Willi syndrome							
Clinically observed tooth grinding and/or clenching							
Olczak-Kowalczy et al. (2018)	Poland	Prader–Willi syndrome	NR	Clinical examination	NS	27.5% (11/40) [95% CI: 14.6–43.8]	0% (0/40)
Rett syndrome and MECP2 Duplication syndrome							
Reported tooth grinding and/or clenching							
Lai et al. (2018)	Australia	Rett syndrome	Genetic diagnosis	Questionnaire answered by the caregiver/parents	NS	49.7% (94/189) [95% CI: 42.3–57.0]	NA
Miguet et al. (2017)	France	MECP2 Duplication syndrome (MDS)	DSM-V	Medical and parental records	NS	77.1% (27/35) [95% CI: 59.8–89.5]	NA
Peters et al. (2019)	USA	Rett Syndrome, and MDS	Genetic diagnosis	Parental report	NS	73.8% (31/42) [95% CI: 57.9–86.1]	NA
Clinically observed tooth grinding and/or clenching							
Ribeiro et al. (1997)	Brazil	Rett syndrome	NR	Clinical examination and Parental report	NS	82% (14/17) [95% CI: 56.5–96.2]	NA
Williams syndrome							
Reported tooth grinding and/or clenching							
Annaz et al. (2011)	England	Williams syndrome	Fluorescence in situ hybridisation	Questionnaire answered by the caregiver/parents (Children's Sleep Habits Questionnaire)	SGC	11% (7/64) [95% CI: 4.5–21.2]	NR
Ashworth et al. (2013) <sup>a</sup>	UK	Williams syndrome	Clinical diagnosis and Fluorescence in situ hybridisation analysis	Questionnaire answered by the caregiver/parents (Children's Sleep Habits Questionnaire)	SGC	8% (2/24) <sup>a</sup> [95% CI: 1.0–26.9]	23% (11/47) <sup>a</sup>

Abbreviations: AGC, awake tooth grinding and/or clenching; ADHD, attention-deficit hyperactivity disorder; ASD, autism spectrum disorder; CE, clinical examination; CG, control group; HC, hearing and voice impairment; n, number of cases; N, sample size; NA, not applicable; NR, not reported; NS, not specified; PR, parental report; SGC, sleep tooth grinding and/or clenching; VI, vision impairment.

<sup>a</sup>Calculated by authors



### 3.5.3 | ASD: Prevalence of reported and clinically observed tooth grinding and/or clenching

The pooled prevalence of reported tooth grinding and/or clenching in individuals with ASD was 50.4% (95% CI: 35.5–65.4;  $I^2$ : 93.6%; 7 studies; 703 individuals). The pooled prevalence of clinically observed tooth grinding and/or clenching in individuals with ASD was 57.5% (95% CI: 31.6–83.4;  $I^2$ : 96.6%; 8 studies; 451 individuals). No study included in this review evaluated tooth grinding and/or clenching using polysomnography for a definitive assessment.

### 3.5.4 | Cerebral Palsy: Prevalence of tooth grinding and/or clenching

Pooled prevalence of reported tooth grinding and/or clenching in individuals with CP was 67.0% (95% CI: 59.2–74.8;  $I^2$ : 86.5%; 11 studies; 1266 individuals). Prevalence of clinically observed tooth grinding and/or clenching was 71.9% (95% CI: 52.4–91.4;  $I^2$ : 91.5%; 5 studies; 349 individuals). None of the included studies evaluated tooth grinding and/or clenching using methods for a definitive assessment.

### 3.5.5 | Down syndrome: Prevalence of tooth grinding and/or clenching

Prevalence of reported tooth grinding and/or clenching in individuals with DS was 68.2% (95% CI: 59.8–76.6;  $I^2$ : 75.9%; 9 studies; 600 individuals). Studies that evaluate reported tooth grinding using the Children's Sleep Habits Questionnaire (CSHQ) presented a pooled prevalence of 63.1% (95% CI: 53.9 to 72.3;  $I^2$ : 0%; 3 studies; 113 individuals). No studies included in our review evaluated clinically observed or definitive tooth grinding and/or clenching.

### 3.5.6 | Prevalence of tooth grinding and/or clenching in children and adolescents with other developmental conditions

Prevalence of tooth grinding and/or clenching in individuals with Angelman syndrome, intellectual disability, vision and hearing-and-voice impairment, Pallister–Killian syndrome, Prader–Willi syndrome, Williams syndrome, Rett syndrome and MECP2 duplication syndrome are displayed in [Table 1](#).

All forest plots are presented in Supplementary file 4.

## 3.6 | Additional outcomes

In studies where data about the prevalence of tooth grinding and/or clenching were available in both control and study groups (children with disabilities), a meta-analysis was conducted as a secondary outcome. All meta-analyses are available in Supplementary file 5.

The odds of children and adolescents with ADHD presenting reported tooth grinding and/or clenching is 2.84 (95% CI: 2.14–3.76;  $I^2$ : 34%; 16 studies; 2,383 individuals) higher than the control group. In children and adolescents with ASD, the odds of the prevalence of reported tooth grinding and/or clenching are 2.04 (95% CI: 1.34–3.11;  $I^2$ : 0%; 4 studies; 630 individuals) higher than those without disability. When evaluating the prevalence of clinically observed tooth grinding and/or clenching, children and adolescents with ASD present an odds of 5.22 (95% CI: 3.20 to 8.53;  $I^2$ : 0%; 5 studies; 685 individuals) higher than their non-disabled peers. In individuals with Down syndrome, the odds of the prevalence of reported tooth grinding and/or clenching are 3.75 (95% CI: 1–13.98;  $I^2$ : 82%; 4 studies; 437 individuals) higher than those in the control group. Individuals with cerebral palsy presented an odds of 1.61 (95% CI: 0.66–3.97;  $I^2$ : 84%; 4 studies; 850 individuals) higher than those in the control group to have reported tooth grinding and/or clenching.

## 3.7 | Reporting bias assessment

Most of the included studies presented important concerns regarding the high risk of bias. As already stated, most studies had some issue with sample or use of a non-validated method to assess tooth grinding and/or clenching. Moreover, when conducting meta-analysis most of the sub-groups presented an  $I^2$  with considerable heterogeneity so these results should be interpreted with caution.

## 4 | DISCUSSION

This review reported the prevalence of tooth grinding and/or clenching in children and adolescents with neurodevelopmental and associated disorders through a systematic synthesis of 77 studies. Despite focusing on neurodevelopmental disorders, we found a myriad of studies investigating samples with different disabilities. Due to the inherent heterogeneity across these disorders, pooled analyses were not conducted for those with neurodevelopmental disorders as a whole. Rather, we performed our analyses by diagnosis and by type of tooth grinding and/or clenching assessment to reduce heterogeneity. Most studies presented a high risk of bias in many domains presented in the quality assessment tool. When analysing meta-analysis, even though we used sub-groups, most of the analysis presented considerable heterogeneity based on the  $I^2$ .

Based on our findings, the prevalence of tooth grinding and/or clenching in children and adolescents with neurodevelopmental disorders was higher than in those without a disability. Moreover, concerning tooth grinding and/or clenching, it is important to consider the different assessment methods evaluated in the studies in our review. Most of the studies presented data about reported tooth grinding and/or clenching. This may occur because it is the easiest and primary method to collect information about tooth grinding and/or clenching since this is based on parent report. Although none of the included studies used self-reported measures of tooth grinding

and/or clenching, it is important to address that many instruments use Likert scales to assess self-report which are not reliable in children with cognitive disabilities.

Also, it is important to consider that the intensity and duration of masticatory muscle activity cannot be easily quantified based on self or parent report.<sup>20,21</sup> In studies evaluating clinically observed tooth grinding and/or clenching—that is based on the clinical examination—an important consideration is that clinical features of both teeth grinding and/or clenching may be consequences of other functional oromotor activities or represent past tooth grinding and/or clenching, without current activity.<sup>20</sup> Lastly, definitive tooth grinding and/or clenching is the most reliable assessment and is based on electromyographic and polysomnography records, although the diagnosis of all individuals with polysomnography needs a large amount of funding and training.

It is important to highlight that most studies included in our review classified tooth grinding and/or clenching as 'bruxism'. According to the latest bruxism consensus, the jaw-muscle activity of grinding the teeth is only characterised as bruxism in otherwise healthy individuals. Future studies need to address these differences since the 'triggers' to activate both awake and sleep bruxism are related to psychological aspects and the activation of the central nervous system or the autonomic nervous system,<sup>2</sup> which may occur in different ways in individuals with neurodevelopmental disabilities. Hence, in people with underlying conditions, 'grinding activity' should not be discounted as bruxism but should require the attention and investigation of different health professionals in its multidisciplinary management to comprehend the full context of such motor activity. In many contexts, some long-term medications are taken which can activate the central nervous system (mainly in individuals with disorders such as ADHD and ASD). Thus, the use of medication and which medication are taken need to be specified in future studies since this can modify the presence of tooth grinding and/or clenching (aggravating or attenuating). Medicaments such as Buspiron (an anxiolytic), clonazepam (a benzodiazepine with anti-convulsant properties) and Gabapentin may have the capability to attenuate tooth grinding and/or clenching.<sup>5</sup> Also, many studies that evaluate sleep-wake patterns in these individuals demonstrate that tooth grinding and/or clenching may be associated with other night behaviours, movements, and fears (such as sleep talking and nightmares), wake patterns (such as daytime sleepiness and daytime fatigue), and the initiation and maintenance of sleep.<sup>8,22,23</sup>

Concerning the risk of bias at the study level, most of the domains were at high risk of bias. Most issues were due to the sample such as the use of convenience sample and sample frame, which limits the extrapolation of the results to the population. Although, it is a good starting point in the absence of data at a population level. Another issue was due to the small sample size and the absence of sample size calculation. Moreover, the use of a non-validated method to assess tooth grinding and/or clenching was present in many studies, raising concerns about classification bias. Also, when a non-validated method is used, the measurement of the condition may not be reliable for all participants, compromising the overall quality of the studies.

Although our study presents a lot of strengths such as the published protocol, report of the findings following the PRISMA statement, transparency of data fully available in supplementary files and rigorous methodology, we found some limitations in the present review. First, even though we searched different databases and the grey literature, some references could not have their full text accessed. Moreover, most studies presented many domains with a high risk of bias which may interfere with the results. Also, it was stated a considerable heterogeneity in the meta-analysis and the results should be interpreted with caution. Based on our assessments of the risk of bias, many limitations were encountered, and future research should try to mitigate them. Selection of a better sample frame, use of a randomly selected sample, sample size calculation, and use of validated assessment tool for tooth grinding and/or clenching assessment should improve further studies on this topic.

The data presented in this review could help health professionals to raise awareness about the presence and baseline trends of tooth grinding and/or clenching in these individuals. Also, the report by parents of a high frequency of tooth grinding and/or severe tooth wear should raise focus on the searching of underlying conditions that may represent potential health concerns (such as respiratory disturbances).<sup>20</sup> Furthermore, based on current data, the management of tooth grinding and/or clenching—if needed—should be based on inherent conditions since it suggested that the natural course of sleep tooth grinding and/or clenching decreases after the age of 9–10 years in children.<sup>24</sup> The management of tooth grinding and/or clenching should be centred on establishing a multidisciplinary framework team to be assessed throughout childhood and adolescence.<sup>25</sup> Moreover, knowledge of the prevalence of tooth grinding and/or clenching can assist health services and policymakers set priorities, planning the management of services, and evaluating trends over time.

To the best of our knowledge, this is the first systematic review that evaluated the prevalence of tooth grinding and/or clenching in this population. In conclusion, due to high heterogeneity and high risk of bias in primary studies, the results should be interpreted with caution. Furthermore, tooth grinding and/or clenching is a relatively frequent condition in individuals with a neurodevelopmental disorder and other developmental conditions. Individuals with Down syndrome presented a higher prevalence of tooth grinding and/or clenching, followed by individuals with cerebral palsy, ADHD, ASD, intellectual disability and Williams syndrome.

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### CONFLICT OF INTEREST

The authors have stated that they had no interests, which might be perceived as posing a conflict or bias.

### AUTHORS' CONTRIBUTION

All authors listed in the manuscript meet all the criteria stated by the International Committee of Medical Journal Editors Recommendations for the conduct, reporting, editing and the publication of Scholarly Work in Medical Journals (ICMJE Recommendations 2018). Kammer PV contributed to the conception and design of the work; acquisition of data; analysis and interpretation of data; drafted the article and revised it critically for important intellectual content; and final approval of the version to be published. Moro JM and Soares JP contributed to the conception and design of the work; acquisition of data; analysis and interpretation of data; revised the manuscript it critically for important intellectual content; and final approval of the version to be published. Massignan C and Phadraig CMG contributed to the conception and design of the work, drafted the article, revised it critically for important intellectual content, and final approval of the version to be published. Bolan M contributed to the conception and design of the work, drafted the article, revised it critically for important intellectual content, and final approval of the version to be published.

### PEER REVIEW

The peer review history for this article is available at <https://publons.com/publon/10.1111/joor.13315>.

### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available in the supplementary material of this article.

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### SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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### **2.2.1 Material Suplementar**

O material complementar deste artigo encontra-se disponível como ANEXO E – Estratégia de busca, ANEXO F – Elegibilidade, ANEXO G – Risco de Viés, ANEXO H – Meta-análises de prevalência e ANEXO I – Meta-análises de associação.

### 2.3 REVISÃO DE ESCOPO

Artigo será submetido ao periódico *Community Dentistry Oral Epidemiology* (Qualis A1; FI: 2.489).

**Title:** Oral-health related Quality of Life in children and adolescents with autism spectrum disorder, Down syndrome, and cerebral palsy: A scoping review

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**Data Availability Statement:** The data that supports the findings of this study are available in the supplementary material of this article.

**Conflict of Interest:** The authors have stated that they had no interests which might be perceived as posing a conflict or bias.

**Title:** Oral-health related Quality of Life in children and adolescents with autism spectrum disorder, Down syndrome, and cerebral palsy: A scoping review

### **Abstract**

**Objectives:** This scoping review aims to map the studies that evaluate the oral health-related quality of life (OHRQoL) of children and adolescents with autism spectrum disorder, Down syndrome, and cerebral palsy.

**Methods:** Followed a registered protocol, a search strategy was developed with relevant terms in five database and the grey literature on June of 2022. Study outcomes were extracted and synthesized.

**Results:** After selection, 15 of the 1396 studies met the inclusion criteria. Nine studies were about children with cerebral palsy, followed by four of autism spectrum disorder and one of Down syndrome. The most used instruments were the P-CPQ and FIS, followed by the ECOHIS. Only one study used a disability-specific instrument for Down syndrome. When compared to OHRQoL of children without disability, children with cerebral palsy experience worst OHRQoL. Most of the studies observed a negative impact of dental caries and oral health status on OHRQoL.

**Conclusion:** In conclusion, most of the studies were about children with cerebral palsy from Brazil and used the P-CPQ. It seems that children with disability have a worst OHRQoL but there is no agreement in the existent literature.

**Keywords:** Down Syndrome; Autistic Disorder; Dental Care for People With Disabilities; People with Disabilities; Dentistry.

## Introduction

Oral Health-Related Quality of Life (OHRQoL) is defined as “The impact of oral diseases and disorders on aspects of everyday life that a patient or person values, that are of sufficient magnitude, in terms of frequency, severity or duration to affect their experience and perception of their life overall”.<sup>1</sup> In other words, some authors explained that the definition of OHRQoL is related to how impactful the oral health or oral disease has on the well-being and it takes into account the individual’s perceptions of their oral health status as well as the psychological and social impact of oral disease.<sup>2</sup>

Children with disability may develop poorer oral health leading to a significant effect on their quality of life, causing difficulty with speech, eating, sleep disturbances, pain and missed days at school.<sup>3</sup> Moreover, poor oral health may prejudice the family welfare because the parents feel guilty, may have work absenteeism and expenses associated with dental treatment.<sup>4</sup> The oral health status of an individual with disability may be shaped by factors such as living conditions, age, special diets, severity of impairment, and the type of medication taken.<sup>5</sup>

Many times these children are neglected in terms of access to services such as education, however, no up-to-date data is available indicating their health status and use of health services. Previous studies have shown high levels of untreated caries in CSNs and poor access to oral health care services.<sup>6</sup> This could be attributed to the different perceptions of the caregivers to their oral health needs. Highlighting the importance of the caregiver’s perceptions of their children oral health status and OHRQoL which may influence their seeking behavior to oral health care and motivates them to access oral health services.<sup>7,8</sup>

Oral Health Related Quality of Life can be measured by many instruments and some of the questionnaires used for children include the Child Oral Health Related Quality of Life questionnaire (COHRQoL),<sup>9,10</sup> the Child Oral Health Impact Profile (COHIP),<sup>11</sup> the Child-Oral Impacts on Daily Performances (Child-OIDP),<sup>12</sup> the Michigan OHRQoL scale<sup>13</sup> and, Early Childhood Oral Health Impact Scale (ECOHIS).<sup>14</sup>

Scoping reviews provide a systematic approach, with the aim to identify current literature, provide a summary of a topic and highlight areas for future research. Given that OHRQoL includes a wide range of outcomes and instruments a scoping review would be the

appropriate tool to synthesize the current knowledge of oral health related quality of life amongst children and adolescents with autism spectrum disorder, Down syndrome, and cerebral palsy.

Thus, this study has the goal to identify, explore and map the literature on oral health related quality of life conditions among children and adolescents with autism spectrum disorder, Down syndrome, and cerebral palsy.

## **2. Methods**

### *2.1 Design and registration*

This scoping review followed the Joanna Briggs Institute (JBI) methodology for conducting scoping review<sup>15</sup> and a protocol was previously registered [[https://osf.io/3xdn6/?view\\_only=cfbe23ff0fd345f0a023cfc61767f847](https://osf.io/3xdn6/?view_only=cfbe23ff0fd345f0a023cfc61767f847)].

### *2.2 Search strategy*

One author (PVK) developed the search strategies with an information specialist from the University Library at the Federal University of Santa Catarina. The searches contain free-text terms with spelling variants, acronyms, and synonyms, and controlled vocabulary terms (e.g., MeSH, Emtree) of the population, oral health-related quality of life terms and instruments. There were no publication language restrictions or time limit. All strategies are available in Supplementary file 1.

The search strategy was constructed and adapted in the following databases CINAHL EBSCO, Dentistry & Oral Sciences Source EBSCO, Embase, MEDLINE via PubMed, PsycINFO, Scopus, and Web of Science. Moreover, grey literature was searched using the first 200 results on Google Scholar. Reference lists of included records were searched. All searches were conducted on June 20, 2022.

### *2.3 Evidence Selection*

All references identified in the database searches were exported to a reference manager software (Endnote X7, Clarivate Analytics®), where duplicates were removed. Selectors were calibrated on 25 titles/abstracts prior to data collection (PVK and JM). Titles and/or



abstracts of retrieved studies were screened independently applying inclusion criteria by using the online software Rayyan. Full texts of these potentially eligible studies were retrieved and independently assessed for eligibility (Supplementary File 2). Articles with unclear status were resolved through discussion.

#### *2.4 Eligibility criteria*

Selectors at both title/abstract and full text review stages applied eligibility criteria according Participants, Concept, Context and type of sources as specify in the protocol and in this section.

The participants of interest of this review were studies that evaluate OHRQoL in children and adolescents under 18 years old with a diagnosis of Autism spectrum disorder, Down syndrome, and Cerebral palsy. As for Concept, the criteria was based on studies that used OHRQoL instruments that evaluate children and adolescents with those disability. The context of this review is open. All studies that evaluated the impact of OHRQoL in children and adolescents with disability are eligible. No restriction of country, research setting, sex, age of participants (0 to 18 years old), and cultural aspects will be applied.

This scoping review considered both experimental and quasi-experimental study designs including randomized controlled trials, non-randomized controlled trials, before and after studies and interrupted time-series studies. In addition, observational studies including prospective and retrospective cohort studies, case-control studies and analytical cross-sectional studies, and descriptive cross-sectional studies will be eligible for inclusion.

#### *2.5 Data extraction*

Data were extracted by one reviewer and verified by another. Discrepancies were identified and resolved through discussion. Missing data were not requested from authors. Extracted information included study ID, participants, sample size, age, disability, OHRQoL instruments, domains, statistical analysis, and key findings relevant to the review question. Risk of bias was not assessed.

#### *2.6 Synthesis*

OHRQoL instruments were synthesized by domains, key findings and other information related to study methods in tables. Subgroup and meta-analyses were not undertaken. This synthesis did not focus on strength of cumulative evidence.

## Results

Of 1396 studies we identified 15 studies in total that met the inclusion and exclusion criteria. Studies ranged in publication date from 2010 to 2022 with a sample size ranged from 26 to 347 individuals. Nine studies were about individuals with cerebral palsy<sup>16-25</sup>, four about individuals with autism spectrum disorder<sup>26-29</sup> and one about individuals with Down syndrome<sup>30</sup>. Nine studies were from Brazil<sup>16-18,20,21,25,26,28,29</sup>, two from China<sup>22,27</sup>, two from Saudi Arabia<sup>24,30</sup>, one from Bangladesh<sup>19</sup>, and one from Egypt.<sup>23</sup>

The P-CPQ and FIS was used eight times<sup>16-20,24-26</sup>, the ECOHIS (Brazilian and Chinese versions) four times<sup>22,27-29</sup>, the FHC-OHRQOL one time<sup>23</sup>, PedsQL Oral Health Scale 3.0 one time<sup>21</sup>, and one time the OH-QOLADS.<sup>30</sup> None of the studies modified the instruments to better “fit” people with disabilities (except the study by Al-Jameel et al.<sup>30</sup> which used an instrument specific for people with Down syndrome). Most of the studies used a five-point Likert scale to score the items.

Five studies compared the OHRQoL of people with disability compared to people without disability.<sup>20,22,23,27,28</sup> Among the studies with children with cerebral palsy all of them conclude that children with CP had a worse score in the OHRQoL compared to children without CP.<sup>20,22,23</sup> Difficulty in opening the mouth and presence of gastroesophageal reflux disease were factors that contribute to a negative effect on OHRQoL.<sup>20</sup> Moreover, some studies showed that dental caries had a negative impact on both groups<sup>28</sup> and that oral health status is not significantly different between normally developed children.<sup>23</sup>

Two studies compared the OHRQoL in individuals with ASD and those without.<sup>27,28</sup> Du et al.<sup>27</sup> observed that children with ASD had a worst health-related quality of life and OHRQoL than children without it. Also, having a poorer OHRQoL predicted a poorer health-related quality of life. Moreover, Faker et al.<sup>28</sup> conclude that untreated dental caries is associated with a negative impact in both groups and there was no difference between the scores of OHRQoL. Although, children with ASD showed significant negative impact on the OHRQoL and their caregivers experience more distress.

The main results of all studies are available at Table 1. Most of the studies observed a negative impact of dental caries, bruxism, and poorer oral health status. Also, sociodemographic factor such a higher family income can improve the OHRQoL.

## **Discussion**

This scoping review was conducted to examine the oral health related quality of life conditions among children and adolescents with autism spectrum disorder, Down syndrome, and cerebral palsy. Most studies were about people with cerebral palsy and were from Brazil, this is explained by the fact that cerebral palsy has a higher prevalence on countries with low and middle-income. Most of the studies used the P-CPQ as the instrument to measure OHRQoL. In general, children with disabilities had worst OHRQoL scores.

Oral health related quality of life measures has been used to evaluate the impact of oral disease on their quality of life using self-reports or proxy-report from patients and caregivers. The use of self-report or proxy-report answers on OHRQoL instruments should measure the same condition in order to allow the comparisons between the caregiver x children perception. For young children, especially those with disabilities, a parent/caregiver proxy report may be needed. Even when children may be able to report for itself, caregiver reports need to be considered as a complement of the children answer.<sup>31</sup>

OHRQoL is usually assessed by a questionnaire using a Likert scale and asks respondents questions about the impact of oral diseases on activities such as chewing, pain, psychosocial functions and social wellbeing. In this review, most of the studies showed that specific oral conditions such as dental caries, bruxism and oral health status are responsible for a negative impact on OHRQoL of children with disability. Also, it is important to highlight that there were disagreements between whether children with disability present a worst OHRQoL when compared to those without disability. Moreover, only one study used an instrument specific to people with Down syndrome, although the instrument is not used widely in the literature.

Moreover, the influence of sociodemographic factors of the caregivers on the OHRQoL has been studied by many authors.<sup>32,33</sup> Although the studies were in normally

development children, some authors report the influence of sociodemographic variables such as the age of the caregivers, mother's education, age of the children, source of income, gender, and family structure on the perception of OHRQoL of children. Their results demonstrate a significant influence of these variables on the perception of the OHRQoL.<sup>34</sup>

This may be explained due to the caregiver perception of overall wellbeing is mostly affected by the severity of disability rather than the oral health status.<sup>35</sup> Most people do not consider oral health as a life-threatening condition, especially when there is a debilitating illness or disability affecting these children. Since maintaining good oral health is a challenge among people with disabilities due to limitations such as lack of access to health care, poor neuromuscular coordination, and competing demands.<sup>35</sup> This is a wakeup call to policy makers and health educators to start developing efforts to teach the caregivers about the importance of oral health to general health. More research in high-income countries would provide new insights to understand whether the OHRQoL outcomes experienced by children with those disabilities in these settings are the same or different from those in low- and middle-income countries.

It is important to highlight that this was the first scoping review that evaluated OHRQoL instruments in children and adolescents with Down syndrome, autism spectrum disorder, and cerebral palsy. Also, we searched different types of studies on five databases and the grey literature and no restriction regarding time and language was applied. Even though we applied a rigorous methodology, this study has some limitations. First, even though we searched different databases and the grey literature, some references could not have their full text accessed. Moreover, all studies were from low and middle-income countries, which can lead to some bias. Also, many studies with children with disability were not included due to the inaccessibility to separate data of the specific disabilities evaluated in this review.

In conclusion, most of the studies were about children with cerebral palsy from Brazil and used the P-CPQ. Only one study had an OHRQoL instrument specific to a disability (Down syndrome). Moreover, it seems that children with disability have a worst OHRQoL but there is no agreement in the existent literature. Future research should focus on oral health education and determinants of caregiver's perception of oral health as well

as the development of instruments to measure OHRQoL that can better fit the reality of children and caregivers living with disabilities.



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## TABLES

**Table 1.** Main characteristics of included studies.

Author, Year, Country	Disability & Instruments used	Respondents & Sample size	Authors Conclusion
Abanto et al. 2012, Brazil	Cerebral Palsy P-CPQ, FIS and two questions on global ratings	Parents, 60	“The severity of dental caries, severity of communication ability and low family income are conditions strongly associated with a negative impact on OHRQoL of children with CP...”
Abanto et al. 2014a, Brazil	Cerebral Palsy P-CPQ, FIS	Parents, 60	“We concluded that dental caries experience and presence of bruxism are conditions strongly associated with a negative impact on OHRQoL of children with CP and their parents, though a higher family income can improve this negative impact...”
Abanto et al. 2014b, Brazil	Cerebral Palsy P-CPQ, FIS	Parents, 60	“ETW in CP children is associated to frequent consumption of soft drinks between meals, powdered juices and reported gastroesophageal reflux; however, ETW has not a negative impact on the OHRQoL of these children according to parent’s proxy reports.”
Akhter et al. 2019, Bangladesh	Cerebral Palsy P-CPQ, FIS	Parents/Caregivers, 90	“Our data suggests that children and adolescents with CP who have dental caries are at increased risk of negative oral health related quality of life...”
Al-Jameel et al. 2021, Saudi Arabia	Down Syndrome Oral Health-Related Quality of Life for Children with Down Syndrome (OH-QOLADS)	Parents, 63	“...it can be concluded that inadequate oral health exerts significant negative impacts on different aspects of children’s lives as well as those of their families. As poor oral health status often results in pain and causes emotional and social issues, these children need to receive appropriate care in a timely manner. As the reported impacts on the child and/or his/her family could be caused by disability and its consequences (for example, social isolation and stigmatization)...”
Araújo et al. 2022, Brazil	Cerebral Palsy	Parents, 242 (121 individuals with CP and 121 without)	“...Children and adolescents with CP suffered a greater negative impact on OHRQoL than individuals without CP; Difficulty in opening the mouth and the

	Brazilian short version of P-CPQ		presence of GERD were factors with a negative effect on the OHRQoL of individuals with CP; Dental caries had a negative impact on the OHRQoL of children and adolescents of both groups, with and without CP.”
Cardoso et al. 2018, Brazil	Cerebral Palsy PedsQL Oral Health Scale 3.0	Parents, 149	“Children and adolescents with CP had low HRQoL scores, with greater physical capacity impairment. The impact on HRQoL in individuals with CP was associated with female gender, poor general health perception, and moderate or severe communication skills. The HRQoL score showed no differences, according to the presence of oral disorders. The frequency of impact on OHRQoL was low and associated to age group of 10 to 18 years, presence of gastroesophageal reflux, dental caries, and periodontal diseases.”
De Almeida et al. 2021, Brazil	Autism Spectrum Disorder P-CPQ	Parents, 115	“In conclusion, this prospective study demonstrated that according to the perception of the caregivers, dental treatment had a significantly positive impact on the OHRQoL of children and adolescents with ASD. This was evident in the evaluation carried out 3 months after the dental treatment.”
Du et al. 2010, China	Cerebral Palsy Chinese version of the Early Childhood Oral Health Impact Scale (ECOHIS) and PedsQL	Parents/Caregivers, 144 (72 with CP and 72 without)	“...The HQoL and OHQoL were significantly more compromised among children affected by CP than for preschool children without CP, highlighting the effects that CP has on general and oral health. The PedsQL had a weak correlation with ECOHIS indicating that HQoL assessment may be inappropriate for capturing OHQoL attributes, and this thus supports the need to include separate OHQoL assessments for children with CP.”
Du et al. 2020, China	Autism Spectrum disorder Chinese version of the Early Childhood Oral Health Impact Scale (ECOHIS)	Parents, 604 (347 with ASD and 257 without)	“Significant difference in health-related quality of life (HrQoL) and oral health-related quality of life (OHRQoL) existed between the preschool children with and without ASD... There were significant but generally weak correlation between HrQoL and OHRQoL measures. Regression analyses predicted that having ASD negatively affected both HrQoL and OHRQoL of preschool



			children and their families. Having a poorer OHRQoL predicted a poorer HrQoL, and having increased dental visit experiences predicted a poorer OHRQoL, highlighting the potential importance of preschool children's proper oral health care for enhancing their quality of life."
El Ashiry et al. 2016, Egypt	Cerebral Palsy FHC-OHRQOL questionnaire.	Parents, 173 (63 with CP and 110 without)	"...The OHRQOL of children with CP is significantly lower than that of normally developing children in 3 sections of the FHC-OHRQOL questionnaire...The oral health status of children with CP is not significantly different from that of normally developing children in the same age group..."
Faker et al. 2022, Brazil	Autism spectrum disorder B- ECOHIS	Parents, 68 (34 with ASD and 34 without)	"In conclusion, untreated dental caries is associated with a negative impact on the OHRQoL of children with and without ASD and of their families. There was no statistically significant difference in overall OHRQoL scores between the groups. In the ASD group, children with untreated dental caries showed significant negative impact on OHRQoL and their parents experience more distress than parents of children without autism. Understanding of these influences can help clinicians and researchers assess oral health needs, establish priorities of care, and evaluate various treatment strategies, especially for children with ASD."
Pani et al. 2020, Saudi Arabia	Cerebral Palsy P-CPQ	Parents, 45	"With the limitations of the current study, we can conclude that motor function has a significant impact on both the oral health and the oral health-related quality of life of adolescents with spastic cerebral palsy..."
Paula et al. 2022, Brazil	Autism spectrum disorder B-ECOHIS	Parents, 27	"Individuals with ASD showed improvement in their OHRQoL after dental treatment. The results of this work suggest that the B-ECOHIS is responsive to changes in OHRQoL and also indicated its good longitudinal construct validity, making it suitable as an outcome measure in clinical trials."

Santos et al. 2017, Brazil	Cerebral Palsy P-CPQ	Parents, 26 in the experimental group (78 in total)	“The six applications of PBMT with an 808 nm CW diode laser increased masseter thickness, and the amplitude of mouth opening, and reduced the impact of spastic CP on OHRQOL.”
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### **2.3.1 Material Suplementar**

O material complementar deste artigo encontra-se disponível como APÊNDICE A – Supplementary file 1 e APÊNDICE B – Supplementary file 2

### 3 OUTROS TRABALHOS DESENVOLVIDOS

- Artigo em processo de submissão a periódico:

Juliana da Silva Moro; Tatiane Dominoni Rodrigues; Pedro Vitali Kammer; Alessandra Rodrigues de Camargo; Michele Bolan. **Efficacy of the video modeling technique as a facilitator of dental care in autistic children: Randomized clinical trial.**

- Artigo em processo de submissão a periódico:

Caoimhin Mac Giolla Phadraig; Pedro Vitali Kammer; Koula Asimakopoulou; Olive Healy; Isabel Fleischmann; Heather Buchanan; Tim J Newton; Blanaid Daly; Jacobo Limeres Posse; Marie Therese Hosey; Carilynne Yarascavitch; Yvonne MacAuley; Chris Stirling; Aisyah Binti Ahmad Fisal; June Nunn. **Labels and descriptions of dental behavior support techniques: A Scoping Review of Clinical Practice Guidelines.**

- Artigo em processo de submissão a periódico:

Caoimhin Mac Giolla Phadraig; Pedro Vitali Kammer; Koula Asimakopoulou; Olive Healy; Isabel Fleischmann; Heather Buchanan; Tim J Newton; Blanaid Daly; Jacobo Limeres Posse; Marie Therese Hosey; Carilynne Yarascavitch; Yvonne MacAuley; Chris Stirling; Aisyah Binti Ahmad Fisal; June Nunn; et al. **Consensus on what techniques are used to support patients to receive dental care: A Delphi study.**

## 4 CONCLUSÃO

Baseado nos presentes estudos, a área de Odontologia para pacientes especiais vem crescendo mundialmente. Na área de Odontopediatria focada em pacientes com deficiência, inúmeros artigos são encontrados nas bases de dados internacionais. Com o aumento da prevalência de condições/transtornos que desafiam o manejo e condução dos casos, a necessidade pela busca de atualização profissional é uma obrigação.

Baseado nos resultados de nossa revisão bibliométrica, podemos concluir a mudança de paradigmas que pessoas com deficiência estão vivenciando na ciência. O cirurgião-dentista necessita se adaptar as necessidades dos pacientes, e não o contrário e alterar a linguagem capacitista para uma inclusiva e acessível. Por fim, investir em intervenções focadas na prevenção e educação de profissionais de saúde para garantir o acesso desses indivíduos aos serviços de saúde antes da necessidade de intervenções “curativas”.

Complementar a esses achados, de acordo com os resultados da revisão sistemática que avalia a prevalência do bruxismo/ranger dos dentes nesses indivíduos, observamos a diversidade e a variabilidade dos mesmos. Isso destaca a individualidade de cada paciente, extrapolando o diagnóstico e lembrando a necessidade de avaliar o paciente como um todo. Além disso, é de extrema importância destacar a variabilidade metodológica dos estudos, ponto importante para que futuras pesquisas sejam comparáveis entre si.

Por fim, com os resultados da revisão de escopo podemos observar o impacto que a condição oral gera na qualidade de vida de pessoas com deficiência. Vale a pena destacar a presença majoritária de estudos feitos no Brasil, destacando a importância do acesso a saúde desses indivíduos na nossa sociedade e, também, a seriedade na qual a Odontologia brasileira estuda essa temática.

A área de Odontopediatria com foco em pacientes com deficiência possui uma imensidade de necessidades e possibilidades para estudos futuros. Principalmente no controle da variabilidade entre estudos e a execução de estudos clínicos, sobre técnicas de manejo comportamental, efetividade de intervenções modificadas, longevidade do uso de materiais restauradores e de revisões que sintetizem a literatura, que muitas vezes encontram resultados conflitantes.

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## APÊNDICE A – Supplementary file 1

**Supplementary file 1.** Database search strategy (June 20, 2022).

Database	Search
MEDLINE (PubMed) 286	("Disabled Persons"[Mesh] OR Disabl* OR special-needs OR "special needs" OR handicap* OR disabil* OR special-care OR "special care" OR "disabled Children"[Mesh] OR "Children with Disabilities" OR "Children with Disability" OR "Disabled Child" OR "Developmental Disabilities"[Mesh] OR "Developmental Disabilities" OR "Intellectual Disability"[Mesh] OR "Intellectual Disability" OR "Intellectual Disabilities" OR "Intellectual Development Disorder" OR "Neurodevelopmental Disorders"[Mesh] OR "Neurodevelopmental Disorders" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Mental Deficiencies" OR "Mental Deficiency" OR "developmental delay" OR "Cerebral Palsy"[Mesh] OR "Cerebral Palsy" OR "Spastic Cerebral Palsy" OR "Hypotonic Cerebral Palsy" OR "Atonic Cerebral Palsy" OR "Dyskinetic Cerebral Palsy" OR "Athetoid Cerebral Palsy" OR "Monoplegic Cerebral Palsy" OR "Spastic Diplegia" OR "Little's Disease" OR "Little Disease" OR "Congenital Cerebral Palsy" OR "Rolandic Type Cerebral Palsy" OR "Quadriplegic Infantile Cerebral Palsy" OR "Mixed Cerebral Palsy" OR "Down syndrome"[Mesh] OR "Down syndrome" OR "Trisomy 21" OR Mongolism OR "partial trisomy 21" OR "down syndrome*" OR "Trisomy G" OR 47,XX,+21 OR "Down's Syndrome" OR "Downs Syndrome" OR "Attention Deficit Disorder with Hyperactivity"[Mesh] OR "Attention Deficit Disorder with Hyperactivity" OR "Hyperkinetic Syndrome" OR "Attention Deficit-Hyperactivity Disorders" OR "attention deficit hyperactivity disorder" OR ADHD OR ADDH OR "Autistic Disorder"[Mesh] OR "Autistic Disorder" OR Autism OR "Kanner's Syndrome" OR "Kanner Syndrome" OR "Infantile Autism" OR "Autism Spectrum Disorder"[Mesh] OR "Autism Spectrum Disorder" OR "Autism Spectrum Disorders" OR "Asperger Syndrome"[Mesh] OR "Asperger Syndrome") AND (((("Child Oral Health Impact Profile" OR COHIP OR COHIP-PS OR "Early Childhood Oral Health Impact Scale" OR ECOHIS OR SOHO-5 OR MOHRQOL-P OR MOHRQOL-C OR CDPQ OR "Child Perceptions Questionnaire" OR CPQ OR CPQ8-10 OR CPQ11-14 OR COIDP OR C-OIDP OR TOQOL OR "child oral health-related quality of life" OR COHRQoL OR "Child Oral Health Impact Profile-Short Form" OR COHIP-SF OR POQL)) OR (((((child[Mesh] OR child OR children OR pediatric OR adolescent[Mesh] OR adolescent OR adolescents OR "child, preschool"[Mesh] OR "preschool child" OR preschool OR "dental care for children"[Mesh])) AND ("oral health"[Mesh] AND "quality of life"[Mesh]) OR ("Oral Health" AND "Quality of Life") OR "oral health related quality of life" OR OHRQoL OR "oral health"[Mesh] OR (oral AND health) OR "oral health")) AND (related)) AND ("quality of life"[Mesh] OR (quality AND life) OR "quality of life"))))
Scopus 239	( INDEXTERMS ( "Disabled Persons" ) OR disabl* OR special-needs OR "special needs" OR handicap* OR disabil* OR special-care OR "special care" OR INDEXTERMS ( "disabled Children" ) OR "Children with Disabilities" OR "Children with Disability" OR "Disabled Child" OR INDEXTERMS ( "Developmental Disabilities" ) OR "Developmental Disabilities" OR INDEXTERMS ( "Intellectual Disability" ) OR "Intellectual Disability" OR "Intellectual Disabilities" OR "Intellectual Development Disorder" OR INDEXTERMS ( "Neurodevelopmental Disorders" ) OR "Neurodevelopmental Disorders" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Mental Deficiencies" OR "Mental Deficiency" OR "developmental delay" OR INDEXTERMS ( "Cerebral Palsy" ) OR "Cerebral Palsy" OR "Spastic Cerebral Palsy" OR "Hypotonic Cerebral Palsy" OR "Atonic Cerebral Palsy" OR "Dyskinetic Cerebral Palsy" OR "Athetoid Cerebral Palsy" OR "Monoplegic Cerebral Palsy" OR "Spastic Diplegia" OR "Little's Disease" OR "Little Disease" OR "Congenital

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		<p>Cerebral Palsy" OR "Rolandic Type Cerebral Palsy" OR "Quadriplegic Infantile Cerebral Palsy" OR "Mixed Cerebral Palsy" OR INDEXTERMS ("Down syndrome" ) OR "Down syndrome" OR "Trisomy 21" OR mongolism OR "partial trisomy 21" OR "down syndrome*" OR "Trisomy G" OR 47,xx,+21 OR "Down's Syndrome" OR "Downs Syndrome" OR INDEXTERMS ( "Attention Deficit Disorder with Hyperactivity" ) OR "Attention Deficit Disorder with Hyperactivity" OR "Hyperkinetic Syndrome" OR "Attention Deficit-Hyperactivity Disorders" OR "attention deficit hyperactivity disorder" OR adhd OR addh OR INDEXTERMS ( "Autistic Disorder" ) OR "Autistic Disorder" OR autism OR "Kanner's Syndrome" OR "Kanner Syndrome" OR "Infantile Autism" OR INDEXTERMS ( "Autism Spectrum Disorder" ) OR "Autism Spectrum Disorder" OR "Autism Spectrum Disorders" OR INDEXTERMS ( "Asperger Syndrome" ) OR "Asperger Syndrome" ) AND ( ( ( "Child Oral Health Impact Profile" OR cohip OR cohip-ps OR "Early Childhood Oral Health Impact Scale" OR ecohis OR soho-5 OR mohrqol-p OR mohrqol-c OR cdpq OR "Child Perceptions Questionnaire" OR cpq OR cpq8-10 OR cpq11-14 OR coidp OR c-oidp OR toqol OR "child oral health-related quality of life" OR cohqol OR "Child Oral Health Impact Profile-Short Form" OR cohpsf OR poql ) ) OR ( ( ( ( INDEXTERMS ( child ) OR child OR children OR pediatric OR INDEXTERMS ( adolescent ) OR adolescent OR adolescents OR INDEXTERMS ( "child, preschool" ) OR "preschool child" OR preschool OR INDEXTERMS ( "dental care for children" ) ) ) AND ( ( INDEXTERMS ( "oral health" ) AND INDEXTERMS ( "quality of life" ) ) OR ( "Oral Health" AND "Quality of Life" ) OR "oral health related quality of life" OR ohrqol OR INDEXTERMS ( "oral health" ) OR ( oral AND health ) OR "oral health" ) ) AND ( related ) ) AND ( INDEXTERMS ( "quality of life" ) OR ( quality AND life ) OR "quality of life" ) ) ) )</p>
Web	of	TS=("Disabled Persons" OR Disabl* OR special-needs OR "special needs"
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"Autism Spectrum Disorders" OR "Asperger Syndrome" OR "Asperger Syndrome" ) )  
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 MOHRQOL-P OR MOHRQOL-C OR CDPQ OR "Child Perceptions Questionnaire"  
 OR CPQ OR CPQ8-10 OR CPQ11-14 OR COIDP OR C-OIDP OR TOQOL OR "child  
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 Profile-Short Form" OR COHIP-SF OR POQL ) ) OR (((((child OR child OR children  
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 related quality of life" OR OHRQoL OR "oral health" OR (oral AND health ) OR "oral  
 health" ) ) AND (related ) ) AND ("quality of life" OR (quality AND life ) OR "quality  
 of life" ))))

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CINAHL ((MH "Disabled Persons"+) OR Disabl\* OR special-needs OR "special needs" OR handicap\* OR disabil\* OR special-care OR "special care" OR (MH 64 "disabled Children"+) OR "Children with Disabilities" OR "Children with Disability" OR "Disabled Child" OR (MH "Developmental Disabilities"+) OR "Developmental Disabilities" OR (MH "Intellectual Disability"+) OR "Intellectual Disability" OR "Intellectual Disabilities" OR "Intellectual Development Disorder" OR (MH "Neurodevelopmental Disorders"+) OR "Neurodevelopmental Disorders" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Mental Deficiencies" OR "Mental Deficiency" OR "developmental delay" OR (MH "Cerebral Palsy"+) OR "Cerebral Palsy" OR "Spastic Cerebral Palsy" OR "Hypotonic Cerebral Palsy" OR "Atonic Cerebral Palsy" OR "Dyskinetic Cerebral Palsy" OR "Athetoid Cerebral Palsy" OR "Monoplegic Cerebral Palsy" OR "Spastic Diplegia" OR "Little's Disease" OR "Little Disease" OR "Congenital Cerebral Palsy" OR "Rolandic Type Cerebral Palsy" OR "Quadriplegic Infantile Cerebral Palsy" OR "Mixed Cerebral Palsy" OR (MH "Down syndrome"+) OR "Down syndrome" OR "Trisomy 21" OR Mongolism OR "partial trisomy 21" OR "down syndrome\*" OR "Trisomy G" OR 47,XX,+21 OR "Down's Syndrome" OR "Downs Syndrome" OR (MH "Attention Deficit Disorder with Hyperactivity"+) OR "Attention Deficit Disorder with Hyperactivity" OR "Hyperkinetic Syndrome" OR "Attention Deficit-Hyperactivity Disorders" OR



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	<p>(((Any Field: "Child Oral Health Impact Profile" OR Any Field: COHIP OR Any Field: COHIP-PS OR Any Field: "Early Childhood Oral Health Impact Scale" OR Any Field: ECOHIS OR Any Field: SOHO-5 OR Any Field: MOHRQOL-P OR Any Field: MOHRQOL-C OR Any Field: CDPQ OR Any Field: "Child Perceptions Questionnaire" OR Any Field: CPQ OR Any Field: CPQ8-10 OR Any Field: CPQ11-14 OR Any Field: COIDP OR Any Field: C-OIDP OR Any Field: TOQOL OR Any Field: "child oral health-related quality of life" OR Any Field: COHRQoL OR Any Field: "Child Oral Health Impact Profile-Short Form" OR Any Field: COHIP-SF OR Any Field: POQL)) OR (Any Field: "oral health" AND Any Field: "quality of life") OR (Any Field: "Oral Health" AND Any Field: "Quality of Life") OR Any Field: "oral health related quality of life" OR Any Field: OHRQoL OR Any Field: "oral health" OR (Any Field: oral AND Any Field: health) OR Any Field: "oral health")) AND (Any Field: related)) AND (Any Field: "quality of life" OR (Any Field: quality AND Any Field: life) OR Any Field: "quality of life"))))</p>
<p>Dentistry &amp; Oral Sciences Source (DOSS)  130</p>	<p>((("Child Oral Health Impact Profile" OR COHIP OR COHIP-PS OR "Early Childhood Oral Health Impact Scale" OR ECOHIS OR SOHO-5 OR MOHRQOL-P OR MOHRQOL-C OR CDPQ OR "Child Perceptions Questionnaire" OR CPQ OR CPQ8-10 OR CPQ11-14 OR COIDP OR C-OIDP OR TOQOL OR "child oral health-related quality of life" OR COHRQoL OR "Child Oral Health Impact Profile-Short Form" OR COHIP-SF OR POQL)) OR (((((exp child/ OR child OR children OR pediatric OR exp adolescent/ OR adolescent OR adolescents OR exp "child, preschool"/ OR "preschool child" OR preschool OR exp "dental care for children"/)) AND ((exp "oral health"/ AND exp "quality of life"/) OR ("Oral Health" AND "Quality of Life" ) OR "oral health related quality of life" OR OHRQoL OR exp "oral health"/ OR (oral AND health ) OR "oral health" )) AND (related )) AND (exp "quality of life"/ OR (quality AND life ) OR "quality of life" )))</p>
<p>Google Scholar  200</p>	<p>("Developmental Disabilities" OR "Intellectual Disability" OR "Neurodevelopmental disorders" OR "Cerebral Palsy" OR "Down syndrome" OR "Autism Spectrum Disorder" OR "Autistic Disorder") AND ("oral health related quality of life" OR "quality of life")</p>

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## APÊNDICE B – Supplementary file 2

### Supplementary file 2 - Articles excluded and the reasons for exclusion (n=30).

Reference	Author (year)	Reasons for Exclusion*
▪	Abanto (2012)	Included
▪	Abanto (2014a) <sup>1</sup>	Included
▪	Abanto (2014b) <sup>2</sup>	Included
▪	Akhter (2019) <sup>3</sup>	Included
▪	Al-Nowaiser (2017) <sup>4</sup>	1
▪	Al-Jameel (2021) <sup>5</sup>	Included
▪	Alvarenga (2020) <sup>6</sup>	2
▪	Alwattban (2021) <sup>7</sup>	1
▪	Ansari (2016) <sup>8</sup>	1
▪	Araujo (2022) <sup>9</sup>	Included
▪	Cancio (2018) <sup>10</sup>	1
▪	Cardoso (2018) <sup>11</sup>	Included
▪	Chang (2014) <sup>12</sup>	1*
▪	Da Fonseca(2002) <sup>13</sup>	4
▪	Davis (2013) <sup>14</sup>	3*
▪	De Almeida (2021) <sup>15</sup>	Included
▪	Du (2010) <sup>16</sup>	Included
▪	Du (2020) <sup>17</sup>	Included
▪	El Ashiry (2016) <sup>18</sup>	Included
▪	El-Meligy (2016) <sup>19</sup>	1
▪	Faker (2018) <sup>20</sup>	1
▪	Faker (2022) <sup>21</sup>	Included
▪	Farsi (2018) <sup>22</sup>	1
▪	Nelson (2009) <sup>23</sup>	3
▪	Pani (2020) <sup>24</sup>	Included
▪	Paula (2022) <sup>25</sup>	Included
▪	Santos (2017) <sup>26</sup>	Included
▪	Sesiliana () <sup>27</sup>	4

▪	Tefera (2021) <sup>28</sup>	1
▪	Ulfah (2019) <sup>29</sup>	1

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\*Legend:

1. Other disabilities rather than autism spectrum disorders, cerebral palsy and Down syndrome.

2. OHRQoL of parents/caregiver rather than children OHRQoL.

3. Do not evaluate OHRQoL.

4. Full-text not found.

## REFERENCES FOR THE SUPPLEMENTARY FILE 2

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2. Abanto J, Shitsuka C, Murakami C, Ciamponi AL, Raggio DP, Bönecker M. Associated factors to erosive tooth wear and its impact on quality of life in children with cerebral palsy. *Special Care in Dentistry*. 2014;34(6):278-285.
3. Akhter R, Hassan NMM, Martin EF, et al. Caries experience and oral health-related quality of life (OHRQoL) of children and adolescents with cerebral palsy in a low-resource setting. *BMC Oral Health*. 2019;19(1):N.PAG-N.PAG.
4. Al-Nowaiser AM, Al Suwyed AS, Al Zoman KH, et al. Influence of full mouth rehabilitation on oral health-related quality of life among disabled children. *Clinical and experimental dental research*. 3(5):171-178.
5. AlJameel A, Hassan a, AlKawari H. Oral Health-Related Quality of Life (OHRQoL) of Children with Down Syndrome and Their Families: A Cross-Sectional Study. *Children*. 2021;8(11):1-8.
6. Alvarenga É DSL, Silva AM, da Silva TAE, de Araújo RF, Prado Júnior RR, Mendes RF. Oral health-related quality of life in caregivers of individuals with Cerebral Palsy: a case-control study. *European archives of paediatric dentistry : official journal of the European Academy of Paediatric Dentistry*. 21(2):193-202.
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9. Araujo TDB, Nogueira BR, Mendes RF, Junior RRP. Oral health-related quality of life in children and adolescents with cerebral palsy: paired cross-sectional study. *European Archives of Paediatric Dentistry*. 23(3):391-398.
10. Cancio V, Faker K, Bendo CB, Paiva SM, Tostes MA. Individuals with special needs and their families' oral health-related quality of life. *Brazilian Oral Research*. 32:1-9.
11. Cardoso AMR, de Medeiros MMD, Gomes LN, et al. Factors associated with health and oral health-related quality of life of children and adolescents with cerebral palsy. *Special Care in Dentistry*. 2018;38(4):216-226.
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13. da Fonseca MA. Oral health-related quality of life in children and adolescents with special health care needs. *Oral Health-Related Quality of Life*. 2002:89-97.
14. Davis E, Mackinnon A, Davern M, et al. Description and psychometric properties of the CP QOL-Teen: a quality of life questionnaire for adolescents with cerebral palsy. *Research in developmental disabilities*. 2013;34(1):344-352.
15. de Almeida JS, Fernandes RF, et al. Impact of dental treatment on the oral health-related quality of life of children and adolescents with Autism Spectrum Disorder. *Special Care in Dentistry*. 2021;41(6):658-669.
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17. Du RY, Yiu CKY, King NM. Health- and oral health-related quality of life among preschool children with autism spectrum disorders. *European Archives of Paediatric Dentistry (Springer Science & Business Media BV)*. 21(3):363-371.
18. El Ashiry EA, Alaki SM, Nouri SM. Oral Health Quality of Life in Children with Cerebral Palsy: Parental Perceptions. *Journal of Clinical Pediatric Dentistry*. 2016;40(5):375-387.
19. El-Meligy O, Maashi M, Al-Mushayt A, Al-Nowaiser A, Al-Mubark S. The Effect of Full-Mouth Rehabilitation on Oral Health-Related Quality of Life for Children with Special Health Care Needs. *Journal of Clinical Pediatric Dentistry*. 2016;40(1):53-61.



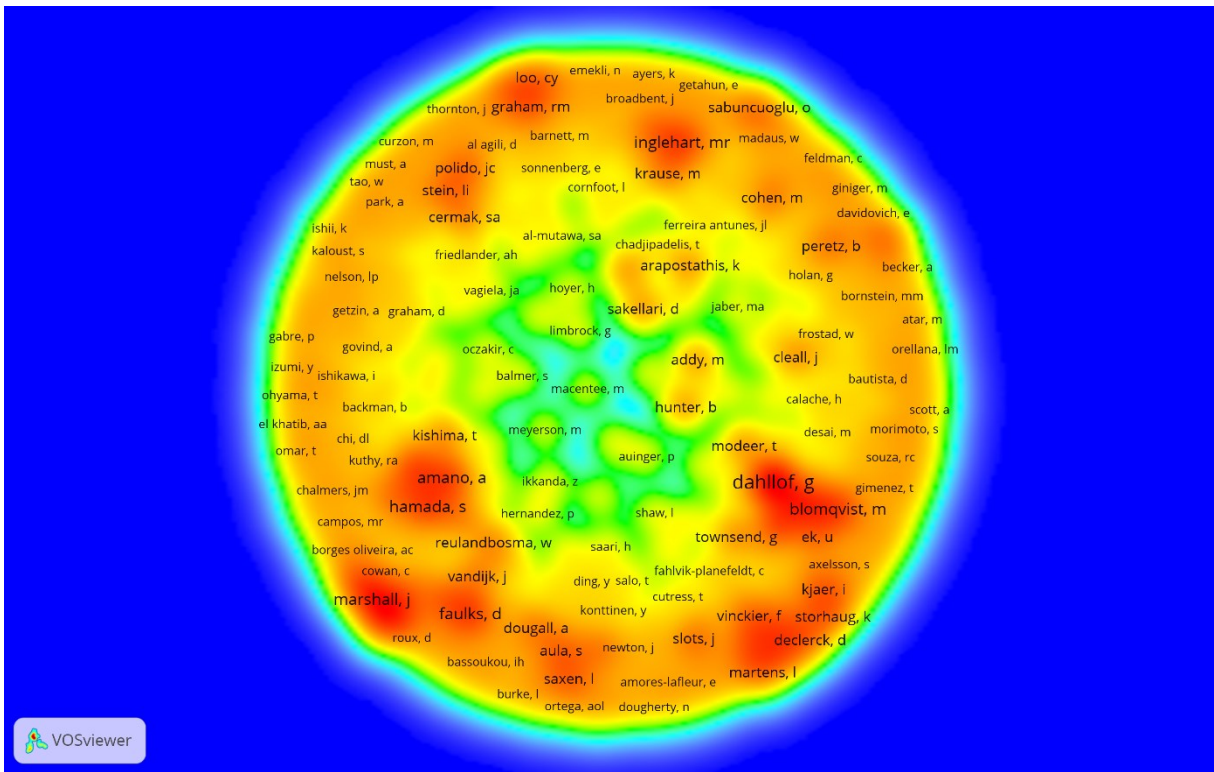
- 20.Faker K, Tostes MA, Cancio de Paula VA. ORAL HEALTH-RELATED QUALITY OF LIFE AMONG AUTISTIC CHILDREN COMPARED TO CHILDREN WITHOUT AUTISM IN BRAZIL. *International Journal of Clinical Dentistry*.15(1):27-37.
- 21.Faker K, Tostes MA, Paula VAC. Impact of untreated dental caries on oral health-related quality of life of children with special health care needs. *Braz Oral Res*.32:e117.
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- 23.Nelson LP, Getzin A, Graham D, et al. Unmet Dental Needs and Barriers to Care for Children with Significant Special Health Care Needs. *Pediatric Dentistry*.33(1):29-36.
- 24.Pani SC, AlEidan SF, AlMutairi RN, et al. The Impact of Gross Motor Function on the Oral Health-Related Quality of Life in Young Adults with Cerebral Palsy in Saudi Arabia. *International Journal of Dentistry*.2020.
- 25.Paula VAC, Faker K, Bendo CB, Tostes MA. Responsiveness of the B-ECOHIS to detect changes in OHRQoL following dental treatment of children with autism spectrum disorder. *Braz Oral Res*. 2022;36:e079.
- 26.Santos M, Nascimento K, Carazzato S, et al. Efficacy of photobiomodulation therapy on masseter thickness and oral health-related quality of life in children with spastic cerebral palsy. *Lasers in Medical Science*. 2017;32(6):1279-1288.
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- 28.Tefera AT, Girma B, Adane A, et al. Dental health problems and treatment-seeking behavior among special need school students in Amhara region, Ethiopia. *BMC Oral Health*. 2021;21(1):1-9.
- 29.Ulfah SF, Marjianto A. Dental caries and oral health related to quality of life of children with disabilities. *Indian Journal of Forensic Medicine and Toxicology*. 2019;13(4):1739-1744.

## ANEXO A – Estratégia de busca

### Supplementary material 1. Database search strategy (October 21, 2020)

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- #1** (TS=("Disabled Persons" OR "Disabl\*" OR "special-needs" OR "special needs" OR "handicap\*" OR "disabil\*" OR "special-care" OR "special care" OR "disabled Children" OR "Children with Disabilities" OR "Children with Disability" OR "Disabled Child" OR "Developmental Disabilities" OR "Intellectual Disability" OR "Intellectual Disabilities" OR "Intellectual Development Disorder" OR "Psychosocial Mental Retardation" OR "Psychosocial Mental Retardations" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Cerebral Palsy" OR "Spastic Cerebral Palsy" OR "Hypotonic Cerebral Palsy" OR "Atonic Cerebral Palsy" OR "Dyskinetic Cerebral Palsy" OR "Athetoid Cerebral Palsy" OR "Monoplegic Cerebral Palsy" OR "Spastic Diplegia" OR "Little's Disease" OR "Little Disease" OR "Congenital Cerebral Palsy" OR "Rolandic Type Cerebral Palsy" OR "Quadriplegic Infantile Cerebral Palsy" OR "Mixed Cerebral Palsy" OR "Down syndrome" OR "Trisomy 21" OR "down syndrome\*" OR "Trisomy G" OR "47,XX,+21" OR "Down's Syndrome" OR "Downs Syndrome" OR "Attention Deficit Disorder with Hyperactivity" OR "Hyperkinetic Syndrome" OR "Attention Deficit-Hyperactivity Disorders" OR "attention deficit hyperactivity disorder" OR "ADHD" OR "ADDH" OR "Autistic Disorder" OR "Autism" OR "Kanner's Syndrome" OR "Kanner Syndrome" OR "Infantile Autism" OR "Autism Spectrum Disorder" OR "Autism Spectrum Disorders" OR "Asperger Syndrome" OR "Vision Disord\*" OR "visual impair\*" OR "Vision Disorders" OR "Hearing Disorders" OR "Vision Disorders" OR "Hearing Disord\*" OR "hearing impair\*" OR "developmental speech sound disorders" OR "developmental speech fluency disorder" OR "Developmental language disorder" OR "Language Development Disorders" OR "Learning Disabilities" OR "Learning Disabilities" OR "Developmental motor coordination disorder" OR "Motor Skills Disorders" OR "Stereotyped movement disorder" OR "Stereotypic Movement Disorder" OR "Stereotypic Movement Disorder" OR "developmental delay" OR "Neurodevelopmental Disorders" OR "Neurodevelopmental Disorders" OR "Cri-du-Chat Syndrome" OR "X-Linked Mental Retardations" OR "Prader-Willi Syndrome" OR "WAGR Syndrome" OR "Trisomy Syndrome" OR "Williams Syndrome" OR "Fetal Alcohol Spectrum Disorders" OR "Fetal Alcohol Syndrome" OR "Partial Fetal Alcohol Syndrome" OR "FASD" OR "FASDs" OR "Alcohol Related Birth Defects" OR "Fragile X Syndrome" OR "Fragile X Syndromes" OR "Marker X Syndrome" OR "Marker X Syndromes" OR "Martin-Bell Syndrome" OR "FRAXE Syndrome" OR "FRAXE Syndromes" OR "FRAXA Syndrome" OR "FRAXA Syndromes" OR "Kernicterus" OR "Bilirubin Encephalopathy" OR "Bilirubin Encephalopathies" OR "Muscular Dystrophies" OR "Myodystrophica" OR "Myodystrophy" OR "Tourette Syndrome" OR "Gilles de la Tourette Syndrome" OR "Tourette Disease" OR "Tourette Disorder" OR "Tourettes Syndrome"))
- 
- #2** WC=(Dentistry, Oral Surgery & Medicine)
- 
- #3** #1 AND #2
-

### ANEXO B – Figura complementar 1





## ANEXO D – Os 100 artigos mais citados

**Table 1.** The 100 most-cited articles in special care dentistry

Rank	Title of the article	Citation count WoS-CC (Citation density)	Citation count Scopus (Citation density)	Citation count Google Scholar (Citation density)
1	Desai SS. Down syndrome - A review of the literature. Oral Surgery Oral Medicine Oral Pathology Oral Radiology and Endodontics. Sep 1997;84(3):279-285. doi:10.1016/S1079-2104(97)90343-7	106 (4.61)	133 (5.78)	367 (15.96)
2	Nakagawa I, Amano A, Ohara-Nemoto Y, et al. Identification of a new variant of fimA gene of Porphyromonas gingivalis and its distribution in adults and disabled populations with periodontitis. Journal of Periodontal Research. Dec 2002;37(6):425-432. doi:10.1034/j.1600-0765.2002.01637.x	96 (5.33)	102 (5.67)	156 (8.67)
3	Reulandbosma W, Vandijk J. Periodontal-Disease in Downs-Syndrome - a Review. Journal of Clinical Periodontology. Jan 1986;13(1):64-73. doi:10.1111/j.1600-051X.1986.tb01416.x	91 (2.68)	107 (3.15)	229 (6.74)
4	Slots J, Rams TE. New Views on Periodontal Microbiota in Special Patient Categories. Journal of Clinical Periodontology. Jul 1991;18(6):411-420. doi:10.1111/j.1600-051X.1991.tb02309.x	89 (3.07)	84 (2.90)	214 (7.38)

- 5 Cohen MM, Winer RA. Dental and Facial Characteristics in Downs Syndrome (Mongolism). *Journal of Dental Research*. 1965 1965;44(1SP2):197-+. doi:10.1177/00220345650440011601
- 6 Jaber MA. Dental caries experience, oral health status and treatment needs of dental patients with autism. *Journal of Applied Oral Science*. May-Jun 2011;19(3):212-217. doi:10.1590/S1678-77572011000300006
- 7 Nelson LP, Getzin A, Graham D, et al. Unmet Dental Needs and Barriers to Care for Children with Significant Special Health Care Needs. *Pediatric Dentistry*. Jan-Feb 2011;33(1):29-36.
- 8 Blomqvist M, Holmberg K, Lindblad F, Fernell E, Ek U, Dahllof G. Salivary cortisol levels and dental anxiety in children with attention deficit hyperactivity disorder. *European Journal of Oral Sciences*. Feb 2007;115(1):1-6. doi:10.1111/j.1600-0722.2007.00423.x
- 9 Loo CY, Graham RM, Hughes CV. The caries experience and behavior of dental patients with autism spectrum disorder. *Journal of the American Dental Association*. Nov 2008;139(11):1518-1524. doi:10.14219/jada.archive.2008.0078

- |           |   |           |           |             |
|-----------|---|-----------|-----------|-------------|
| <b>10</b> | <p>Morgan JP, Minihan PM, Stark PC, et al. The oral health status of 4,732 adults with intellectual and developmental disabilities. <i>Journal of the American Dental Association</i>. Aug 2012;143(8):838-846. doi:10.14219/jada.archive.2012.0288</p>         | 69 (8.63) | 79 (9.88) | 146 (18.25) |
| <b>11</b> | <p>Fink GB, Madaus WK, Walker GF. Quantitative Study of Face in Downs-Syndrome. <i>American Journal of Orthodontics and Dentofacial Orthopedics</i>. 1975 1975;67(5):540-553. doi:10.1016/0002-9416(75)90299-7</p>  | 64 (1.42) | 68 (1.51) | 106 (2.36)  |
| <b>12</b> | <p>Barnett ML, Press KP, Friedman D, Sonnenberg EM. The Prevalence of Periodontitis and Dental-Caries in a Downs-Syndrome Population. <i>Journal of Periodontology</i>. May 1986;57(5):288-293. doi:10.1902/jop.1986.57.5.288</p>                               | 59 (1.74) | 73 (2.15) | 152 (4.47)  |
| <b>13</b> | <p>Friedlander AH, Vagiela JA, Paterno VI, Mahler ME. The neuropathology, medical management and dental implications of autism. <i>Journal of the American Dental Association</i>. Nov 2006;137(11):1517-1527. doi:10.14219/jada.archive.2006.0086</p>          | 58 (4.14) | 54 (3.86) | 139 (9.93)  |
| <b>14</b> | <p>Francis JR, Hunter B, Addy M. A Comparison of 3 Delivery Methods of Chlorhexidine in Handicapped-Children .1. Effects on Plaque, Gingivitis, and Toothstaining. <i>Journal of Periodontology</i>. Jul 1987;58(7):451-455. doi:10.1902/jop.1987.58.7.451.</p> | 58 (1.76) | 60 (1.82) | 124 (3.76)  |

15	Loo CY, Graham RM, Hughes CV. Behaviour guidance in dental treatment of patients with autism spectrum disorder. <i>International Journal of Paediatric Dentistry</i> . Nov 2009;19(6):390-398. doi:10.1111/j.1365-263X.2009.01011.x	55 (5.00)	65 (5.91)	138 (12.55)
16	Gizani S, Declerck D, Vinckier F, Martens L, Marks L, Goffin G. Oral health condition of 12-year-old handicapped children in Flanders (Belgium). <i>Community Dentistry and Oral Epidemiology</i> . Oct 1997;25(5):352-357. doi:10.1111/j.1600-0528.1997.tb00954.x.	55 (2.39)	71 (3.09)	154 (6.70)
17	Oczakir C, Balmer S, Mericske-Stern R. Implant-prosthetic treatment for special care patients: A case series study. <i>International Journal of Prosthodontics</i> . Sep-Oct 2005;18(5):383-389.	54 (3.60)	57 (3.80)	97 (6.47)
18	Pezzememti ML, Fisher MA. Oral health status of people with intellectual disabilities in the southeastern United States. <i>Journal of the American Dental Association</i> . Jul 2005;136(7):903-912. doi:10.14219/jada.archive.2005.0291	54 (3.60)	58 (3.87)	122 (8.13)
19	Shapira J, Chaushu S, Becker A. Prevalence of tooth transposition, third molar agenesis, and maxillary canine impaction in individuals with Down syndrome. <i>Angle Orthodontist</i> . Aug 2000;70(4):290-296.	54 (2.70)	62 (3.10)	142 (7.10)
20	Burke LW, Jones MC. Kabuki Syndrome - Underdiagnosed Recognizable Pattern in Cleft-Palate Patients. <i>Cleft Palate-</i>	54 (2.16)	63 (2.52)	79 (3.16)



- Craniofacial Journal. Jan 1995;32(1):77-84.
- 21 Dos Santos M, Nogueira MLG. Infantile reflexes and their effects on dental caries and oral hygiene in cerebral palsy individuals. Journal of Oral Rehabilitation. Dec 2005;32(12):880-885. 53 (3.53) 54 (3.60) 132 (8.80)
- 22 Townsend GC. Fluctuating Dental Asymmetry in Downs-Syndrome. Australian Dental Journal. 1983 1983;28(1):39-44. doi:10.1111/j.1834-7819.1983.tb01068.x 53 (1.43) 59 (1.59) 76 (2.05)
- 23 Izumi Y, Sugiyama S, Shinozuka O, Yamazaki T, Ohyama T, Ishikawa I. Defective Neutrophil Chemotaxis in Downs-Syndrome Patients and Its Relationship to Periodontal Destruction. Journal of Periodontology. May 1989;60(5):238-242. doi:10.1902/jop.1989.60.5.238 51 (1.65) 67 (2.16) 110 (3.55)
- 24 Desai M, Messer LB, Calache H. A study of the dental treatment needs of children with disabilities in Melbourne, Australia. Australian Dental Journal. Mar 2001;46(1):41-50. doi:10.1111/j.1834-7819.2001.tb00273.x. 50 (2.63) 46 (2.42) 137 (7.21)
- 25 Jaspers MT. Taurodontism in the down Syndrome. Oral Surgery Oral Medicine Oral Pathology Oral Radiology and Endodontology. 1981 1981;51(6):632-636. doi:10.1016/S0030-4220(81)80014-X 50 (1.28) 47 (1.21) 84 (2.15)

26	Cutress TW. Periodontal Disease and Oral Hygiene in Trisomy 21. Archives of Oral Biology. 1971;16(11):1345-+. doi:10.1016/0003-9969(71)90036-7	50 (1.02)	59 (1.20)	129 (2.63)
27	Marshall J, Sheller B, Mancl L. Caries-risk Assessment and Caries Status of Children with Autism. Pediatric Dentistry. Jan-Feb 2010;32(1):69-75.	48 (4.80)	50 (5.00)	101 (10.10)
28	Hanookai D, Nowzari H, Contreras A, Morrison JL, Slots J. Herpesviruses and periodontopathic bacteria in trisomy 21 periodontitis. Journal of Periodontology. Mar 2000;71(3):376-384. doi:10.1902/jop.2000.71.3.376	48 (2.40)	54 (2.70)	90 (4.50)
29	Marshall J, Sheller B, Williams BJ, Mand L, Cowan C. Cooperation predictors for dental patients with autism. Pediatric Dentistry. Sep-Oct 2007;29(5):369-376.	47 (3.62)	42 (3.23)	102 (7.85)
30	Gabre P, Martinsson T, Gahnberg L. Longitudinal study of dental caries, tooth mortality and interproximal bone loss in adults with intellectual disability. European Journal of Oral Sciences. Feb 2001;109(1):20-26. doi:10.1034/j.1600-0722.2001.00965.x	46 (2.42)	51 (2.68)	119 (6.26)
31	Modeer T, Barr M, Dahllof G. Periodontal-Disease in Children with Down-Syndrome. Scandinavian Journal of Dental Research. Jun 1990;98(3):228-234.	46 (1.53)	53 (1.77)	96 (3.20)

- 32 Al Agili DE, Roseman J, Pass MA, Thornton JB, Chavers LS. Access to dental care in Alabama for children with special needs - Parents' perspectives. *Journal of the American Dental Association*. Apr 2004;135(4):490-495. doi:10.14219/jada.archive.2004.0216
- 33 Meyerson MD. Resiliency and success in adults with Moebius syndrome. *Cleft Palate-Craniofacial Journal*. May 2001;38(3):231-235.
- 34 Franklin DL, Luther F, Curzon MEJ. The prevalence of malocclusion in children with cerebral palsy. *European Journal of Orthodontics*. Dec 1996;18(6):637-643.
- 35 Saxen L, Aula S, Westermarck T. Periodontal-Disease Associated with Downs-Syndrome - Orthopantomographic Evaluation. *Journal of Periodontology*. 1977;48(6):337-340. doi:10.1902/jop.1977.48.6.337
- 36 Frostad WA, Cleall JF, Melosky LC. Craniofacial Complex in Trisomy-21 Syndrome (Downs Syndrome). *Archives of Oral Biology*. 1971;16(7):707-&
- 37 Hennequin M, Faulks D, Roux D. Accuracy of estimation of dental treatment need in special care patients. *Journal of Dentistry*. Feb 2000;28(2):131-136. doi:10.1016/S0300-5712(99)00052-4.

- 38 Jensen GM, Cleall JF, Yip ASG. Dentoalveolar Morphology and Developmental Changes in Down-Syndrome (Trisomy-21). *American Journal of Orthodontics and Dentofacial Orthopedics*. 1973;64(6):607-618. 44 (0.94) 43 (0.91) 92 (1.96)
- 39 Backman B, Pilebro C. Visual pedagogy in dentistry for children with autism. *Journal of Dentistry for Children*. Sep-Oct 1999;66(5):325-+. 43 (2.05) 44 (2.10) 114 (5.43)
- 40 Townsend GC. Tooth Size in Children and Young-Adults with Trisomy-21 (down) Syndrome. *Archives of Oral Biology*. 1983;28(2):159-166. doi:10.1016/0003-9969(83)90123-1. 43 (1.16) 47 (1.27) 67 (1.81)
- 41 Suri S, Tompson BD, Cornfoot L. Cranial base, maxillary and mandibular morphology in Down syndrome. *Angle Orthodontist*. Sep 2010;80(5):861-869. doi:10.2319/111709-650.1 42 (4.20) 42 (4.20) 92 (9.20)
- 42 Feldman CA, Giniger M, Sanders M, Saporito R, Zohn HK, Perlman SP. Special Olympics, special smiles: Assessing the feasibility of epidemiologic data collection. *Journal of the American Dental Association*. Dec 1997;128(12):1687-1696. doi:10.14219/jada.archive.1997.0131 41 (1.78) 50 (2.17) 79 (3.43)
- 43 Fischerbrandies H. Cephalometric Comparison between Children with and without Down-Syndrome. *European Journal of Orthodontics*. Aug 1988;10(3):255-263. 41 (1.28) 45 (1.41) 71 (2.22)

44	Shaw L, Maclaurin ET, Foster TD. Dental Study of Handicapped-Children Attending Special Schools in Birmingham, Uk. Community Dentistry and Oral Epidemiology. Feb 1986;14(1):24-27. doi:10.1111/j.1600-0528.1986.tb01488.x	41 (1.21)	55 (1.62)	135 (3.97)
45	Faulks D, Freedman L, Thompson S, Sagheri D, Dougall A. The value of education in special care dentistry as a means of reducing inequalities in oral health. European Journal of Dental Education. Nov 2012;16(4):195-201. doi:10.1111/j.1600-0579.2012.00736.x	40 (5.00)	41 (5.13)	68 (8.50)
46	Orner G. Periodontal-Disease among Children with Downs-Syndrome and Their Siblings. Journal of Dental Research. 1976 1976;55(5):778-782. doi:10.1177/00220345760550051101	40 (0.91)	43 (0.98)	67 (1.52)
47	Usher PJ. Oral Hygiene in Mentally-Handicapped Children - Pilot-Study of Use of Chlorhexidine Gel. British Dental Journal. 1975 1975;138(6):217-221. doi:10.1038/sj.bdj.4803419	40 (0.89)	33 (0.73)	57 (1.27)
48	Garn SM, Cohen MM, Geciauskas MA. Increased Crown-Size Asymmetry in Trisomy-G. Journal of Dental Research. 1970 1970;49(2):465-+. doi:10.1177/00220345700490025301	40 (0.80)	33 (0.66)	58 (1.16)

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|-----------|--|-----------|-----------|------------|
| <b>49</b> | <p>Cogulu D, Sabah E, Kutukculer N, Ozkinay F. Evaluation of the relationship between caries indices and salivary secretory IgA, salivary pH, buffering capacity and flow rate in children with Down's syndrome. Archives of Oral Biology. Jan 2006;51(1):23-28. doi:10.1016/j.archoralbio.2005.06.001</p> | 39 (2.79) | 51 (3.64) | 112 (8.00) |
| <b>50</b> | <p>Limbrock GJ, Hoyer H, Scheying H. Drooling, Chewing and Swallowing Dysfunctions in Children with Cerebral-Palsy - Treatment According to Castillo-Morales. Journal of Dentistry for Children. Nov-Dec 1990;57(6):445-451.</p>   | 39 (1.30) | 51 (1.70) | 75 (2.50)  |
| <b>51</b> | <p>Saxen L, Aula S. Periodontal Bone Loss in Patients with Downs-Syndrome - a Follow-up-Study. Journal of Periodontology. 1982 1982;53(3):158-162. doi:10.1902/jop.1982.53.3.158</p>   | 39 (1.03) | 48 (1.26) | 89 (2.34)  |
| <b>52</b> | <p>El Khatib AA, El Tekeya MM, El Tantawi MA, Omar T. Oral health status and behaviours of children with Autism Spectrum Disorder: a case-control study. International Journal of Paediatric Dentistry. Jul 2014;24(4):314-323. doi:10.1111/ipd.12067</p>  | 38 (6.33) | 37 (6.17) | 90 (15.00) |
| <b>53</b> | <p>Bassoukou IH, Nicolau J, dos Santos MT. Saliva flow rate, buffer capacity, and pH of autistic individuals. Clinical Oral Investigations. Mar 2009;13(1):23-27. doi:10.1007/s00784-008-0209-5</p>  | 38 (3.45) | 34 (3.09) | 78 (7.09)  |

54	Kopycka-Kedzierawski DT, Auinger P. Dental needs and status of autistic children: Results from the National Survey of Children's Health. <i>Pediatric Dentistry</i> . Jan-Feb 2008;30(1):54-58.	38 (3.17)	42 (3.50)	82(6.83)
55	Barragholme M, Dahllof G, Linder L, Modeer T. Actinobacillus-Actinomycetemcomitans, Capnocytophaga and Porphyromonas-Gingivalis in Subgingival Plaque of Adolescents with Downs-Syndrome. <i>Oral Microbiology and Immunology</i> . Aug 1992;7(4):244-248. doi:10.1111/j.1399-302X.1992.tb00033.x	38 (1.36)	45 (1.61)	76 (2.71)
56	Stein LI, Polido JC, Najera SOL, Cermak SA. Oral Care Experiences and Challenges in Children with Autism Spectrum Disorders. <i>Pediatric Dentistry</i> . Sep-Oct 2012;34(5):387-391.	37 (4.63)	38 (4.75)	76 (9.50)
57	Weil TN, Inglehart MR. Dental Education and Dentists' Attitudes and Behavior Concerning Patients with Autism. <i>Journal of Dental Education</i> . Dec 2010;74(12):1294-1307.	37 (3.70)	37 (3.70)	71 (7.10)
58	Krause M, Vainio L, Zwetchkenbaum S, Inglehart MR. Dental Education About Patients with Special Needs: A Survey of U.S. and Canadian Dental Schools. <i>Journal of Dental Education</i> . Nov 2010;74(11):1179-1189.	37 (3.70)	-	83 (8.30)
59	Borges Oliveira AC, Paiva SM, Campos MR, Czeresnia D. Factors associated with malocclusions in children and adolescents with Down syndrome. <i>American Journal of Orthodontics and</i>	37 (3.08)	48 (4.00)	106 (8.83)

- Dentofacial Orthopedics. Apr 2008;133(4)doi:10.1016/j.ajo.2007.09.014
- 60 Honkala E, Honkala S, Shyama M, Al-Mutawa SA. Field trial on caries prevention with xylitol candies among disabled school students. Caries Research. 2006;40(6):508-513. doi:10.1159/000095650 37 (2.64) 38 (2.71) 87 (6.21)
- 61 Holan G, Peretz B, Efrat J, Shapira Y. Traumatic injuries to the teeth in young individuals with cerebral palsy. Dental Traumatology. Apr 2005;21(2):65-69. doi:10.1111/j.1600-9657.2004.00274.x 37 (2.47) 34 (2.27) 82 (5.47)
- 62 Kaloust S, Ishii K, Vargervik K. Dental development in apert syndrome. Cleft Palate-Craniofacial Journal. Mar 1997;34(2):117-121. 37 (1.61) 43 (1.87) 79 (3.43)
- 63 Atar M, Koerperich EJ. Systemic disorders and their influence on the development of dental hard tissues: A literature review. Journal of Dentistry. Apr 2010;38(4):296-306. doi:10.1016/j.jdent.2009.12.001 36 (3.60) 34 (3.40) 72 (7.20)
- 64 MacEntee MI. An existential model of oral health from evolving views on health, function and disability. Community Dental Health. Mar 2006;23(1):5-14. 36 (2.57) 42 (3.00) 77 (5.50)
- 65 Sakellari D, Arapostathis KN, Konstantinidis A. Periodontal conditions and subgingival microflora in Down syndrome patients - A case-control study. Journal of Clinical 36 (2.40) 40 (2.67) 94 (6.27)



- Periodontology. Jun  
2005;32(6):684-690.  
doi:10.1111/j.1600-  
051X.2005.00737.x
- 66 Axelsson S, Storhaug K, Kjaer I. Post-natal size and morphology of the sella turcica in Williams syndrome. European Journal of Orthodontics. Dec 2004;26(6):613-621.  
doi:10.1093/ejo/26.6.613 36 (2.25) 39 (2.44) 87 (5.44)
- 67 Trulsson U, Klingberg G. Living with a child with a severe orofacial handicap: experiences from the perspectives of parents. European Journal of Oral Sciences. Feb 2003;111(1):19-25.  
doi:10.1034/j.1600-0722.2003.00001.x 36 (2.12) 39 (2.29) 67 (3.94)
- 68 Amano A, Kishima T, Kimura S, et al. Periodontopathic bacteria in children with Down syndrome. Journal of Periodontology. Feb 2000;71(2):249-255.  
doi:10.1902/jop.2000.71.2.249 36 (1.80) 49 (2.45) 109 (5.45)
- 69 Ferreira De Camargo MA, Ferreira Antunes JL. Untreated dental caries in children with cerebral palsy in the Brazilian context. International Journal of Paediatric Dentistry. Mar 2008;18(2):131-138.  
doi:10.1111/j.1365-263X.2007.00829.x 35 (2.92) 37 (3.08) 90 (7.50)
- 70 Sabuncuoglu O. Traumatic dental injuries and attention-deficit/hyperactivity disorder: is there a link? Dental Traumatology. Jun 2007;23(3):137-142. 35 (2.69) 11 (0.85) 70 (5.38)

doi:10.1111/j.1600-9657.2005.00431.x

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|----|---|-----------|-----------|------------|
| 71 | <p>Martens L, Marks L, Goffin G, Gizani S, Vinckier F, Declerck D. Oral hygiene in 12-year-old disabled children in Flanders, Belgium, related to manual dexterity. <i>Community Dentistry and Oral Epidemiology</i>. Feb 2000;28(1):73-80. doi:10.1034/j.1600-0528.2000.280110.x</p>                 | 35 (1.75) | 42 (2.10) | 123 (6.15) |
| 72 | <p>Yarat A, Akyuz S, Koc L, Erdem H, Emekli N. Salivary sialic acid, protein, salivary flow rate, pH, buffering capacity and caries indices in subjects with Down's syndrome. <i>Journal of Dentistry</i>. Feb 1999;27(2):115-118. doi:10.1016/S0300-5712(98)00030-X</p>                              | 35 (1.67) | 45 (2.14) | 93 (4.43)  |
| 73 | <p>Dougall A, Fiske J. Access to special care dentistry, part 1. Access. <i>British Dental Journal</i>. Jun 2008;204(11):605-616. doi:10.1038/sj.bdj.2008.457</p>   | 34 (2.83) | 33 (2.75) | 79 (6.58)  |
| 74 | <p>Chi DL, Momany ET, Kuthy RA, Chalmers JM, Damiano PC. Preventive dental utilization for Medicaid-enrolled children in Iowa identified with intellectual and/or developmental disability. <i>Journal of Public Health Dentistry</i>. Win 2010;70(1):35-44. doi:10.1111/j.1752-7325.2009.00141.x</p> | 33 (3.30) | 31 (3.10) | 55 (5.50)  |

- Blomqvist M, Holmberg K, Fernell E, Dahllof G. A retrospective study of dental behavior management problems in children with attention and learning problems. *European Journal of Oral Sciences*. Oct 2004;112(5):406-411. doi:10.1111/j.1600-0722.2004.00150.x
- 75 33 (2.06) 30 (1.88) 54 (3.38)
- Stein LI, Polido JC, Cermak SA. Oral Care and Sensory Over-responsivity in Children with Autism Spectrum Disorders. *Pediatric Dentistry*. May-Jun 2013;35(3):230-235.
- 76 32 (4.57) 29 (4.14) 53 (7.57)
- Vainio L, Krause M, Inglehart MR. Patients with Special Needs: Dental Students' Educational Experiences, Attitudes, and Behavior. *Journal of Dental Education*. Jan 2011;75(1):13-22.
- 77 32 (3.56) 29 (3.22) 54 (6.00)
- Ortega AOL, Guimaraes AS, Ciamponi AL, Marie SKN. Frequency of parafunctional oral habits in patients with cerebral palsy. *Journal of Oral Rehabilitation*. May 2007;34(5):323-328. doi:10.1111/j.1365-2842.2006.01703.x
- 78 32 (2.46) 31 (2.38) 82 (6.31)
- Klein T, Pope AW, Getahun E, Thompson J. Mothers' reflections on raising a child with a craniofacial anomaly. *Cleft Palate-Craniofacial Journal*. Sep 2006;43(5):590-597. doi:10.1597/05-117
- 79 32 (2.29) 34 (2.43) 62 (4.43)
- Sabuncuoglu O, Taser H, Berkem M. Relationship between traumatic dental injuries and attention-deficit/hyperactivity disorder in children and adolescents: proposal of an explanatory model. *Dental Traumatology*. Oct 2005;21(5):249-253.
- 80 32 (2.13) 31 (2.07) 69 (4.60)

doi:10.1111/j.1600-9657.2005.00317.x

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|-----------|--|-----------|-----------|------------|
| <b>81</b> | Broadbent JM, Ayers KMS, Thomson WM. Is attention-deficit hyperactivity disorder a risk factor for dental caries? A case-control study. <i>Caries Research</i> . 2004;38(1):29-33. doi:10.1159/000073917   | 32 (2.00) | 48 (3.00) | 90 (5.63)  |
| <b>82</b> | Axelson S, Bjornland T, Kjaer I, Heiberg A, Storhaug K. Dental characteristics in Williams syndrome: a clinical and radiographic evaluation. <i>Acta Odontologica Scandinavica</i> . 2003;61(3):129-136. doi:10.1080/00016350310001451                 | 32 (1.88) | 42 (2.47) | 75 (4.41)  |
| <b>83</b> | Amano A, Kishima T, Akiyama S, Nakagawa I, Hamada S, Morisaki I. Relationship of periodontopathic bacteria with early-onset periodontitis in Down's syndrome. <i>Journal of Periodontology</i> . Mar 2001;72(3):368-373. doi:10.1902/jop.2001.72.3.368 | 32 (1.68) | 45 (2.37) | 104 (5.47) |
| <b>84</b> | Romer M, Dougherty N, Amores-Lafleur E. Predoctoral education in special care dentistry: Paving the way to better access? <i>Journal of Dentistry for Children</i> . Mar-Apr 1999;66(2):132-135.   | 32 (1.52) | 37 (1.76) | 75 (3.57)  |

- 85 Scott A, March L, Stokes ML. A survey of oral health in a population of adults with developmental disabilities: Comparison with a national oral health survey of the general population. *Australian Dental Journal*. Aug 1998;43(4):257-261. doi:10.1111/j.1834-7819.1998.tb00174.x 32 (1.45) 36 (1.64) 93 (4.23)
- 86 Halinen S, Sorsa T, Ding YL, et al. Characterization of matrix metalloproteinase (MMP-8 and -9) activities in the saliva and in gingival crevicular fluid of children with Down's syndrome. *Journal of Periodontology*. Aug 1996;67(8):748-754. doi:10.1902/jop.1996.67.8.748 32 (1.33) 33 (1.38) 66 (2.75)
- 87 Kalaga A, Addy M, Hunter B. The Use of 0.2-Percent Chlorhexidine Spray as an Adjunct to Oral Hygiene and Gingival Health in Physically and Mentally-Handicapped Adults. *Journal of Periodontology*. Jul 1989;60(7):381-385. doi:10.1902/jop.1989.60.7.381 32 (1.03) 35 (1.13) 62 (2.00)
- 88 Orellana L-M, Silvestre F-J, Martinez-Sanchis S, Martinez-Mihi V, Bautista D. Oral manifestations in a group of adults with autism spectrum disorder. *Medicina Oral Patologia Oral Y Cirugia Bucal*. May 2012;17(3):E415-E419. doi:10.4317/medoral.17573 31 (3.88) 32 (4.00) 72 (9.00)
- 89 Hernandez P, Ikkanda Z. Applied behavior analysis: Behavior management of children with autism spectrum disorders in dental environments. *Journal of the American Dental Association*. 31 (3.44) 34 (3.78) 87 (9.67)

Mar 2011;142(3):281-287.  
doi:10.14219/jada.archive.2011.0167

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|-----------|--|-----------|-----------|-----------|
| <b>90</b> | Davidovich E, Aframian DJ, Shapira J, Peretz B. A comparison of the sialochemistry, oral pH, and oral health status of down syndrome children to healthy children. <i>International Journal of Paediatric Dentistry</i> . Jul 2010;20(4):235-241. doi:10.1111/j.1365-263X.2010.01045.x                       | 31 (3.10) | 36 (3.60) | 82 (8.20) |
| <b>91</b> | Blomqvist M, Holmberg K, Fernell E, Ek U, Dahllof G. Oral health, dental anxiety, and behavior management problems in children with attention deficit hyperactivity disorder. <i>European Journal of Oral Sciences</i> . Oct 2006;114(5):385-390. doi:10.1111/j.1600-0722.2006.00393.x                       | 31 (2.21) | 37 (2.64) | 95 (6.79) |
| <b>92</b> | Sakellari D, Belibasakis G, Chadjipadelis T, Arapostathis K, Konstantinidis A. Supragingival and subgingival microbiota of adult patients with Down's syndrome. Changes after periodontal treatment. <i>Oral Microbiology and Immunology</i> . Dec 2001;16(6):376-382. doi:10.1034/j.1399-302X.2001.160610.x | 31 (1.63) | 34 (1.79) | 53 (2.79) |
| <b>93</b> | Saemundsson SR, Roberts MW. Oral self-injurious behavior in the developmentally disabled: Review and a case. <i>Journal of Dentistry for Children</i> . May-Jun 1997;64(3):205-&.  | 31 (1.35) | 38 (1.65) | 88 (3.83) |

- Reulandbosma W, Vandijk J, Vanderweele L. Experimental Gingivitis around Deciduous Teeth in Children with Downs-Syndrome. *Journal of Clinical Periodontology*. Apr 1986;13(4):294-300. doi:10.1111/j.1600-051X.1986.tb02225.x
- 94 31 (0.91) 37 (1.09) 52 (1.53)
- da Silva SN, Gimenez T, Souza RC, et al. Oral health status of children and young adults with autism spectrum disorders: systematic review and meta-analysis. *International Journal of Paediatric Dentistry*. Sep 2017;27(5):388-398. doi:10.1111/ipd.12274
- 95 30 (10.00) 28 (9.33) 48 (16.00)
- Delli K, Reichart PA, Bornstein MM, Livas C. Management of children with autism spectrum disorder in the dental setting: Concerns, behavioural approaches and recommendations. *Medicina Oral Patologia Oral Y Cirugia Bucal*. Nov 2013;18(6):E862-E868. doi:10.4317/medoral.19084
- 96 30 (4.29) 35 (5.00) 97 (13.86)
- Faulks D, Collado V, Mazille MN, Veyrune JL, Hennequin M. Masticatory dysfunction in persons with Down's syndrome. Part 1: aetiology and incidence. *Journal of Oral Rehabilitation*. Nov 2008;35(11):854-862. doi:10.1111/j.1365-2842.2008.01877.x
- 97 30 (2.50) 32 (2.67) 69 (5.75)
- Marshall J, Sheller B, Mancl L, Williams BJ. Parental Attitudes Regarding Behavior Guidance of Dental Patients with Autism. *Pediatric Dentistry*. Sep-Oct 2008;30(5):400-407.
- 98 30 (2.50) 28 (2.33) 75 (6.25)

99	Kaye PL, Fiske J, Bower EJ, Newton JT, Fenlon M. Views and experiences of parents and siblings of adults with Down Syndrome regarding oral healthcare: a qualitative and quantitative study. <i>British Dental Journal</i> . May 14 2005;198(9):571-578. doi:10.1038/sj.bdj.4812305	30 (2.00)	31 (2.07)	76 (5.07)
100	Fahlvik-Planefeldt C, Herrstrom P. Dental care of autistic children within the non-specialized Public Dental Service. <i>Swedish Dental Journal</i> . 2001 2001;25(3):113-118.	30 (1.58)	31 (1.63)	85 (4.47)

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## ANEXO E – Estratégia de busca

## Supplementary file 1. Database search strategy (September 22, 2020).

Database	Search
MEDLINE (PubMed)	((("Disabled Persons"[Mesh] OR Disabl* OR "special-needs" OR "special needs" OR "handicap*" OR "disabil*" OR "special-care" OR "special care" OR "disabled Children"[Mesh] OR "Children with Disabilities" OR "Children with Disability" OR "Disabled Child" OR "Developmental Disabilities"[Mesh] OR "Developmental Disabilities" OR "Intellectual Disability"[Mesh] OR "Intellectual Disability" OR "Intellectual Disabilities" OR "Intellectual Development Disorder" OR "Neurodevelopmental Disorders"[Mesh] OR "Neurodevelopmental Disorders" OR "Psychosocial Mental Retardation" OR "Psychosocial Mental Retardations" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Mental Deficiencies" OR "Mental Deficiency" OR "developmental delay" OR "Cerebral Palsy"[Mesh] OR "Cerebral Palsy" OR "Spastic Cerebral Palsy" OR "Hypotonic Cerebral Palsy" OR "Atonic Cerebral Palsy" OR "Dyskinetic Cerebral Palsy" OR "Athetoid Cerebral Palsy" OR "Monoplegic Cerebral Palsy" OR "Spastic Diplegia" OR "Little's Disease" OR "Little Disease" OR "Congenital Cerebral Palsy" OR "Rolandic Type Cerebral Palsy" OR "Quadriplegic Infantile Cerebral Palsy" OR "Mixed Cerebral Palsy" OR "Down syndrome"[Mesh] OR "Down syndrome" OR Trisomy 21 OR Mongolism OR partial trisomy 21 OR down syndrome* OR Trisomy G OR 47,XX,+21 OR "Down's Syndrome" OR "Downs Syndrome" OR "Attention Deficit Disorder with Hyperactivity"[Mesh] OR "Attention Deficit Disorder with Hyperactivity" OR "Hyperkinetic Syndrome" OR "Attention Deficit-Hyperactivity Disorders" OR "attention deficit hyperactivity disorder" OR "ADHD" OR "ADDH" OR "Autistic Disorder"[Mesh] OR "Autistic Disorder" OR "Autism" OR "Kanner's Syndrome" OR "Kanner Syndrome" OR "Infantile Autism" OR "Autism Spectrum Disorder"[Mesh] OR "Autism Spectrum Disorder" OR "Autism Spectrum Disorders" OR "Asperger Syndrome"[Mesh] OR "Asperger Syndrome" OR "Vision Disorders"[Mesh] OR "Vision Disord*" OR "visual impair*" OR "Vision Disorders" OR "Hearing Disorders"[Mesh] OR "Vision Disorders" OR "Hearing Disord*" OR "hearing impair*" OR "developmental speech sound disorders" OR "developmental speech fluency disorder" OR "Developmental language disorder" OR "Language Development Disorders"[Mesh] OR "Learning Disabilities" OR "Learning Disabilities"[Mesh] OR "Developmental motor coordination disorder" OR "Motor Skills Disorders"[Mesh] OR "Stereotyped movement disorder" OR "Stereotypic Movement Disorder"[Mesh] OR "Stereotypic Movement Disorder" OR "Cri-du-Chat Syndrome" OR "X-Linked Mental Retardations" OR "Prader-Willi Syndrome"[Mesh] OR "Prader-Willi Syndrome" OR "WAGR Syndrome" OR "Trisomy 13 Syndrome" OR "Williams Syndrome"[Mesh] OR "Williams Syndrome" OR "Fetal Alcohol Spectrum Disorders"[Mesh] OR "Fetal Alcohol Spectrum Disorders" OR "Fetal Alcohol Syndrome" OR "Partial Fetal Alcohol Syndrome" OR "FASD" OR "FASDs" OR "Alcohol Related Birth Defects" OR "Fragile X Syndrome"[Mesh] OR "Fragile X Syndrome" OR "Fragile X Syndromes" OR "Marker X Syndrome" OR "Marker X Syndromes" OR "Martin-Bell Syndrome" OR "FRAXE Syndrome" OR "FRAXE Syndromes" OR "FRAXA Syndrome" OR "FRAXA Syndromes" OR "Kernicterus"[Mesh] OR "Bilirubin Encephalopathy" OR "Bilirubin Encephalopathies" OR "Muscular Dystrophies"[Mesh] OR "Muscular Dystrophies" OR "Myodystrophica" OR "Myodystrophy" OR "Tourette Syndrome"[Mesh] OR "Tourette Syndrome" OR "Gilles de la Tourette Syndrome" OR "Tourette Disease" OR "Tourette Disorder" OR "Tourettes Syndrome"))AND ((("Bruxism"[Mesh] OR "Sleep Bruxism"[Mesh] OR "bruxer" OR "bruxers" OR "tooth grinding" OR "tooth clenching" OR "teeth grinding" OR "teeth clenching" OR "Bruxism" OR "bruxisms" OR "Sleep Bruxism" OR "awake bruxism" OR "diurnal bruxism" OR "Teeth Grinding Disorder" OR "Teeth Grinding Disorders" OR "Childhood Sleep Bruxism" OR "Childhood Sleep Bruxisms" OR "Nocturnal Bruxism" OR "Nocturnal Bruxisms" OR "Nocturnal Teeth Grinding Disorder" OR "Sleep Related Bruxism" OR "Sleep-Related Bruxism" OR "Sleep-Related Bruxisms")))
Scopus	TITLE-ABS-KEY("Disabled Persons" OR "Disabl*" OR "special-needs" OR "special needs" OR "handicap*" OR "disabil*" OR "special-care" OR "special care" OR "disabled

Children" OR "Children with Disabilities" OR "Children with Disability" OR "Disabled Child" OR "Developmental Disabilities" OR "Intellectual Disability" OR "Intellectual Disabilities" OR "Intellectual Development Disorder" OR "Psychosocial Mental Retardation" OR "Psychosocial Mental Retardations" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Cerebral Palsy" OR "Spastic Cerebral Palsy" OR "Hypotonic Cerebral Palsy" OR "Atonic Cerebral Palsy" OR "Dyskinetic Cerebral Palsy" OR "Athetoid Cerebral Palsy" OR "Monoplegic Cerebral Palsy" OR "Spastic Diplegia" OR "Little's Disease" OR "Little Disease" OR "Congenital Cerebral Palsy" OR "Rolandic Type Cerebral Palsy" OR "Quadriplegic Infantile Cerebral Palsy" OR "Mixed Cerebral Palsy" OR "Down syndrome" OR "Trisomy 21" OR "down syndrome\*" OR "Trisomy G" OR "47,XX,+21" OR "Down's Syndrome" OR "Downs Syndrome" OR "Attention Deficit Disorder with Hyperactivity" OR "Hyperkinetic Syndrome" OR "Attention Deficit-Hyperactivity Disorders" OR "attention deficit hyperactivity disorder" OR "ADHD" OR "ADDH" OR "Autistic Disorder" OR "Autism" OR "Kanner's Syndrome" OR "Kanner Syndrome" OR "Infantile Autism" OR "Autism Spectrum Disorder" OR "Autism Spectrum Disorders" OR "Asperger Syndrome" OR "Vision Disord\*" OR "visual impair\*" OR "Vision Disorders" OR "Hearing Disorders" OR "Vision Disorders" OR "Hearing Disord\*" OR "hearing impair\*" OR "developmental speech sound disorders" OR "developmental speech fluency disorder" OR "Developmental language disorder" OR "Language Development Disorders" OR "Learning Disabilities" OR "Learning Disabilities" OR "Developmental motor coordination disorder" OR "Motor Skills Disorders" OR "Stereotyped movement disorder" OR "Stereotypic Movement Disorder" OR "Stereotypic Movement Disorder" OR "developmental delay" OR "Neurodevelopmental Disorders" OR "Neurodevelopmental Disorders" OR "Cri-du-Chat Syndrome" OR "X-Linked Mental Retardations" OR "Prader-Willi Syndrome" OR "WAGR Syndrome" OR "Trisomy Syndrome" OR "Williams Syndrome" OR "Fetal Alcohol Spectrum Disorders" OR "Fetal Alcohol Syndrome" OR "Partial Fetal Alcohol Syndrome" OR "FASD" OR "FASDs" OR "Alcohol Related Birth Defects" OR "Fragile X Syndrome" OR "Fragile X Syndromes" OR "Marker X Syndrome" OR "Marker X Syndromes" OR "Martin-Bell Syndrome" OR "FRAXE Syndrome" OR "FRAXE Syndromes" OR "FRAXA Syndrome" OR "FRAXA Syndromes" OR "Kernicterus" OR "Bilirubin Encephalopathy" OR "Bilirubin Encephalopathies" OR "Muscular Dystrophies" OR "Myodystrophica" OR "Myodystrophy" OR "Tourette Syndrome" OR "Gilles de la Tourette Syndrome" OR "Tourette Disease" OR "Tourette Disorder" OR "Tourettes Syndrome") AND TITLE-ABS-KEY("bruxer" OR "bruxers" OR "tooth grinding" OR "tooth clenching" OR "teeth grinding" OR "teeth clenching" OR "Bruxism" OR "bruxisms" OR "Sleep Bruxism" OR "awake bruxism" OR "diurnal bruxism" OR "Teeth Grinding Disorder" OR "Teeth Grinding Disorders" OR "Childhood Sleep Bruxism" OR "Childhood Sleep Bruxisms" OR "Nocturnal Bruxism" OR "Nocturnal Bruxisms" OR "Nocturnal Teeth Grinding Disorder" OR "Sleep Related Bruxism" OR "Sleep-Related Bruxism" OR "Sleep-Related Bruxisms")

**Web of Science**

(TS=("Disabled Persons" OR "Disabl\*" OR "special-needs" OR "special needs" OR "handicap\*" OR "disabil\*" OR "special-care" OR "special care" OR "disabled Children" OR "Children with Disabilities" OR "Children with Disability" OR "Disabled Child" OR "Developmental Disabilities" OR "Intellectual Disability" OR "Intellectual Disabilities" OR "Intellectual Development Disorder" OR "Psychosocial Mental Retardation" OR "Psychosocial Mental Retardations" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Cerebral Palsy" OR "Spastic Cerebral Palsy" OR "Hypotonic Cerebral Palsy" OR "Atonic Cerebral Palsy" OR "Dyskinetic Cerebral Palsy" OR "Athetoid Cerebral Palsy" OR "Monoplegic Cerebral Palsy" OR "Spastic Diplegia" OR "Little's Disease" OR "Little Disease" OR "Congenital Cerebral Palsy" OR "Rolandic Type Cerebral Palsy" OR "Quadriplegic Infantile Cerebral Palsy" OR "Mixed Cerebral Palsy" OR "Down syndrome" OR "Trisomy 21" OR "down syndrome\*" OR "Trisomy G" OR "47,XX,+21" OR "Down's Syndrome" OR "Downs Syndrome" OR "Attention Deficit Disorder with Hyperactivity" OR "Hyperkinetic Syndrome" OR "Attention Deficit-Hyperactivity Disorders" OR "attention deficit hyperactivity disorder" OR "ADHD" OR "ADDH" OR "Autistic Disorder" OR "Autism" OR "Kanner's Syndrome" OR "Kanner Syndrome" OR "Infantile Autism" OR "Autism

Spectrum Disorder" OR "Autism Spectrum Disorders" OR "Asperger Syndrome" OR "Vision Disord\*" OR "visual impair\*" OR "Vision Disorders" OR "Hearing Disorders" OR "Vision Disorders" OR "Hearing Disord\*" OR "hearing impair\*" OR "developmental speech sound disorders" OR "developmental speech fluency disorder" OR "Developmental language disorder" OR "Language Development Disorders" OR "Learning Disabilities" OR "Learning Disabilities" OR "Developmental motor coordination disorder" OR "Motor Skills Disorders" OR "Stereotyped movement disorder" OR "Stereotypic Movement Disorder" OR "Stereotypic Movement Disorder" OR "developmental delay" OR "Neurodevelopmental Disorders" OR "Neurodevelopmental Disorders" OR "Cri-du-Chat Syndrome" OR "X-Linked Mental Retardations" OR "Prader-Willi Syndrome" OR "WAGR Syndrome" OR "Trisomy Syndrome" OR "Williams Syndrome" OR "Fetal Alcohol Spectrum Disorders" OR "Fetal Alcohol Syndrome" OR "Partial Fetal Alcohol Syndrome" OR "FASD" OR "FASDs" OR "Alcohol Related Birth Defects" OR "Fragile X Syndrome" OR "Fragile X Syndromes" OR "Marker X Syndrome" OR "Marker X Syndromes" OR "Martin-Bell Syndrome" OR "FRAXE Syndrome" OR "FRAXE Syndromes" OR "FRAXA Syndrome" OR "FRAXA Syndromes" OR "Kernicterus" OR "Bilirubin Encephalopathy" OR "Bilirubin Encephalopathies" OR "Muscular Dystrophies" OR "Myodystrophica" OR "Myodystrophy" OR "Tourette Syndrome" OR "Gilles de la Tourette Syndrome" OR "Tourette Disease" OR "Tourette Disorder" OR "Tourettes Syndrome") AND (TS=("bruxer" OR "bruxers" OR "tooth grinding" OR "tooth clenching" OR "teeth grinding" OR "teeth clenching" OR "Bruxism" OR "bruxisms" OR "Sleep Bruxism" OR "awake bruxism" OR "diurnal bruxism" OR "Teeth Grinding Disorder" OR "Teeth Grinding Disorders" OR "Childhood Sleep Bruxism" OR "Childhood Sleep Bruxisms" OR "Nocturnal Bruxism" OR "Nocturnal Bruxisms" OR "Nocturnal Teeth Grinding Disorder" OR "Sleep Related Bruxism" OR "Sleep-Related Bruxism" OR "Sleep-Related Bruxisms")

DOCUMENT TYPES: (Article)

Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years

#### LILACS

("Disabled Persons" OR "Pessoas com Deficiência" OR "Personas con Discapacidad" OR "Personnes handicapées" OR "Crianças com Deficiência" OR "Disabled Children" OR "Niños con Discapacidad" OR "Enfants handicapés" OR "special - care" OR "special care" OR "special - needs" OR "special needs" OR "Children with Disabilities" OR "Children with Disability" OR "Deficiências do Desenvolvimento" OR "Developmental Disabilities" OR "Discapacidades del Desarrollo" OR "Incapacités de développement" OR "Deficiência Intelectual" OR "Intellectual Disability" OR "Discapacidad Intelectual" OR "Déficiência intellectuelle" OR "Deficiência Mental" OR "Intellectual Development Disorder" OR "Psychosocial Mental Retardation" OR "Psychosocial Mental Retardations" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Paralisia Cerebral" OR "Cerebral Palsy" OR "Parálisis Cerebral" OR "Paralysie cérébrale" OR "Díplegia Espástica" OR "Doença de Little" OR "Síndrome de Down" OR "Down Syndrome" OR "Síndrome de Down" OR "Syndrome de Down" OR "Mongolismo" OR "Trissomia do 21" OR "Trissomia do Cromossomo 21" OR "Trisomy 21" OR "Mongolism" OR "partial trisomy 21" OR "Trisomy G OR 47,XX,+21" OR "Down's Syndrome" OR "Downs Syndrome" OR "Syndrome, Down's" OR "Transtorno do Deficit de Atenção com Hiperatividade" OR "Attention Deficit Disorder with Hyperactivity" OR "Trastorno por Déficit de Atención con Hiperactividad" OR "Trouble déficitaire de l'attention avec hyperactivité" OR "ADHD" OR "Disfunção Cerebral Mínima" OR "Disfunção Encefálica Mínima" OR "Síndrome Hipercinética" OR "TDAH" OR "Transtorno da Falta de Atenção" OR "Transtorno da Falta de Atenção com Hiperatividade" OR "Transtorno de Hiperatividade e Falta de Atenção" OR "Transtorno do Deficit de Atenção" OR "Attention Deficit Disorder with Hyperactivity" OR "Hyperkinetic Syndrome" OR "Attention Deficit - Hyperactivity Disorders" OR "attention deficit hyperactivity disorder" OR "ADDH" OR "Autistic Disorder" OR "Transtorno Autístico" OR "Trouble autistique" OR "Autismo" OR "Autismo Infantil" OR "Síndrome de Kanner" OR "Autistic Disorder" OR "autism" OR "Autism Spectrum Disorder" OR "Kanner's Syndrome" OR "Kanner Syndrome" OR "Infantile Autism" OR "Autism Spectrum Disorders" OR "Asperger Syndrome" OR "Transtorno do Espectro Autista" OR "Trastorno del Espectro Autista" OR "Trouble du spectre autistique" OR "Transtorno de Espectro Autista" OR "Transtorno do Espectro do Autismo" OR "Síndrome de Asperger" OR "Syndrome d'Asperger" OR "Physical limitation" OR "Vision Disorders" OR "Transtornos da Visão" OR "Trastornos de la Visión")

OR "Troubles de la vision" OR "Hearing Disorders" OR "Deficiência Visual" OR "Distúrbios da Visão" OR "Distúrbios Visuais" OR "Transtornos Visuais" OR "developmental speech sound disorders" OR "developmental speech fluency disorder" OR "Developmental language disorder" OR "Language Development Disorders" OR "Learning Disabilities" OR "Learning Disabilities" OR "Developmental motor coordination disorder" OR "Motor Skills Disorders" OR "Stereotyped movement disorder" OR "Stereotypic Movement Disorder" OR "Stereotypic Movement Disorder" OR "developmental delay" OR "Neurodevelopmental Disorders" OR "Neurodevelopmental Disorders" OR "Transtornos do Neurodesenvolvimento" OR "Transtornos del Neurodesarrollo" OR "Distúrbios do Neurodesenvolvimento" OR "Transtornos da Audição" OR "Hearing Disorders" OR "Transtornos de la Audición" OR "Troubles de l'audition" OR "Síndrome do Miado do Gato" OR "Cri-du-Chat Syndrome" OR "Síndrome del Maullido del Gato" OR "Maladie du cri du chat" OR "Síndrome Cri-du-Chat" OR "Síndrome do Grito do Gato" OR "Retardo Mental Ligado ao Cromossomo X" OR "Retraso Mental Ligado al Cromosoma X" OR "Retard mental lié à l'X" OR "Síndrome de Prader-Willi" OR "Prader-Willi Syndrome" OR "Síndrome de Prader-Willi" OR "Syndrome de Prader-Willi" OR "Síndrome de Labhart-Willi" OR "Síndrome de Royer" OR "Síndrome WAGR" OR "WAGR Syndrome" OR "Syndrome WAGR" OR "Síndrome WAGR do Gene Contíguo" OR "Síndrome da Trissomia do Cromossomo 13" OR "Trisomy 13 Syndrome" OR "Síndrome de la Trisomia 13" OR "Syndrome de Patau" OR "Duplicação do Cromossomo 13" OR "Trissomia 13" OR "Síndrome de Patau" OR "Síndrome de Bartholin-Patau" OR "Síndrome da Trissomia em Mosaico do 13" OR "Síndrome de Williams" OR "Síndrome de Fácies de Elfo" OR "Síndrome do Gene Contíguo de Williams" OR "Williams Syndrome" OR "Syndrome de Williams" OR "Fetal Alcohol Spectrum Disorders" OR "Fetal Alcohol Spectrum Disorders" OR "Fetal Alcohol Syndrome" OR "Partial Fetal Alcohol Syndrome" OR "Fragile X Syndrome" OR "Fragile X Syndromes" OR "Martin-Bell Syndrome" OR "FRAXE Syndrome" OR "FRAXE Syndromes" OR "FRAXA Syndrome" OR "Kernicterus" OR "Bilirubin Encephalopathy" OR "Muscular Dystrophies" OR "Muscular Dystrophies" OR Myodystrophica OR Myodystrophy OR "Tourette Syndrome" OR "Tourette Syndrome" OR "Gilles de la Tourette Syndrome" OR "Tourette Disease" OR "Tourette Disorder" OR "Tourettes Syndrome" "Transtornos del Espectro Alcohólico Fetal" OR "Transtornos do Espectro Alcoólico Fetal" OR "Distúrbios Fetais do Espectro de Alcoolismo" OR "Transtornos Fetais do Espectro de Alcoolismo" OR "Síndrome del Cromosoma X Frágil" OR "Síndrome do Cromossomo X Frágil" OR "Síndrome de Fragilidade do Cromossomo X" OR "Síndrome de Martin-Bell" OR "Síndrome do X Frágil" OR "Encefalopatia Bilirrubínica" OR "Encefalopatia Hiperbilirrubinêmica" OR "Kerníctero" OR "Querníctero" OR "Encefalopatía Bilirrubínica" OR "Kerníctero" OR "Distrofias Musculares" OR "Distrofia Muscular" OR "Síndrome de Tourette" OR "Doença de Gilles de la Tourette" OR "Transtorno de Tique Combinado Vocal e Motor Múltiplo" OR "Enfermedad de Gilles de la Tourette") AND ("Bruxismo" OR "Ranger de Dentes" OR "Transtorno do Ranger de Dentes" OR "Bruxism" OR "Teeth Grinding Disorder" OR "Rechinamiento de Dentes" OR "Rechinamiento de los Dientes" OR "Rechinamiento Dental" OR "Bruxisme" OR "Bruxomanie" OR "Brycomanie" OR "Grincement des dents" OR "Bruxismo do Sono" OR "Bruxismo Noturno" OR "Ranger de Dentes Durante o Sono" OR "Ranger de Dentes Noturno" OR "Transtorno do Ranger de Dentes Durante o Sono" OR "Transtorno Noturno de Ranger de Dentes" OR "Sleep Bruxism" OR "Bruxismo del Sueño" OR "Bruxisme du sommeil" OR "bruxer" OR "bruxers" OR "tooth grinding" OR "tooth clenchin'g OR "teeth grinding" OR "teeth clenching" OR "bruxisms" OR "awake bruxism") AND (instance:"regional") AND (db:"LILACS"))

**EMBASE**

('disabled persons'/exp OR 'disabled persons' OR 'disabl\*' OR 'special-needs' OR 'special needs' OR 'handicap\*' OR 'disabil\*' OR 'special-care' OR 'special care' OR 'disabled children'/exp OR 'disabled children' OR 'children with disabilities' OR 'children with disability' OR 'disabled child'/exp OR 'disabled child' OR 'developmental disabilities'/exp OR 'developmental disabilities' OR 'intellectual disability'/exp OR 'intellectual disability' OR 'intellectual disabilities'/exp OR 'intellectual disabilities' OR 'intellectual development disorder' OR 'psychosocial mental retardation' OR 'psychosocial mental retardations' OR 'mental deficiencies' OR 'mental deficiency'/exp OR 'mental deficiency' OR 'cerebral

palsy'/exp OR 'cerebral palsy' OR 'spastic cerebral palsy'/exp OR 'spastic cerebral palsy' OR 'hypotonic cerebral palsy' OR 'atonic cerebral palsy' OR 'dyskinetic cerebral palsy'/exp OR 'dyskinetic cerebral palsy' OR 'athetoid cerebral palsy'/exp OR 'athetoid cerebral palsy' OR 'monoplegic cerebral palsy' OR 'spastic diplegia'/exp OR 'spastic diplegia' OR 'littles disease' OR 'little disease'/exp OR 'little disease' OR 'congenital cerebral palsy' OR 'rolandic type cerebral palsy' OR 'quadriplegic infantile cerebral palsy' OR 'mixed cerebral palsy' OR 'down syndrome'/exp OR 'down syndrome' OR 'trisomy 21'/exp OR 'trisomy 21' OR 'down syndrome\*' OR 'trisomy g'/exp OR 'trisomy g' OR '47,xx,+21' OR 'downs syndrome'/exp OR 'downs syndrome' OR 'attention deficit disorder with hyperactivity'/exp OR 'attention deficit disorder with hyperactivity' OR 'hyperkinetic syndrome'/exp OR 'hyperkinetic syndrome' OR 'attention deficit-hyperactivity disorders' OR 'attention deficit hyperactivity disorder'/exp OR 'attention deficit hyperactivity disorder' OR 'adhd'/exp OR 'adhd' OR 'addh' OR 'autistic disorder'/exp OR 'autistic disorder' OR 'autism'/exp OR 'autism' OR 'kanners syndrome' OR 'kanner syndrome'/exp OR 'kanner syndrome' OR 'infantile autism'/exp OR 'infantile autism' OR 'autism spectrum disorder'/exp OR 'autism spectrum disorder' OR 'autism spectrum disorders'/exp OR 'autism spectrum disorders' OR 'asperger syndrome'/exp OR 'asperger syndrome' OR 'vision disord\*' OR 'visual impair\*' OR 'vision disorders'/exp OR 'vision disorders' OR 'hearing disord\*' OR 'hearing impair\*' OR 'hearing disorders'/exp OR 'hearing disorders' OR 'cri-du-chat syndrome'/exp OR 'developmental delay' OR 'cri-du-chat syndrome' OR 'x-linked mental retardations' OR 'prader-willi syndrome'/exp OR 'prader-willi syndrome' OR 'wagr syndrome'/exp OR 'wagr syndrome' OR 'trisomy syndrome' OR 'fetal alcohol spectrum disorders'/exp OR 'fetal alcohol spectrum disorders' OR 'fetal alcohol syndrome'/exp OR 'fetal alcohol syndrome' OR 'williams syndrome'/exp OR 'williams syndrome' OR 'partial fetal alcohol syndrome' OR 'fasd' OR 'fasds' OR 'alcohol related birth defects' OR 'fragile x syndrome'/exp OR 'fragile x syndrome' OR 'fragile x syndromes' OR 'marker x syndrome' OR 'marker x syndromes' OR 'martin-bell syndrome'/exp OR 'martin-bell syndrome' OR 'fraxe syndrome' OR 'fraxe syndromes' OR 'fraxa syndrome' OR 'fraxa syndromes' OR 'kernicterus'/exp OR 'kernicterus' OR 'bilirubin encephalopathy'/exp OR 'bilirubin encephalopathy' OR 'bilirubin encephalopathies' OR 'muscular dystrophies'/exp OR 'muscular dystrophies' OR 'myodystrophica' OR 'myodystrophy'/exp OR 'myodystrophy' OR 'tourette syndrome'/exp OR 'tourette syndrome' OR 'gilles de la tourette syndrome'/exp OR 'gilles de la tourette syndrome' OR 'tourette disease'/exp OR 'tourette disease' OR 'tourette disorder' OR 'tourettes syndrome'/exp OR 'tourettes syndrome') AND ('Bruxism'/exp OR 'Sleep Bruxism'/exp OR "bruxer" OR "bruxers" OR "tooth grinding" OR "tooth clenching" OR "teeth grinding" OR "teeth clenching" OR "Bruxism" OR "bruxisms" OR "Sleep Bruxism" OR "awake bruxism" OR "diurnal bruxism" OR "Teeth Grinding Disorder" OR "Teeth Grinding Disorders" OR "Childhood Sleep Bruxism" OR "Childhood Sleep Bruxisms" OR "Nocturnal Bruxism" OR "Nocturnal Bruxisms" OR "Nocturnal Teeth Grinding Disorder" OR "Sleep Related Bruxism" OR "Sleep-Related Bruxism" OR "Sleep-Related Bruxisms")

**CINAHL**

((MH "Disabled Persons+") OR Disabl\* OR special-needs OR "special needs" OR handicap\* OR disabil\* OR special-care OR "special care" OR (MH "disabled Children+") OR "Children with Disabilities" OR "Children with Disability" OR "Disabled Child" OR (MH "Developmental Disabilities+") OR "Developmental Disabilities" OR (MH "Intellectual Disability+") OR "Intellectual Disability" OR "Intellectual Disabilities" OR "Intellectual Development Disorder" OR "Psychosocial Mental Retardation" OR "Psychosocial Mental Retardations" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Mental Deficiencies" OR "Mental Deficiency") OR (MH "Cerebral Palsy+") OR "Cerebral Palsy" OR "Spastic Cerebral Palsy" OR "Hypotonic Cerebral Palsy" OR "Atonic Cerebral Palsy" OR "Dyskinetic Cerebral Palsy" OR "Athetoid Cerebral Palsy" OR "Monoplegic Cerebral Palsy" OR "Spastic Diplegia" OR "Little's Disease" OR "Little Disease" OR "Congenital Cerebral Palsy" OR "Rolandic Type Cerebral Palsy" OR "Quadriplegic Infantile Cerebral Palsy" OR "Mixed

Cerebral Palsy") OR (MH "Down syndrome+") OR "Down syndrome" OR "down syndrome\*" OR "Trisomy G" OR 47,XX,+21 OR "Down's Syndrome" OR "Downs Syndrome") OR (MH "Attention Deficit Disorder with Hyperactivity+") OR "Attention Deficit Disorder with Hyperactivity" OR "Hyperkinetic Syndrome" OR "Attention Deficit-Hyperactivity Disorders" OR "attention deficit hyperactivity disorder" OR ADHD OR ADDH OR (MH "Autistic Disorder+") OR "Autistic Disorder" OR Autism OR "Kanner's Syndrome" OR "Kanner Syndrome" OR "Infantile Autism" OR (MH "Autism Spectrum Disorder+") OR "Autism Spectrum Disorder" OR "Autism Spectrum Disorders" OR (MH "Asperger Syndrome+") OR "Asperger Syndrome") OR (MH "Vision Disorders+") OR "Vision Disord\*" OR "visual impair\*" OR "Vision Disorders" OR (MH "Hearing Disorders+") OR "Vision Disorders" OR "Hearing Disord\*" OR "hearing impair\*" OR "developmental speech sound disorders" OR "developmental speech fluency disorder" OR "Developmental language disorder" OR (MH "Language Development Disorders+") OR "Learning Disabilities" OR (MH "Learning Disabilities+") OR "Developmental motor coordination disorder" OR (MH "Motor Skills Disorders+") OR "Stereotyped movement disorder" OR (MH "Stereotypic Movement Disorder+") OR "Stereotypic Movement Disorder" OR "developmental delay" OR (MH "Neurodevelopmental Disorders+") OR "Neurodevelopmental Disorders" OR "Cri-du-Chat Syndrome" OR "X-Linked Mental Retardations" OR (MH "Prader-Willi Syndrome+") OR "Prader-Willi Syndrome" OR "WAGR Syndrome" OR "Trisomy Syndrome" OR (MH "Williams Syndrome+") OR "Williams Syndrome" OR (MH "Fetal Alcohol Spectrum Disorders+") OR "Fetal Alcohol Spectrum Disorders" OR "Fetal Alcohol Syndrome" OR "Partial Fetal Alcohol Syndrome" OR FASD OR FASDs OR "Alcohol Related Birth Defects" OR (MH "Fragile X Syndrome+") OR "Fragile X Syndrome" OR "Fragile X Syndromes" OR "Marker X Syndrome" OR "Marker X Syndromes" OR "Martin-Bell Syndrome" OR "FRAXE Syndrome" OR "FRAXE Syndromes" OR "FRAXA Syndrome" OR "FRAXA Syndromes" OR (MH "Kernicterus+") OR "Bilirubin Encephalopathy" OR "Bilirubin Encephalopathies" OR (MH "Muscular Dystrophies+") OR "Muscular Dystrophies" OR Myodystrophica OR Myodystrophy OR (MH "Tourette Syndrome+") OR "Tourette Syndrome" OR "Gilles de la Tourette Syndrome" OR "Tourette Disease" OR "Tourette Disorder" OR "Tourettes Syndrome") AND ((MH "Bruxism+") OR (MH "Sleep Bruxism+") OR bruxer OR bruxers OR "tooth grinding" OR "tooth clenching" OR "teeth grinding" OR "teeth clenching" OR Bruxism OR bruxisms OR "Sleep Bruxism" OR "awake bruxism" OR "diurnal bruxism" OR "Teeth Grinding Disorder" OR "Teeth Grinding Disorders" OR "Childhood Sleep Bruxism" OR "Childhood Sleep Bruxisms" OR "Nocturnal Bruxism" OR "Nocturnal Bruxisms" OR "Nocturnal Teeth Grinding Disorder" OR "Sleep Related Bruxism" OR "Sleep-Related Bruxism" OR "Sleep-Related Bruxisms")

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**PsycINFO**

("Disabled Persons" OR Disabl\* OR special-needs OR "special needs" OR handicap\* OR disabil\* OR special-care OR "special care" OR "disabled Children" OR "Children with Disabilities" OR "Children with Disability" OR "Disabled Child" OR "Developmental Disabilities" OR "Developmental Disabilities" OR "Intellectual Disability" OR "Intellectual Disability" OR "Intellectual Disabilities" OR "Intellectual Development Disorder" OR "Psychosocial Mental Retardation" OR "Psychosocial Mental Retardations" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Cerebral Palsy" OR "Cerebral Palsy" OR "Spastic Cerebral Palsy" OR "Hypotonic Cerebral Palsy" OR "Atonic Cerebral Palsy" OR "Dyskinetic Cerebral Palsy" OR "Athetoid Cerebral Palsy" OR "Monoplegic Cerebral Palsy" OR "Spastic Diplegia" OR "Little's Disease" OR "Little Disease" OR "Congenital Cerebral Palsy" OR "Rolandic Type Cerebral Palsy" OR "Quadriplegic Infantile Cerebral Palsy" OR "Mixed Cerebral Palsy" OR "Down syndrome" OR "Down syndrome" OR "down syndrome\*" OR "Trisomy G" OR 47,XX,+21 OR "Down's Syndrome" OR "Downs Syndrome" OR "Attention Deficit Disorder with Hyperactivity" OR "Hyperkinetic Syndrome" OR "Attention Deficit-Hyperactivity Disorders" OR "attention deficit hyperactivity disorder" OR ADHD OR ADDH OR "Autistic Disorder" OR "Autistic Disorder" OR Autism OR "Kanner's Syndrome" OR "Kanner Syndrome" OR "Infantile Autism" OR "Autism Spectrum Disorder" OR "Autism Spectrum Disorder" OR "Autism Spectrum Disorders" OR "Asperger Syndrome" OR "Asperger Syndrome" OR "Vision Disorders" OR "Vision Disord\*" OR "visual impair\*" OR "Vision Disorders" OR "Hearing Disorders" OR "Vision Disorders" OR "Hearing Disord\*" OR "hearing impair\*" OR "developmental speech sound disorders" OR "developmental speech

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fluency disorder" OR "Developmental language disorder" OR "Language Development Disorders" OR "Learning Disabilities" OR "Learning Disabilities" OR "Developmental motor coordination disorder" OR "Motor Skills Disorders" OR "Stereotyped movement disorder" OR "Stereotypic Movement Disorder" OR "Stereotypic Movement Disorder" OR "developmental delay" OR "Neurodevelopmental Disorders" OR "Neurodevelopmental Disorders" OR "Cri-du-Chat Syndrome" OR "X-Linked Mental Retardations" OR "Prader-Willi Syndrome" OR "Prader-Willi Syndrome" OR "WAGR Syndrome" OR "Trisomy Syndrome" OR "Williams Syndrome" OR "Williams Syndrome" OR "Fetal Alcohol Spectrum Disorders" OR "Fetal Alcohol Spectrum Disorders" OR "Fetal Alcohol Syndrome" OR "Partial Fetal Alcohol Syndrome" OR FASD OR FASDs OR "Alcohol Related Birth Defects" OR "Fragile X Syndrome" OR "Fragile X Syndrome" OR "Fragile X Syndromes" OR "Marker X Syndrome" OR "Marker X Syndromes" OR "Martin-Bell Syndrome" OR "FRAXE Syndrome" OR "FRAXE Syndromes" OR "FRAXA Syndrome" OR "FRAXA Syndromes" OR Kernicterus OR "Bilirubin Encephalopathy" OR "Bilirubin Encephalopathies" OR "Muscular Dystrophies" OR "Muscular Dystrophies" OR Myodystrophica OR Myodystrophy OR "Tourette Syndrome" OR "Tourette Syndrome" OR "Gilles de la Tourette Syndrome" OR "Tourette Disease" OR "Tourette Disorder" OR "Tourettes Syndrome") AND (Bruxism OR "Sleep Bruxism" OR bruxer OR bruxers OR "tooth grinding" OR "tooth clenching" OR "teeth grinding" OR "teeth clenching" OR bruxisms OR "awake bruxism" OR "diurnal bruxism" OR "Teeth Grinding Disorder" OR "Teeth Grinding Disorders" OR "Childhood Sleep Bruxism" OR "Childhood Sleep Bruxisms" OR "Nocturnal Bruxism" OR "Nocturnal Bruxisms" OR "Nocturnal Teeth Grinding Disorder" OR "Sleep Related Bruxism" OR "Sleep-Related Bruxism" OR "Sleep-Related Bruxisms")

**Dentistry &  
Oral Sciences  
Source (DOSS)**

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	"FRAXE Syndrome" OR "FRAXE Syndromes" OR "FRAXA Syndrome" OR "FRAXA Syndromes" OR Kernicterus OR "Bilirubin Encephalopathy" OR "Bilirubin Encephalopathies" OR "Muscular Dystrophies" OR "Muscular Dystrophies" OR Myodystrophica OR Myodystrophy OR "Tourette Syndrome" OR "Tourette Syndrome" OR "Gilles de la Tourette Syndrome" OR "Tourette Disease" OR "Tourette Disorder" OR "Tourettes Syndrome") AND (Bruxism OR "Sleep Bruxism" OR bruxer OR bruxers OR "tooth grinding" OR "tooth clenching" OR "teeth grinding" OR "teeth clenching" OR bruxisms OR "awake bruxism" OR "diurnal bruxism" OR "Teeth Grinding Disorder" OR "Teeth Grinding Disorders" OR "Childhood Sleep Bruxism" OR "Childhood Sleep Bruxisms" OR "Nocturnal Bruxism" OR "Nocturnal Bruxisms" OR "Nocturnal Teeth Grinding Disorder" OR "Sleep Related Bruxism" OR "Sleep-Related Bruxism" OR "Sleep-Related Bruxisms")
<b>Google Scholar</b>	("Developmental Disabilities" OR "Intellectual Disability" OR "Neurodevelopmental disorders" OR "Cerebral Palsy" OR "Down syndrome" OR "Attention Deficit Disorder with Hyperactivity" OR "Autism Spectrum Disorder" OR "Autistic Disorder") AND ("Bruxism" OR "Sleep Bruxism" OR "tooth grinding" OR "tooth clenching" OR "teeth grinding" OR "teeth clenching" OR "awake bruxism" OR "diurnal bruxism")
<b>Open grey</b>	("Disabled Persons" OR Disabl* OR special - needs OR "special needs" OR handicap* OR disabil* OR special - care OR "special care" OR "disabled Children" OR "Children with Disabilities" OR "Children with Disability" OR "Disabled Child" OR "Developmental Disabilities" OR "Developmental Disabilities" OR "Intellectual Disability" OR "Intellectual Disability" OR "Intellectual Disabilities" OR "Intellectual Development Disorder" OR "Psychosocial Mental Retardation" OR "Psychosocial Mental Retardations" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Cerebral Palsy" OR "Cerebral Palsy" OR "Spastic Cerebral Palsy" OR "Hypotonic Cerebral Palsy" OR "Atonic Cerebral Palsy" OR "Dyskinetic Cerebral Palsy" OR "Athetoid Cerebral Palsy" OR "Monoplegic Cerebral Palsy" OR "Spastic Diplegia" OR "Little's Disease" OR "Little Disease" OR "Congenital Cerebral Palsy" OR "Rolandic Type Cerebral Palsy" OR "Quadriplegic Infantile Cerebral Palsy" OR "Mixed Cerebral Palsy" OR "Down syndrome" OR "Down syndrome" OR "down syndrome*" OR "Trisomy G" OR 47,XX,+21 OR "Down's Syndrome" OR "Downs Syndrome" OR "Attention Deficit Disorder with Hyperactivity" OR "Hyperkinetic Syndrome" OR "Attention Deficit - Hyperactivity Disorders" OR "attention deficit hyperactivity disorder" OR ADHD OR ADDH OR "Autistic Disorder" OR "Autistic Disorder" OR Autism OR "Kanner's Syndrome" OR "Kanner Syndrome" OR "Infantile Autism" OR "Autism Spectrum Disorder" OR "Autism Spectrum Disorder" OR "Autism Spectrum Disorders" OR "Asperger Syndrome" OR "Asperger Syndrome" OR "Vision Disorders" OR "Vision Disord*" OR "visual impair*" OR "Vision Disorders" OR "Hearing Disorders" OR "Vision Disorders" OR "Hearing Disord*" OR "hearing impair*" OR "developmental speech sound disorders" OR "developmental speech fluency disorder" OR "Developmental language disorder" OR "Language Development Disorders" OR "Learning Disabilities" OR "Learning Disabilities" OR "Developmental motor coordination disorder" OR "Motor Skills Disorders" OR "Stereotyped movement disorder" OR "Stereotypic Movement Disorder" OR "Stereotypic Movement Disorder" OR "developmental delay" OR "Neurodevelopmental Disorders" OR "Neurodevelopmental Disorders" OR "Cri-du-Chat Syndrome" OR "X-Linked Mental Retardations" OR "Prader-Willi Syndrome" OR "Prader-Willi Syndrome" OR "WAGR Syndrome" OR "Trisomy Syndrome" OR "Williams Syndrome" OR "Williams Syndrome" OR "Fetal Alcohol Spectrum Disorders" OR "Fetal Alcohol Spectrum Disorders" OR "Fetal Alcohol Syndrome" OR "Partial Fetal Alcohol Syndrome" OR FASD OR FASDs OR "Alcohol Related Birth Defects" OR "Fragile X Syndrome" OR "Fragile X Syndrome" OR "Fragile X Syndromes" OR "Marker X Syndrome" OR "Marker X Syndromes" OR "Martin-Bell Syndrome" OR "FRAXE Syndrome" OR "FRAXE Syndromes" OR "FRAXA Syndrome" OR "FRAXA Syndromes" OR Kernicterus OR "Bilirubin Encephalopathy" OR "Bilirubin Encephalopathies" OR "Muscular Dystrophies" OR "Muscular Dystrophies" OR Myodystrophica OR Myodystrophy OR "Tourette Syndrome" OR "Tourette Syndrome" OR "Gilles de la Tourette Syndrome" OR "Tourette Disease" OR "Tourette Disorder" OR "Tourettes Syndrome") AND (Bruxism OR "Sleep Bruxism" OR bruxer OR bruxers OR "tooth grinding" OR "tooth clenching" OR "teeth grinding" OR "teeth clenching" OR



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<b>Proquest</b>	noft(("Disabled Persons" OR Disabl* OR special - needs OR "special needs" OR handicap* OR disabil* OR special - care OR "special care" OR "disabled Children" OR "Children with Disabilities" OR "Children with Disability" OR "Disabled Child" OR "Developmental Disabilities" OR "Developmental Disabilities" OR "Intellectual Disability" OR "Intellectual Disability" OR "Intellectual Disabilities" OR "Intellectual Development Disorder" OR "Psychosocial Mental Retardation" OR "Psychosocial Mental Retardations" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Mental Deficiencies" OR "Mental Deficiency" OR "Cerebral Palsy" OR "Cerebral Palsy" OR "Spastic Cerebral Palsy" OR "Hypotonic Cerebral Palsy" OR "Atonic Cerebral Palsy" OR "Dyskinetic Cerebral Palsy" OR "Athetoid Cerebral Palsy" OR "Monoplegic Cerebral Palsy" OR "Spastic Diplegia" OR "Little's Disease" OR "Little Disease" OR "Congenital Cerebral Palsy" OR "Rolandic Type Cerebral Palsy" OR "Quadriplegic Infantile Cerebral Palsy" OR "Mixed Cerebral Palsy" OR "Down syndrome" OR "Down syndrome" OR "down syndrome*" OR "Trisomy G" OR 47,XX,+21 OR "Down's Syndrome" OR "Downs Syndrome" OR "Attention Deficit Disorder with Hyperactivity" OR "Attention Deficit Disorder with Hyperactivity" OR "Hyperkinetic Syndrome" OR "Attention Deficit - Hyperactivity Disorders" OR "attention deficit hyperactivity disorder" OR ADHD OR ADDH OR "Autistic Disorder" OR "Autistic Disorder" OR Autism OR "Kanner's Syndrome" OR "Kanner Syndrome" OR "Infantile Autism" OR "Autism Spectrum Disorder" OR "Autism Spectrum Disorder" OR "Autism Spectrum Disorders" OR "Asperger Syndrome" OR "Asperger Syndrome" OR "Vision Disorders" OR "Vision Disord*" OR "visual impair*" OR "Vision Disorders" OR "Hearing Disorders" OR "Vision Disorders" OR "Hearing Disord*" OR "hearing impair*" OR "developmental speech sound disorders" OR "developmental speech fluency disorder" OR "Developmental language disorder" OR "Language Development Disorders" OR "Learning Disabilities" OR "Learning Disabilities" OR "Developmental motor coordination disorder" OR "Motor Skills Disorders" OR "Stereotyped movement disorder" OR "Stereotypic Movement Disorder" OR "Stereotypic Movement Disorder" OR "developmental delay" OR "Neurodevelopmental Disorders" OR "Neurodevelopmental Disorders" OR "Cri-du-Chat Syndrome" OR "X-Linked Mental Retardations" OR "Prader-Willi Syndrome" OR "Prader-Willi Syndrome" OR "WAGR Syndrome" OR "Trisomy Syndrome" OR "Williams Syndrome" OR "Williams Syndrome" OR "Fetal Alcohol Spectrum Disorders" OR "Fetal Alcohol Spectrum Disorders" OR "Fetal Alcohol Syndrome" OR "Partial Fetal Alcohol Syndrome" OR FASD OR FASDs OR "Alcohol Related Birth Defects" OR "Fragile X Syndrome" OR "Fragile X Syndrome" OR "Fragile X Syndromes" OR "Marker X Syndrome" OR "Marker X Syndromes" OR "Martin-Bell Syndrome" OR "FRAXE Syndrome" OR "FRAXE Syndromes" OR "FRAXA Syndrome" OR "FRAXA Syndromes" OR Kernicterus OR "Bilirubin Encephalopathy" OR "Bilirubin Encephalopathies" OR "Muscular Dystrophies" OR "Muscular Dystrophies" OR Myodystrophica OR Myodystrophy OR "Tourette Syndrome" OR "Tourette Syndrome" OR "Gilles de la Tourette Syndrome" OR "Tourette Disease" OR "Tourette Disorder" OR "Tourettes Syndrome")) AND (Bruxism OR "Sleep Bruxism" OR bruxer OR bruxers OR "tooth grinding" OR "tooth clenching" OR "teeth grinding" OR "teeth clenching" OR Bruxism OR bruxisms OR "Sleep Bruxism" OR "awake bruxism" OR "diurnal bruxism" OR "Teeth Grinding Disorder" OR "Teeth Grinding Disorders" OR "Childhood Sleep Bruxism" OR "Childhood Sleep Bruxisms" OR "Nocturnal Bruxism" OR "Nocturnal Bruxisms" OR "Nocturnal Teeth Grinding Disorder" OR "Sleep Related Bruxism" OR "Sleep-Related Bruxism" OR "Sleep-Related Bruxisms")

## ANEXO F – Elegibilidad

## Supplementary file 2 - Articles excluded and the reasons for exclusion (n=39).

Reference	Author (year)	Reasons for Exclusion*
1.	Amjad Wyne (1996)	5
2.	Asokan (2007)	6
3.	Bro (2017)	3
4.	Byiers (2020)	8
5.	Canbay (2015)	8
6.	Carotenuto (2013)	6
7.	Cocchi (1999)	8
8.	Dashdorj (2010)	7
9.	DelRosso (2019)	1
10.	Dominguez Ortega (2013)	7
11.	Du (2015)	6
12.	Esfahani (2019)	1
13.	Firoozmand (2007)	6
14.	Fuertes-Gonzale (2014)	3
15.	Jesus (2013)	7
16.	Kim J (2010)	7
17.	Long (1998)	3
18.	Mellara (2011)	6
19.	Naidoo (2018)	6
20.	Ortega (2007)	7
21.	Paraipan (2015)	7
22.	Patle (2017)	8
23.	Richmond (1984)	8
24.	Rodriguez (2018)	3
25.	Rodriguez-Caballero (2012)	3
26.	Saeves (2012)	3
27.	Salazar (2016)	3
28.	Sarimski (1997)	8
29.	Sarmiento Polo (1996)	8
30.	Shur-Fen Gau (2006)	1
31.	Silvestri (2010)	7
32.	Soria-Bretones (2012)	7
33.	Standridge (2016)	7
34.	Szejko (2019)	3
35.	Tasdelen (2015)	7
36.	Temudo (2007)	3
37.	Turra (2009)	1
38.	Wassel (2014)	8
39.	Yasui (2008)	8

\*Legend: 1.Studies which did not evaluate children and adolescents under 18 years old with neurodevelopmental disabilities or other developmental condition;

2.Studies in which the diagnosis was not confirmed as neurodevelopmental disability or other developmental conditions as listed in CDC/DSM or ICD;

3. Studies in which the prevalence of tooth grinding and/or clenching was investigated only in an adult population (or data could not be extracted separately);
4. Studies in animals;
5. Studies in which the assessment of tooth grinding and/or clenching did not follow any criteria from consensus for bruxism diagnosis (Lobbezoo et. 2018);
6. Studies in which quantitative data regarding the prevalence of tooth grinding and/or clenching in children or adolescents with neurodevelopmental disabilities or other developmental conditions were not reported;
7. Experimental studies, reviews, case-reports, case-series with less than 10 individuals, protocols, short communications, personal opinions, letters, posters, conference abstracts, and laboratory research.
8. Full text not found

## REFERENCES FOR THE SUPPLEMENTARY FILE 2

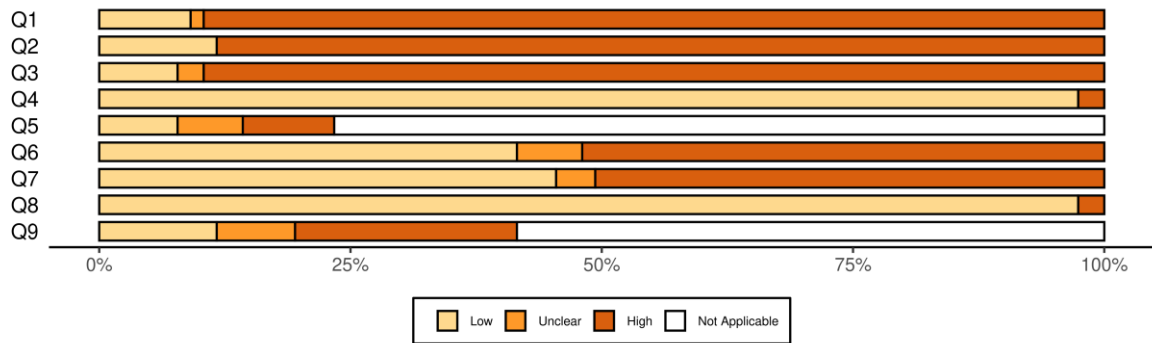
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## ANEXO G – Risco de Viés

**Supplementary file 3** - Results from Joanna Briggs Institute Critical Appraisal Checklist for Studies Reporting Prevalence Data (n=77).



Author (year)	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
1. Abando (2014)	N	N	N	Y	Y	Y	Y	Y	Y
2. Ahmed (2018)	N	Y	N	Y	NA	N	N	Y	N
3. Al-Schaibany (2017)	N	Y	N	Y	U	N	N	Y	U
4. Annaz (2011)	N	N	N	Y	NA	Y	Y	Y	Y
5. Areias (2011)	Y	N	N	Y	N	N	N	Y	N
6. Ashworth (2013)	Y	N	N	Y	U	Y	Y	Y	N
7. Atmetlla (2006)	N	N	N	Y	NA	N	N	Y	NA
8. Bagattoni (2016)	N	N	N	Y	NA	N	N	Y	NA
9. Beghini (2019)	N	N	N	N	NA	N	N	Y	U
10. Bhargava (2005)	N	N	N	N	NA	Y	Y	Y	NA
11. Bimstein (2008)	N	Y	N	Y	N	N	N	Y	NA
12. Botti Rodrigues (2015)	N	N	N	Y	NA	N	N	Y	NA
13. Breslin (2011)	N	N	Y	Y	NA	Y	Y	Y	NA
14. Bruni (2004)	N	N	N	Y	NA	Y	Y	Y	NA
15. Canbay (2017)	N	N	N	Y	NA	N	N	Y	NA
16. Carter (2009)	Y	Y	N	Y	Y	Y	Y	Y	Y
17. Castilho (2016)	N	N	N	Y	NA	N	N	Y	N
18. Castilho (2017b)	N	N	N	Y	NA	N	N	Y	U
19. Chau (2017)	N	N	Y	Y	NA	Y	Y	Y	NA
20. Chiang (2010)	N	N	N	Y	NA	Y	Y	Y	NA
21. Chin (2019)	N	N	N	Y	NA	Y	Y	Y	NA
22. Corkun (1999)	N	N	N	Y	NA	Y	Y	Y	NA
23. DeMattei (2007)	N	N	N	Y	N	N	Y	Y	N
24. dos Santos (2003)	N	Y	N	Y	NA	Y	Y	Y	N
25. Ehlers (2019)	N	N	N	Y	NA	N	N	Y	NA
26. El Khatib (2014)	N	N	Y	Y	NA	N	N	Y	N
27. Elsayed (2013)	N	N	N	Y	NA	N	N	Y	NA
28. Ertuğrul (2018)	N	N	N	Y	NA	N	N	Y	NA
29. Gau (2009)	N	N	N	Y	NA	Y	Y	Y	NA

30. Gerreth (2009)	Y	N	N	Y	N	N	N	Y	N
31. Ghanizadeh (2008)	N	N	N	Y	NA	N	N	Y	NA
32. Ghanizadeh (2010)	N	N	N	Y	NA	N	N	Y	NA
33. Gomes (2014)	N	N	N	Y	NA	Y	Y	Y	Y
34. Hennequin (2000)	N	N	N	Y	U	U	U	Y	N
35. Kuter (2019)	N	N	N	Y	N	N	N	Y	N
36. Lai (2018)	Y	Y	N	Y	NA	U	N	N	NA
37. Leiva García (2019)	N	N	N	Y	NA	Y	Y	Y	Y
38. López-Pérez (2007)	N	N	N	Y	Y	Y	Y	Y	Y
39. Malki (2004)	N	N	N	Y	NA	N	N	Y	NA
40. Mangione (2019)	N	N	N	Y	NA	N	N	Y	NA
41. Manzano (1999)	N	Y	Y	Y	NA	N	N	Y	U
42. Metgud (2015)	N	N	N	Y	NA	N	N	Y	N
43. Miano (2016)	N	N	N	Y	NA	Y	Y	Y	NA
44. Miamoto (2011)	N	N	N	Y	NA	N	N	Y	U
45. Miguet (2017)	U	N	N	Y	NA	U	U	Y	NA
46. Mirtala Orellana (2019)	N	N	N	Y	NA	N	Y	Y	Y
47. Morales Chávez (2008)	N	N	N	Y	NA	N	N	Y	NA
48. Neves (2007)	N	N	N	Y	NA	U	U	Y	NA
49. O'brien (2003)	Y	N	N	Y	N	Y	Y	Y	N
50. Olczak-Kowalczy (2018)	N	N	N	Y	NA	Y	Y	Y	NA
51. Oliveira (2008)	N	N	N	Y	NA	Y	Y	Y	NA
52. Onol (2018)	N	N	U	Y	N	N	N	Y	N
53. Ortega (2014)	N	N	N	Y	NA	N	N	Y	NA
54. Paaavonen (2008)	N	N	N	Y	NA	Y	Y	Y	NA
55. Paraipan (2014)	N	N	N	Y	NA	Y	Y	Y	NA
56. Peres (2007)	N	N	N	Y	NA	N	N	Y	NA
57. Peters (2019)	N	N	N	Y	NA	U	N	N	NA
58. Prihodova (2010)	N	N	N	Y	NA	Y	Y	Y	NA
59. Příhodová (2012)	N	N	N	Y	NA	Y	Y	Y	NA
60. Ribeiro (1997)	N	N	N	Y	NA	N	N	Y	NA
61. Ring (1998)	N	N	N	Y	NA	Y	Y	Y	NA
62. Rodopman-Arman (2011)	N	Y	N	Y	Y	Y	Y	Y	Y
63. Rosenbaum (1966)	N	Y	N	Y	U	N	N	Y	U
64. Ruy Carneiro (2018)	N	N	N	Y	NA	N	Y	Y	N
65. Sabuncuoglu (2014)	N	N	N	Y	NA	N	N	Y	NA
66. Sarnat (2016)	N	N	N	Y	NA	N	N	Y	NA
67. Silvestri (2009)	N	N	N	Y	NA	Y	Y	Y	NA
68. Souza (2015)	N	N	Y	Y	Y	N	N	Y	Y
69. Subramaniam (2011)	N	N	N	Y	NA	N	N	Y	NA
70. Suhaib (2019)	N	N	N	Y	NA	N	N	Y	N
71. Sumaya (2014)	N	N	N	Y	NA	N	N	Y	NA
72. Tomás-Vila (2008)	Y	N	Y	Y	Y	Y	Y	Y	N
73. Tsai (2012)	N	N	U	Y	NA	Y	Y	Y	NA
74. Velez-Galarraga (2016)	N	N	N	Y	NA	Y	Y	Y	NA
75. Zarowski (2008)	N	N	N	Y	NA	N	N	Y	NA
76. Wiggs (1996)	N	N	N	Y	U	Y	Y	Y	N
77. Wiggs (2005)	N	N	N	Y	NA	Y	Y	Y	NA

Legend: Y= Yes; N= No; U= Unclear.

Q1 - Was the sample frame appropriate to address the target population?

Q2- Were study participants sampled in an appropriate way?

Q3- Was the sample size adequate?

Q4- Were the study subjects and the setting described in detail? Were the study subjects and the setting described in detail?

Q5- Was the data analysis conducted with sufficient coverage of the identified sample?

Q6- Were valid methods used for the identification of the condition?

Q7- Was the condition measured in a standard, reliable way for all participants?

Q8- Was there appropriate statistical analysis?

Q9- Was the response rate adequate, and if not, was the low response rate managed appropriately?



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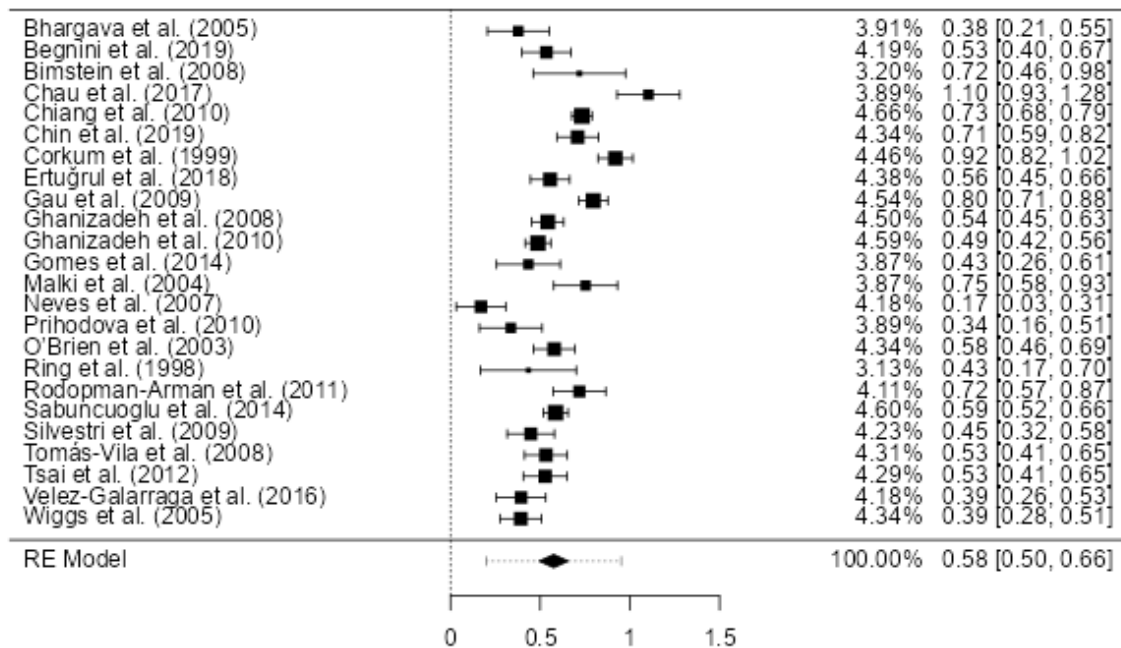
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## ANEXO H – Meta-análises de prevalência

**Supplementary file 4.** Forest plot with the pooled prevalence of sleep tooth grinding and/or clenching according to disability.

### 1. Prevalence of tooth grinding and/or clenching in children and adolescents with ADHD

**Figure 1a.** Pooled prevalence of reported tooth grinding and/or clenching in individuals with ADHD



#### Random-Effects Model (k = 24)

	Estimate	se	Z	p	CI Lower Bound	CI Upper Bound
Intercept	0.576	0.0410	14.0	<.001	0.495	0.656

**Note.** Tau<sup>2</sup> Estimator: Restricted Maximum-Likelihood

#### Heterogeneity Statistics

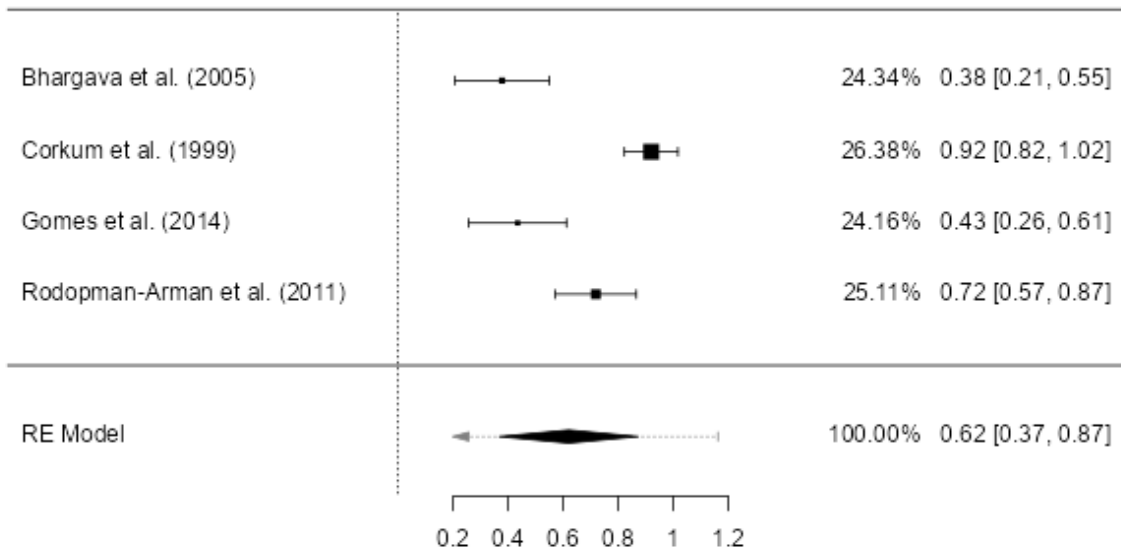
Tau	Tau <sup>2</sup>	I <sup>2</sup>	H <sup>2</sup>	R <sup>2</sup>	df	Q	p
0.188	0.0353 (SE=0.0119)	91.65%	11.976	.	23.000	225.584	<.001



**Random-Effects Model (k = 24)**

	Estimate	se	Z	p	CI Lower Bound	CI Upper Bound
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**Figure 1b.** Pooled prevalence of reported sleep tooth grinding and/or clenching in individuals with ADHD evaluated using the Children Sleep Questionnaire.



**Random-Effects Model (k = 4)**

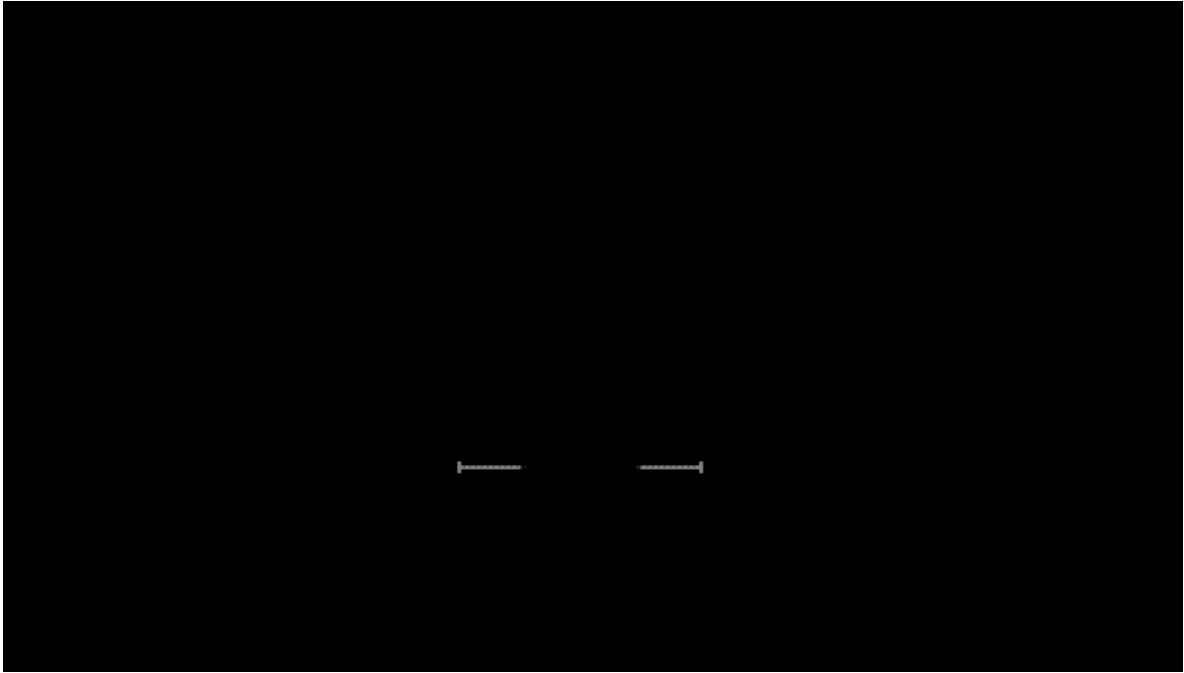
	Estimate	se	Z	p	CI Lower Bound	CI Upper Bound
Intercept	0.620	0.128	4.83	<.001	0.368	0.871

**Note.** Tau<sup>2</sup> Estimator: Restricted Maximum-Likelihood

**Heterogeneity Statistics**

Tau	Tau <sup>2</sup>	I <sup>2</sup>	H <sup>2</sup>	R <sup>2</sup>	df	Q	p
0.245	0.0599 (SE= 0.0538 )	91.83%	12.244	.	3.000	41.316	<.001

**Figure 1c.** Pooled prevalence of reported sleep tooth grinding and/or clenching in individuals with ADHD evaluated using the Pediatric Sleep Questionnaire.



**Random-Effects Model (k = 4)**

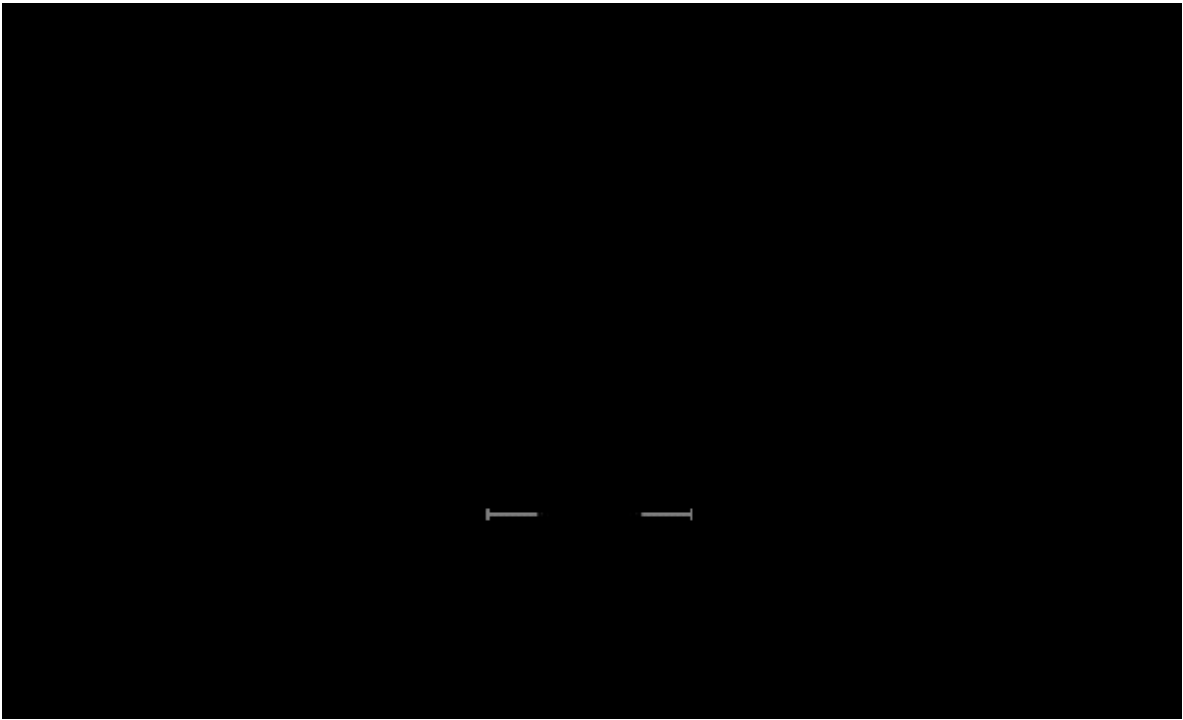
	Estimate	se	Z	p	CI Lower Bound	CI Upper Bound
Intercept	0.508	0.0755	6.73	<.001	0.360	0.656
	.	.	.	.	.	.

**Note.** Tau<sup>2</sup> Estimator: Restricted Maximum-Likelihood

### Heterogeneity Statistics

Tau	Tau <sup>2</sup>	I <sup>2</sup>	H <sup>2</sup>	R <sup>2</sup>	df	Q	p
0.137	0.0189 (SE= 0.0186 )	83.05%	5.900	.	3.000	18.143	< .001

**Figure 1d.** Pooled prevalence of definitive sleep tooth grinding and/or clenching in individuals with ADHD.



### Random-Effects Model (k = 4)

	Estimate	se	Z	p	CI Lower Bound	CI Upper Bound
Intercept	0.398	0.0805	4.95	< .001	0.240	0.556
.	.	.	.	.	.	.

**Note.** Tau<sup>2</sup> Estimator: Restricted Maximum-Likelihood

**Random-Effects Model (k = 4)**


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Estimate	se	Z	p	CI Lower Bound	CI Upper Bound
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**Heterogeneity Statistics**

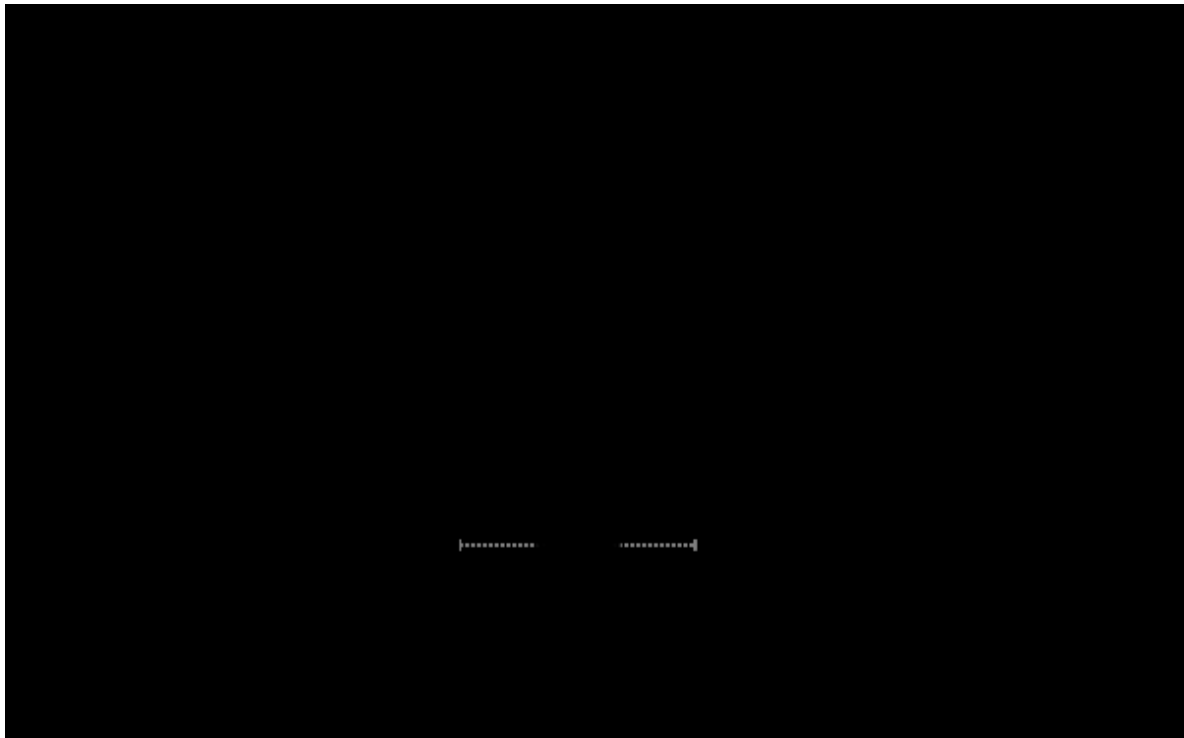

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Tau	Tau <sup>2</sup>	I <sup>2</sup>	H <sup>2</sup>	R <sup>2</sup>	df	Q	p
0.137	0.0188 (SE= 0.0211 )	75.71%	4.116	.	3.000	12.978	0.005

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## 2. Prevalence of tooth grinding and/or clenching in children and adolescents with ASD

**Figure 2a.** Pooled prevalence of reported tooth grinding and/or clenching in individuals with ASD.



### Random-Effects Model (k = 7)

	Estimate	se	Z	p	CI Lower Bound	CI Upper Bound
Intercept	0.504	0.0765	6.60	<.001	0.355	0.654
.	.	.	.	.	.	.

**Note.** Tau<sup>2</sup> Estimator: Restricted Maximum-Likelihood

### Heterogeneity Statistics

Tau	Tau <sup>2</sup>	I <sup>2</sup>	H <sup>2</sup>	R <sup>2</sup>	df	Q	p
0.195	0.0379 (SE= 0.0236 )	93.63%	15.691	.	6.000	117.222	<.001

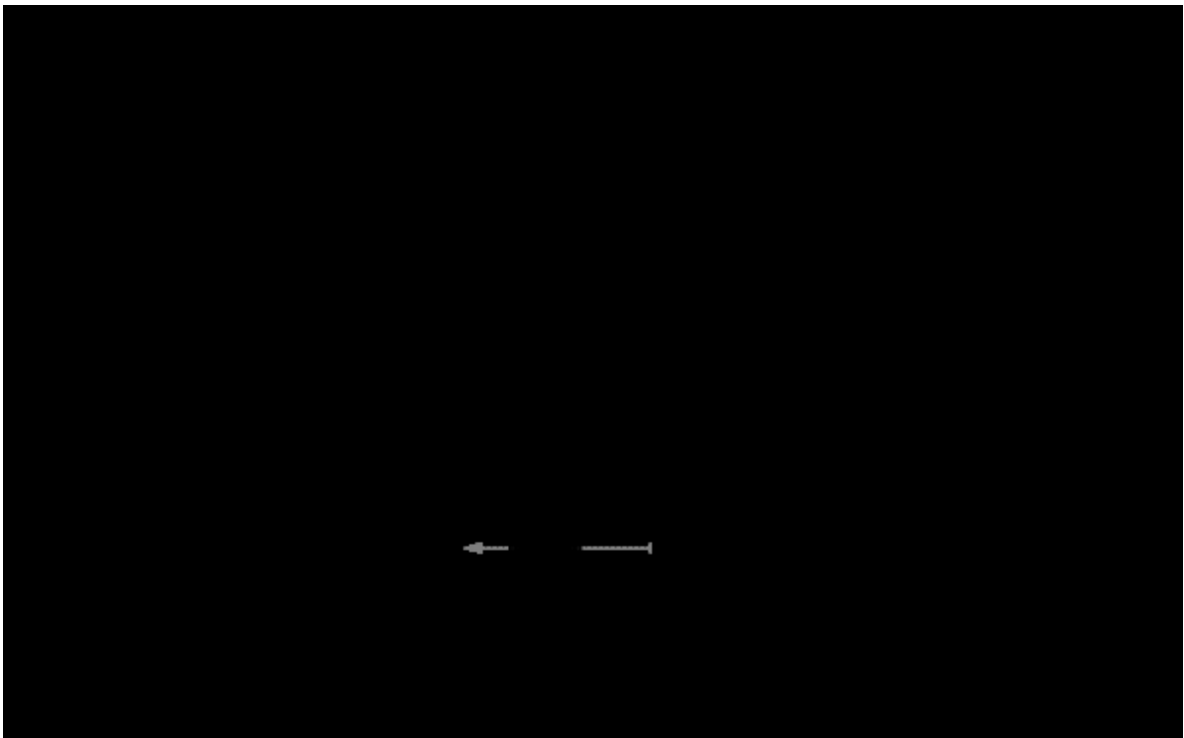
### Heterogeneity Statistics

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Tau	Tau <sup>2</sup>	I <sup>2</sup>	H <sup>2</sup>	R <sup>2</sup>	df	Q	p
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**Figure 2b.** Pooled prevalence of clinically observed tooth grinding and/or clenching in individuals with ASD.



### Random-Effects Model (k = 8)

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	Estimate	se	Z	p	CI Lower Bound	CI Upper Bound
Intercept	0.575	0.132	4.35	< .001	0.316	0.834
	.	.	.	.	.	.

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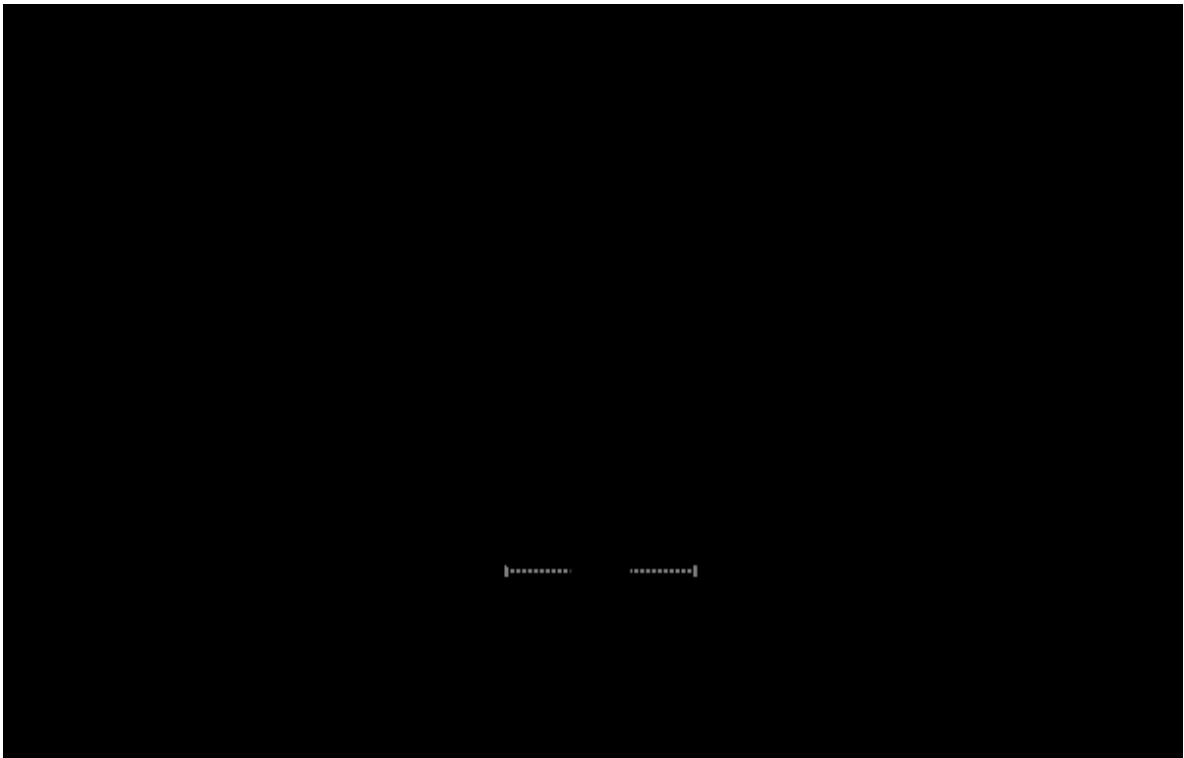
**Note.** Tau<sup>2</sup> Estimator: Restricted Maximum-Likelihood

### Heterogeneity Statistics

Tau	Tau <sup>2</sup>	I <sup>2</sup>	H <sup>2</sup>	R <sup>2</sup>	df	Q	p
0.364	0.1327 (SE= 0.0747 )	96.65%	29.869	.	7.000	126.222	<.001

### 3. Prevalence of tooth grinding and/or clenching in children and adolescents with Cerebral Palsy

**Figure 3a.** Pooled prevalence of reported tooth grinding and/or clenching in individuals with Cerebral Palsy.



### Random-Effects Model (k = 11)

	Estimate	se	Z	p	CI Lower Bound	CI Upper Bound
Intercept	0.670	0.0398	16.8	<.001	0.592	0.748

**Random-Effects Model (k = 11)**

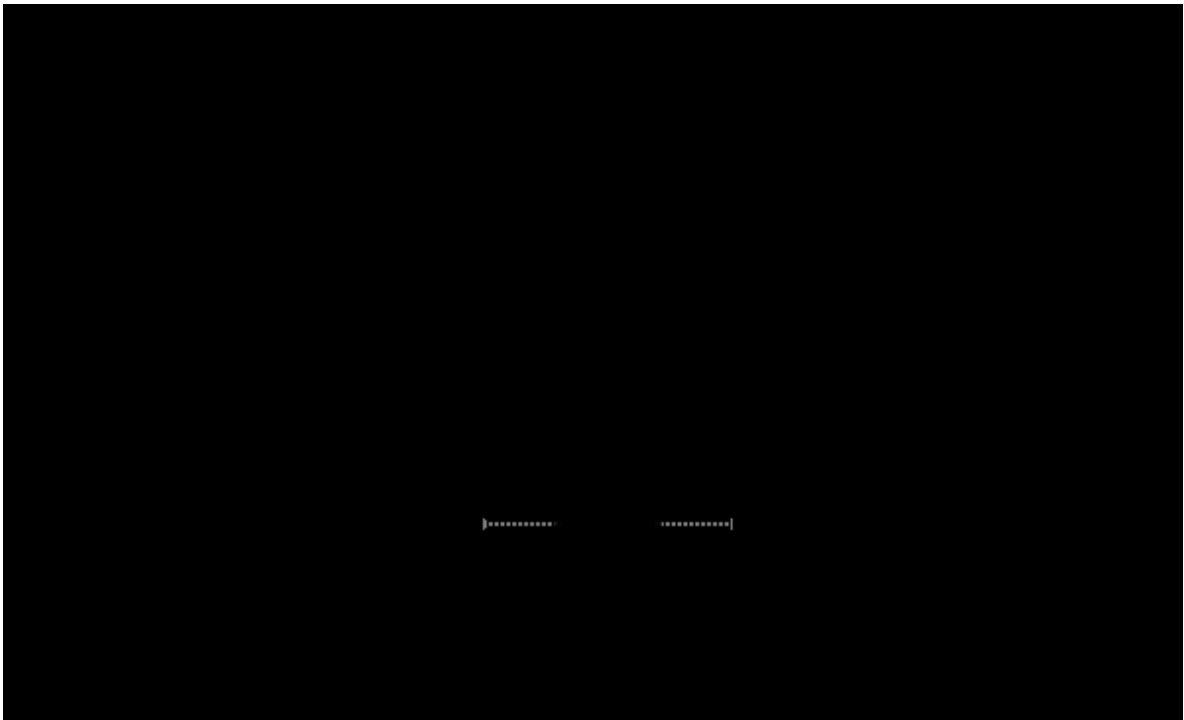
Estimate	se	Z	p	CI Lower Bound	CI Upper Bound
.	.	.	.	.	.

**Note.** Tau<sup>2</sup> Estimator: Restricted Maximum-Likelihood

**Heterogeneity Statistics**

Tau	Tau <sup>2</sup>	I <sup>2</sup>	H <sup>2</sup>	R <sup>2</sup>	df	Q	p
0.121	0.0147 (SE= 0.0078 )	86.57%	7.444	.	10.000	72.463	< .001

**Figure 3b.** Pooled prevalence of clinically observed tooth grinding and/or clenching in individuals with Cerebral Palsy.





**Random-Effects Model (k = 5)**


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	<b>Estimate</b>	<b>se</b>	<b>Z</b>	<b>p</b>	<b>CI Lower Bound</b>	<b>CI Upper Bound</b>
Intercept	0.719	0.0994	7.23	<.001	0.524	0.914
	.	.	.	.	.	.

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**Note.** Tau<sup>2</sup> Estimator: Restricted Maximum-Likelihood

**Heterogeneity Statistics**

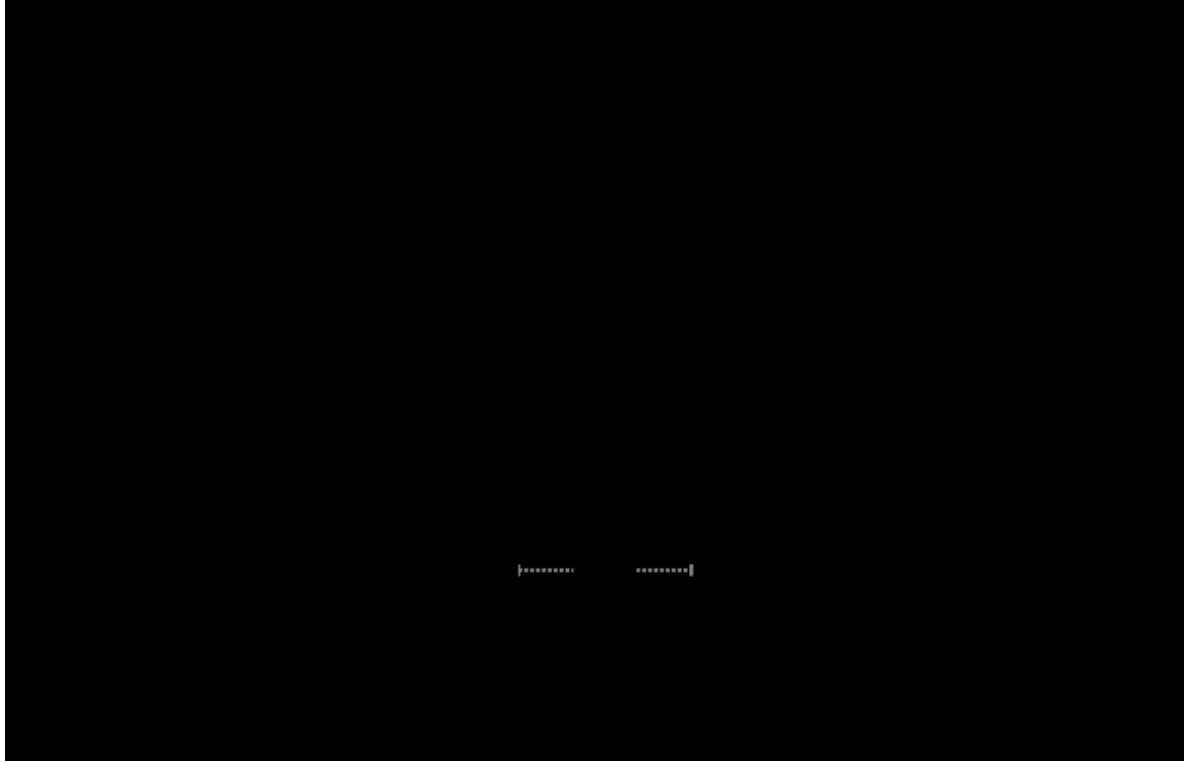

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<b>Tau</b>	<b>Tau<sup>2</sup></b>	<b>I<sup>2</sup></b>	<b>H<sup>2</sup></b>	<b>R<sup>2</sup></b>	<b>df</b>	<b>Q</b>	<b>p</b>
0.207	0.0429 (SE= 0.0348 )	91.51%	11.779	.	4.000	38.366	<.001

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**4. Prevalence of tooth grinding and/or clenching in children and adolescents with Down syndrome**

**Figure 4a.** Pooled prevalence of reported tooth grinding and/or clenching in individuals with Down syndrome



**Random-Effects Model (k = 9)**

	Estimate	se	Z	p	CI Lower Bound	CI Upper Bound
Intercept	0.682	0.0429	15.9	<.001	0.598	0.766
	.	.	.	.	.	.

**Note.** Tau<sup>2</sup> Estimator: Restricted Maximum-Likelihood

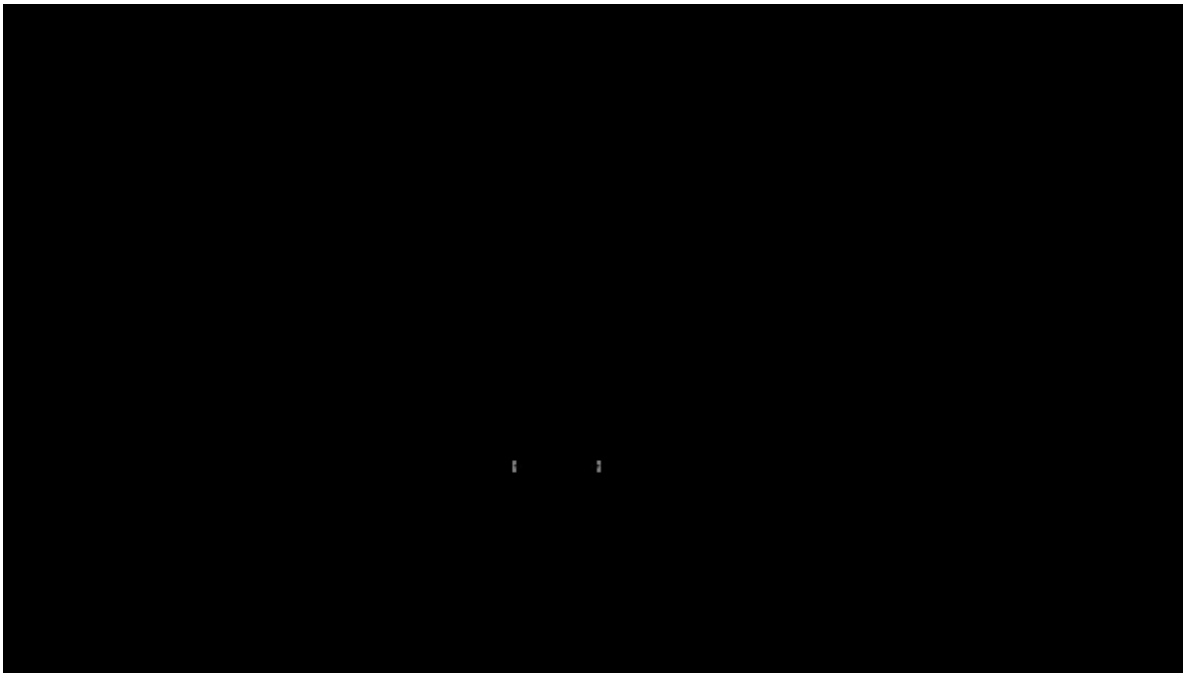
**Heterogeneity Statistics**

Tau	Tau <sup>2</sup>	I <sup>2</sup>	H <sup>2</sup>	R <sup>2</sup>	df	Q	p
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**Random-Effects Model (k = 9)**

	Estimate	se	Z	p	CI Lower Bound	CI Upper Bound
0.110	0.0121 (SE= 0.0082 )		75.91%	4.152	8.000	33.381
						< .001

**Figure 4b.** Pooled prevalence of reported tooth grinding and/or clenching in individuals with Down syndrome evaluated using the Children's Sleep Habits Questionnaire.

**Random-Effects Model (k = 3)**

	Estimate	se	Z	p	CI Lower Bound	CI Upper Bound
Intercept	0.631	0.0467	13.5	< .001	0.539	0.723

**Note.** Tau<sup>2</sup> Estimator: Restricted Maximum-Likelihood

**Random-Effects Model (k = 3)**


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Estimate	se	Z	p	CI Lower Bound	CI Upper Bound
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**Heterogeneity Statistics**


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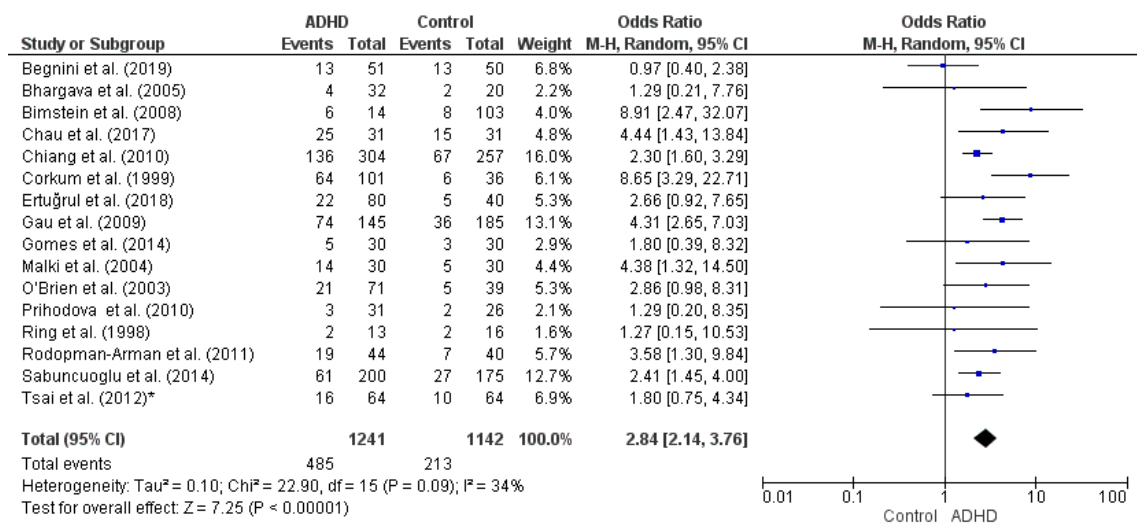
Tau	Tau <sup>2</sup>	I <sup>2</sup>	H <sup>2</sup>	R <sup>2</sup>	df	Q	p
0.000	0 (SE= 0.0069 )	0%	1.000	.	2.000	1.248	0.536

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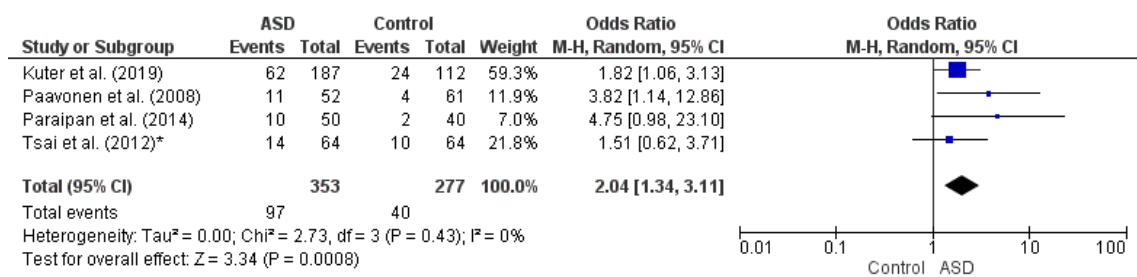
**ANEXO I – Meta-análises de associação**

**Supplementary file 5 – Meta-analysis of association of tooth grinding and/or clenching between children and adolescents with disability and the control group.**

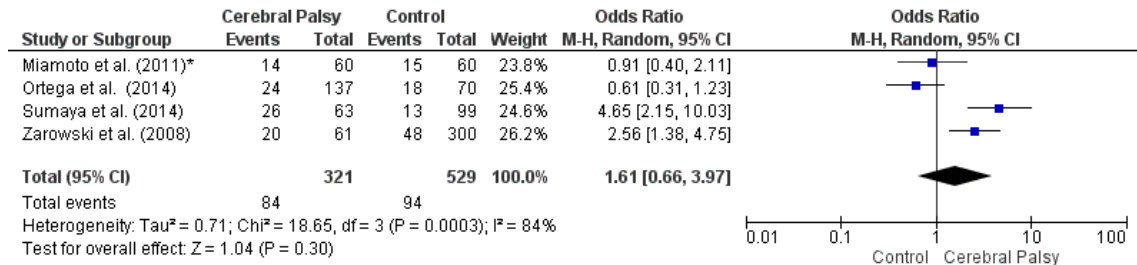
**Figure 1.** Association between reported tooth grinding and/or clenching in children and adolescents with ADHD and children and adolescents without disability.



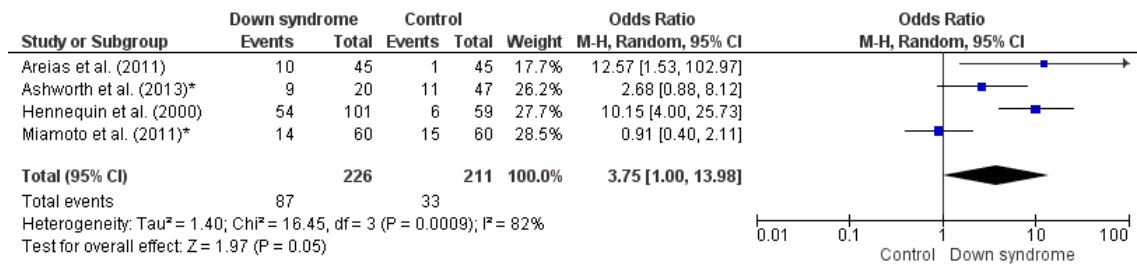
**Figure 2.** Association between reported tooth grinding and/or clenching in children and adolescents with ASD and children and adolescents without disability.



**Figure 3.** Association between reported tooth grinding and/or clenching in children and adolescents with Cerebral Palsy and children and adolescents without disability.



**Figure 4.** Association between reported tooth grinding and/or clenching in children and adolescents with Down syndrome and children and adolescents without disability.



**Figure 5.** Association between clinically observed tooth grinding and/or clenching in children and adolescents with ASD and children and adolescents without disability.

