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CAMILA RITA VICENTE MARCELIANO

SLEEP BRUXISM AND BIOLOGICAL RHYTHM IN SCHOOL-BASED SAMPLE FROM THE CITY OF PIRACICABA, SP, BRAZIL

BRUXISMO DO SONO E RITMO BIOLOGICO EM UMA AMOSTRA DE ESCOLARES DA CIDADE DE PIRACICABA, SP, BRASIL

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Dissertação apresentada à Faculdade de Odontologia de Piracicaba da Universidade Estadual de Campinas como parte dos requisitos exigidos para a obtenção do título de Mestra em Odontologia, na área de Odontopediatria

Dissertation presented to the Piracicaba Dental School of the University of Campinas in partial fulfilment of the requirements for the degree of Master in Odontology, in Pediatric Dentistry area.

Orientadora: Profa. Dra. Maria Beatriz Duarte Gavião

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RESUMO

A possível associação entre bruxismo do sono e variáveis responsáveis pela ruptura do ritmo biológico em crianças pode contribuir para a compreensão da etiologia multifatorial do bruxismo. Perante essa premissa, o objetivo desse estudo foi verificar se crianças com o possível bruxismo do sono poderiam apresentar alterações no ritmo biológico e explorar os possíveis fatores envolvidos. Trata-se de um estudo observacional e transversal com uma amostra de conveniência composta por 178 pais/responsáveis de escolares de 6 a 14 anos de idade, de escolas estaduais de Piracicaba, SP. Os dados foram obtidos por entrevistas online com respostas verbais. Na anamnese, coletou-se dados sobre a frequência do possível bruxismo do sono, dados sociodemográficos, dados antropométricos, variáveis relacionadas ao sono, uso de telas, frequência do consumo de alimentos açucarados e relato sobre apertamento dentário durante a vigília; foi aplicada a escala *Biological Rhythm Interview Assessment in Neuropsychiatry for Kids* (BRIAN-K), a qual contém quatro domínios relacionados (1) ao sono, (2) às atividades de rotina diária, (3) ao comportamento social e (4) à alimentação, além de questões sobre ritmos predominantes relacionados à disposição, concentração e mudança do dia pela noite. res foram formados: (1) sem bruxismo do sono, (2) com possível bruxismo do sono esporádico e (3) com possível bruxismo do sono frequente. Os dados foram analisados pela análise descritiva, qui-quadrado ou Exato de Fisher para as variáveis categóricas, testes ANOVA uma via e teste de Tukey ou Kruskal-Wallis para comparação intergrupos e teste Mann-Whitney para comparações entre duas variáveis. Foram construídos dois modelos de regressão logística ordinal multivariada, tendo como variável dependente a seguinte ordem: sem bruxismo do sono, possível bruxismo do sono esporádico e frequente; no primeiro modelo, as variáveis sociodemográficas constituíram as variáveis independentes e, no segundo, as independentes foram as variáveis referentes ao sono, condição nutricional, uso de telas, frequência de consumo de alimentos açucarados e o relato do apertamento dentário. Os resultados mostraram que o número de meninos com o possível bruxismo do sono foi similar ao número de meninas (P=0,153). As variáveis corporais e sociodemográficas foram similares entre os grupos (P>0,05). O valor total da escala de BRIAN-K foi significativamente maior para o grupo de possível bruxismo do sono frequente em relação aos outros dois grupos (P<0,05). O primeiro domínio, sono, apresentou valores significativamente maiores para os grupos com possível bruxismo do sono (P<0,05), enquanto nos outros três domínios, não houve diferença significativa entre os grupos, bem como para os ritmos predominantes (P>0,05). O

fator que diferiu entre os grupos na análise bivariada foi o apertamento dentário, sendo que o número de crianças com possível bruxismo do sono esporádico foi significativamente maior ($\chi 2$, P=0,005). No primeiro modelo de regressão logística ordinal multivariada as variáveis sociodemográficas não se associaram ao possível bruxismo do sono. No segundo modelo o primeiro domínio (sono) da escala BRIAN-K (P=0,003) e apertamento dentário (P=0,048) foram positivamente associados ao possível bruxismo do sono (OR=1,20 e 2,04, respectivamente). Concluiu-se que maior dificuldade em manter o ritmo do sono e o relato pelos pais/responsáveis sobre apertamento dentário pelas crianças durante a vigília determinaram maior chance do aumento da frequência do possível bruxismo do sono.

Palavras-chave: Bruxismo do sono, ritmo circadiano, crianças, bruxismo, odontologia pediátrica

ABSTRACT

The possible association between sleep bruxism and variables responsible for the disruption of the biological rhythm in children may contribute to the understanding of the multifactorial etiology of bruxism. Given this premise, the objective of this study was to verify whether children with possible sleep bruxism could present changes in biological rhythm and explore the possible factors involved. This is an observational, cross-sectional study with a convenience sample composed of 178 parents/guardians of schoolchildren aged between 6 and 14 years old, from state schools in Piracicaba, SP. Data were obtained through online interviews with verbal responses. In the anamnesis, data were collected on the frequency of possible sleep bruxism, sociodemographic data, anthropometric data, sleep-related variables, use of screens, frequency of consumption of sugary foods and reports of clenching teeth during wakefulness; it was applied the *Biological Rhythm Interview Assessment in Neuropsychiatry for Kids* scale (BRIAN-K), which contains four domains related (1) to sleep, (2) to daily routine activities, (3) to social behavior and (4) to food, in addition to questions about predominant rhythms related to disposition, concentration and changing the day by night. Three groups of children were formed: (1) without sleep bruxism, (2) sometime possible sleep bruxism and (3) frequent possible sleep bruxism. Data were analyzed by descriptive analysis, chi-square or Fisher's exact for categorical variables, one-way ANOVA and Tukey test or Kruskal-Wallis test for intergroup comparison and Mann-Whitney test for comparisons between two variables. Two multivariate ordinal logistic regression models were constructed, having as the dependent variable the following order: without sleep bruxism, sometimes and frequent possible sleep bruxism; in the first model, the sociodemographic variables constituted the independent variables and, in the second, the independent ones were those related to sleep, nutritional status, use of screens, frequency of consumption of sugary foods and the report of clenching teeth. The results showed that the number of boys with possible sleep bruxism was similar to girls (P=0.153). Body and sociodemographic variables were similar between groups (P>0.05). The total value of the BRIAN-K scale was significantly higher for the frequent possible sleep bruxism group compared to the other two groups (P<0.05). First domain (sleep) presented significantly higher values for the groups with possible sleep bruxism (P<0.05), while in the other three domains, there was no significant difference between the groups, as well as for the predominant rhythms (P>0.05). The factor that differed between the groups in the bivariate analysis was clenching, and the number of children with sometimes possible sleep bruxism was significantly higher ($\chi 2$,

P=0.005). In the first multivariate ordinal logistic regression model, the sociodemographic variables were not associated with possible sleep bruxism. In the second model, the first domain (sleep) of the BRIAN-K scale (*P*=0.003) and clenching (*P*=0.048) were positively associated with possible sleep bruxism (OR=1.20 and 2.04, respectively). It was concluded that greater difficulties in maintaining sleep rhythm and reports by parents/guardians about clenching teeth during wakefulness determined a greater chance of children increasing the frequency of possible sleep bruxism.

Keywords: Sleep bruxism, circadian rhythm, children, bruxism., pediatric dentistry

SUMÁRIO

1 INTRODUÇÃO

O bruxismo é uma atividade repetida da musculatura mastigatória caracterizada por apertar ou ranger os dentes e/ou segurar ou impulsionar a mandíbula. Apresenta duas manifestações circadianas distintas, uma durante o sono e outra durante a vigília, definindo o bruxismo do sono e o bruxismo em vigília, respectivamente (Bader, 2000; Lobbezoo et al., 2013), que podem ocorrer de forma isolada ou concomitante (Lavigne, 2003).

A atividade muscular no bruxismo do sono é caracterizada por contrações rítmicas (contração fásica) ou não rítmicas (contração tônica) (Lobbezoo et al., 2018). Tal atividade muscular surge como resposta à excitabilidade do sistema motor e autônomo, associado ao desequilíbrio de neurotransmissores (Kato, 2001), sendo a dopamina o principal neurotransmissor envolvido. Portanto, o bruxismo do sono tem origem no sistema nervoso central e ocorre a partir de uma sequência de eventos fisiológicos que culminam com o episódio da atividade muscular mastigatória que precede o ranger dos dentes (Lavigne et al., 2003).

Estes eventos iniciam-se com o aumento da atividade do sistema nervoso simpático, com ativação cardíaca e autonômica, que acontece por volta de quatro a oito minutos antes do episódio da atividade muscular mastigatória rítmica (Lavigne et al., 2003, 2007).

Após este primeiro sinal e a quatro segundos dos movimentos, o córtex cerebral apresenta aumento de atividade, seguido por aumento da frequência cardíaca, aumento do tônus dos músculos supra-hióideos, os quais provavelmente podem ser responsáveis pela protrusão da mandíbula e abertura das vias aéreas superiores; após, ocorrem duas incursões respiratórias e a seguir a atividade muscular mastigatória rítmica (1 e 0,8 segundos respectivamente) culminando com o início do episódio de ranger os dentes (Lavigne et al., 2003, 2007).

Aproximadamente 60% dos episódios de ranger os dentes terminam com amplo movimento de deglutição (Lavigne et al., 2003, 2007). Portanto, fatores periféricos não são mais considerados determinantes do bruxismo do sono, como no passado, quando se acreditava que alterações e interferências oclusais aumentavam a probabilidade da ocorrência do bruxismo do sono (Lobezzo et al., 2006).

O bruxismo em vigília é a atividade dos músculos mastigatórios durante a vigília caracterizada por contato repetitivo ou sustentado dos dentes e/ou por projeção da mandíbula para a frente ou para os lados, o que pode ocorrer com ou sem contato dentário, não sendo um distúrbio do movimento em indivíduos saudáveis (Lobbezoo et al., 2018), pode estar associado a fatores psicossociais e a sintomas psicopatológicos (Manfredini et al., 2011).

A avaliação do bruxismo do sono por relatos de pessoas que convivem com o indivíduo, e em vigília por autorrelato, continua sendo a principal ferramenta na pesquisa e na prática clínica (Raphael et al., 2015), apesar da baixa concordância com as abordagens instrumentais, em parte por causa dos critérios utilizados e as condições para avaliação instrumental (Raphael et al., 2016).

A prevalência em crianças e adolescentes apresenta grande variabilidade, de 3,5 a 40,6%, definida a partir de diferentes métodos de diagnóstico (entrevistas, relatos dos pais, avaliação clínica, polissonografia (considerada o padrão outro para o diagnóstico do bruxismo do sono) e avaliação eletromiografia (bruxismo em vigília) (Manfredini et al., 2013), já a prevalência do bruxismo em vigília é estimada somente em adultos com variação de 5,0 a 31,0% (Jensen et al., 1993; Winocur et al., 2011; Wetselaar et al., 2019).

A avaliação por meio de questionários (autorrelato e / ou relato dos pais) com ou sem exame físico são utilizados na maioria dos estudos para detectar essa condição (Lobezzo et al., 2013). Assim, os pais/cuidadores contribuem significativamente na determinação do bruxismo do sono em crianças.

No entanto, devido ao baixo conhecimento sobre este comportamento, o diagnóstico é muitas vezes tardio (Tavares et al., 2017). Um sistema de classificação do bruxismo para determinar a probabilidade de que uma determinada avaliação realmente produza um resultado válido, foi proposto por Lobbezoo et al. (2018) sendo esse classificado de três maneiras: “possível” baseado apenas em um autorrelato positivo; “provável” baseado em uma inspeção clínica positiva, com ou sem autorrelato positivo e o “definitivo” baseado em uma avaliação instrumental positiva, como a eletromiografia e a polissonografia, com ou sem autorrelato positivo e/ou inspeção clínica positiva.

Para o bruxismo do sono, teoricamente, a abordagem é mais difícil, uma vez que o indivíduo está dormindo enquanto realiza a atividade, mas os relatos de outros são relevantes e no caso de crianças, os pais/cuidadores são considerados informantes confiáveis. Para a avaliação mais precisa do bruxismo em vigília por autorrelato, inicialmente o indivíduo deve ser conscientizado sobre as características dessa atividade, isto é, o que significa apertar os dentes, apertar/empurrar, ou seja, quando os dentes se tocam sem haver deglutição e quando há aumento da atividade dos músculos mastigatórios sem contatos dentários. É importante que os comportamentos no bruxismo do sono e em vigília sejam monitorados durante uma ou duas semanas para os relatos serem fidedignos (Shiffman et al., 2008, Lobbezzo et al., 2013, 2018).

A frequência da atividade muscular mastigatória pode ser observada, mas a intensidade e a duração não podem ser quantificadas facilmente por meio de relatos (Yachida et al., 2016).

O bruxismo do sono pode ser classificado etiologicamente em primário (idiopático) ou secundário. O bruxismo primário inclui as formas de apertamento dentário ou de ranger os dentes durante o dia ou durante a noite, na ausência de causas médicas O secundário pode estar associado a um transtorno clínico, neurológico ou psiquiátrico, relacionado a fatores iatrogênicos (uso ou retirada de substâncias ou medicamentos) ou a outro transtorno do sono (Bader et al., 2000; Kato, 2001; Falisi et al., 2014).

De acordo com Raphael et al. (2016) e Lobbezoo et al. (2018) o bruxismo em indivíduos saudáveis não deve ser considerado como distúrbio, mas pode ser um sinal de condições adversas que requerem avaliação clínica, como por exemplo distúrbios respiratórios e neurológicos (*International Classification of Sleep Disorders*, 2014; Manfredini et al., 2016). Neste contexto, o bruxismo deve ser considerado um fator de risco e não um distúrbio em indivíduos saudáveis uma vez que atividade muscular mastigatória exacerbada pode aumentar o risco de consequências negativas para a saúde bucal (por exemplo, dor muscular mastigatória severa ou dor na articulação temporomandibular, desgaste mecânico extremo dos dentes, complicações protéticas) (Raphael et al., 2016; Manfredini et al., 2021).

Por outro lado, considera-se que a atividade muscular mastigatória rítmica pode ter efeitos positivos para o indivíduo com bruxismo do sono, isto é, quando está associado a um ou mais desfechos positivos à saúde, como em casos de problemas respiratórios. Durante o sono ocorre diminuição natural das incursões ventilatórias e do fluxo de ar com consequente redução da concentração plasmática de oxigênio; em indivíduos com problemas respiratórios e bruxismo do sono, pode-se observar que poucos segundos após o ranger dos dentes os níveis de saturação de oxigênio voltam aos níveis fisiológicos. Portanto, os eventos fisiológicos que ocorrem no bruxismo do sono podem prevenir o colapso ou restaurar a permeabilidade das vias aéreas superiores durante o sono (Lavigne et al., 2003; Manfredini et al., 2015). Além disso, movimentos mandibulares, como ocorrem no bruxismo do sono, estimulam a salivação que lubrifica o trato alimentar superior. Nos casos de refluxo gastroesofágico, a saliva poderá contribuir para minimizar a erosão química dos dentes e neutralizar o pH do esôfago após a deglutição que ocorre na finalização dos movimentos de ranger dos dentes (Ohmure et al., 2011). Esses efeitos positivos conotam que o bruxismo seria um potencial fator de proteção, pois diminui a chance de um desfecho negativo para a saúde. Além disso, o bruxismo do sono

pode estar associado a outras condições clínicas, como apneia do sono ou outros distúrbios do sono, ou sintomas como a xerostomia, mas sem relação de causa e efeito (Ahlberg et al., 2005; Manfredini et al., 2015).

Outros fatores possivelmente influenciadores do bruxismo do sono seriam o aumento no uso das mídias sociais associado e hábitos alimentares inadequados (açúcares), associados ou não, que podem agir diretamente na neurotransmissão da dopamina (DRD2) (Scariot et al., 2019; Ramos-Lopaz et al., 2018) e levar a criança desenvolver problemas comportamentais, como alta de homeostase do cortisol (Wallenius et al., 2010; DiNicolantonio et al., 2018), depressão (Lissak et al., 2018), sintomas relacionados ao Transtorno de Déficit de Atenção (Yen et al., 2007), hiperatividade e alterações no sono (Janssen et al., 2020). Tais condições podem estar diretamente relacionadas à etiologia do bruxismo, principalmente pela ação direta no polimorfismo no receptor de dopamina D2 (Ramos-Lopaz et al., 2018). De fato, crianças com bruxismo do sono apresentaram má qualidade do sono, dormindo menos de 8 horas por noite, de acordo com Serra-Negra et al. (2017). No mais, estímulos luminosos e sonoros diretos e indiretos durante o sono podem ser considerados fatores predisponentes do bruxismo do sono em crianças (Serra-Negra et al., 2014).

Neste contexto, os ritmos biológicos podem ser considerados como parte da estrutura multifatorial que poderia explicar a etiologia do bruxismo (Serra-Negra et al., 2017), uma vez que o sono é um dos componentes do ritmo biológico. Este ritmo é considerado influenciador das manifestações fisiológicas e comportamentais que ocorrem com periodicidade regular (García, 2014); por exemplo, secreção hormonal, ciclo menstrual, ciclos do sono e de vigília, regularidade na alimentação entre outros (Mondin et al., 2017; Berny et al., 2018). A constância do ritmo biológico é essencial para preservar boa saúde e qualidade de vida. Portanto, o período da infância inclui fases de desenvolvimento fisiológico, morfológico e comportamental importantes e se desorganizadas, podem determinar consequências adversas (Chiu et al., 2017).

Tem-se observado que o acúmulo de atividades e responsabilidades atribuídos à criança pode gerar estresse e, consequentemente, influenciar diretamente o comportamento e afetar áreas cerebrais ligadas ao monitoramento do ciclo de atividades (glândula pineal e o núcleo supraquiasmático) (Reyes et al., 2019).

A pandemia COVID-19 iniciada em 2020, determinou um novo fator possivelmente influenciador do sono por causa do isolamento social/confinamento domiciliar obrigatório

(Blume et al., 2020; Korman et al., 2020). O isolamento social foi implementado como medida de saúde pública para mitigar a infecção da população. Tal medida poderia alterar a rotina dos indivíduos (Wilder-Smith et al., 2020) com efeitos adversos que, por sua vez, poderiam impactar a vida cotidiana dos indivíduos.

Tendo em vista a importância do ritmo biológico, Berny et al. (2018) desenvolveram um instrumento de pesquisa, a fim de avaliar as perturbações do ritmo biológico em crianças e adolescentes, a partir do *Biological Rhythm Interview of Assessment in Neuropsychiatr*y (BRIAN) para adultos (Giglio et al., 2009), *BRIAN for Kids* (BRIAN-K) (Berny et al., 2018). Esta escala é composta por quatro domínios: sono, atividade, ritmos sociais e padrão alimentar, onde, os escores mais altos indicam maior dificuldade em manter o ritmo biológico, além de três questões que avaliam o ritmo predominante. Essa escala foi traduzida e validada para quatro idiomas e utilizada para avaliação tanto de crianças com ou sem alterações neurológicas ou psiquiátricas (Bach et al., 2019) e apresentou propriedades psicométricas favoráveis (Berny et al., 2018).

Com base na literatura descrita acima o presente estudo teve por objetivo analisar crianças com bruxismo do sono e as possíveis alterações no ritmo biológico, referentes ao sono, às atividades rotineiras diárias, ao comportamento social e ao tipo de alimentação e verificar os possíveis fatores influenciadores, como as características sociodemográficas, características do sono, consumo de alimentos açucarados e uso de mídias digitais.

2 ARTIGO:

POSSIBLE SLEEP BRUXISM AND BIOLOGICAL RHYTHM IN SCHOOL CHILDREN

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ABSTRACT

Objective: To verify whether children with possible sleep bruxism (PSB) had alterations in their biological rhythm and to explore the possible factors involved, such as sleep characteristics, screen time, breathing, sugary food consumption, clenching teeth during wakefulness reported by parents/guardians. **Methodology:** Data were collected by online interview from 178 parents/guardians of students aged 6 to 14 years, enrolled in five public schools in Piracicaba, SP. The frequency of PSB, sociodemographic data, time of sugary, sleep data were assessed through anamnesis. The Biological Rhythm Interview Assessment in Neuropsychiatry for Kids (BRIAN-K) was applied during online interviews. It was composed by four domains (1) sleep, (2) daily routine activities, (3) social behavior and (4) eating and questions about predominant rhythms related to disposition, concentration, and change day to night. Three groups were formed: (1) without possible sleep bruxism (WPSB), (2) with possible sleep bruxism sometimes (PSBS) and (3) with possible frequent sleep bruxism (PSBF). **Results:** The number of boys with PSB was similar to that of girls (P=0.153); body variables and sociodemographic variables were similar between groups (P>0.05); the total value of the BRIAN-K Scale for the 4 domains was significantly higher for the PSBF group compared to WSB group; first domain of BRIAN-K scale, sleep, presented a significantly higher values for the PSBS and PSBF, while in the other three domains, no significant difference between groups occurred, as well as for predominant rhythm. The only factor that differed between the groups in the bivariate analysis was clenching teeth, as the number of children with possible sleep bruxism sometimes was significantly higher ($\chi 2$, P=0.005). Multivariate ordinal logistic regression showed that sociodemographic variables were not associate with PSB, were first domain of the BRIAN-K scale, sleep, (P=0.004), and clenching teeth (P=0.022) were positively associated with PSB (OR 1.19 and 2.35, respectively). **Conclusion:** Difficulties in maintaining sleep rhythm and clenching teeth during wakefulness reported by parents/guardians may determine a greater chance of children to increase the frequency of possible sleep bruxism.

Keywords: Sleep bruxism. Circadian rhythm. Children. Bruxism. Pediatric dentistry

Introduction

Bruxism consists of masticatory muscle activities that occur during sleep or wakefulness, qualifying it as sleep and awake bruxism, respectively, which in turn are different entities (Lobbezoo et al., 2018). The muscle activity in sleep bruxism is characterized as rhythmic (phasic) or non-rhythmic (tonic) and in awake bruxism as repetitive or sustained tooth contact and/or by bracing or thrusting of the mandible); both are not a movement disorder in otherwise healthy individuals. Moreover, sleep bruxism is not considered a sleep disorder (Lobbezoo et al., 2018). Currently, it is conceptualized that bruxism is regulated centrally, not peripherally, that is, anatomical factors, such as characteristics of occlusion and dental articulation, are not causal factors (Lobbezoo et al., 2012; Raphael et al., 2016). Thus, the etiology is multifactorial involving complex processes that can result in teeth grinding (Lavigne et al., 2003). Awake bruxism can be associated with psychosocial factors and psychopathology symptoms (Manfredini et al., 2011).

Due to the limitation of diagnostic methods, sleep bruxism and awake bruxism are classified as possible, probable and definite (Lobbezzo et al., 2013). Possible bruxism is based on positive self-report, through a questionnaire and/or anamnesis. In the meantime, the probable should be based on a positive clinical examination (such as tooth wear, muscle pain or fatigue, indentations in the mucosa of the tongue or cheek) with or without positive self-report. For definite sleep bruxism, the positive polysomnographic record is required; definite awake bruxism should be based on the graphic record of the electromyogram, preferably combined with the so-called momentary ecological assessment methodology, which allows obtaining a true estimate, among others, of the frequency of dental contacts during wakefulness; these indicators may or not be associated with self-report or positive clinical examination (Lobbezzo et al., 2018).

In fact, self-reported of possible sleep bruxism is considered reliable, although theoretically difficult as the individual is asleep whilst performing the activity, but informants can be interrogated, and for children, their parents/guardians are considered eligible and confident proxies. On the other hand, self-report is required for awake bruxism, but the individual must be aware of what awake bruxism means, that is, clenching and bracing/thrusting, more easily defined as the teeth touching not for swallowing purposes, and as increased levels of masticatory muscle activity without tooth contacts, respectively (Raphael et al., 2015; Lobbezoo et al., 2018). Reports over a one to two weeks can be useful in research and clinical practice to assess the presence of sleep and awake bruxism.

The prevalence of sleep bruxism in children and adolescents varies widely between 3.5% and 40.6%, as defined by different diagnostic methods (interviews, parent reports, clinical assessment, objective polysomnography, and electromyographic assessment) (Manfredini et al., 2013). The prevalence of awake bruxism due to difficult diagnosis is estimated only in adults, ranging from 5.0 to 31.0% (Jensen et al., 1993; Winocur et al., 2011; Wetselaar et al., 2019).

The etiology bruxism can be classified as primary (idiopathic) and secondary (iatrogenic). Primary or idiopathic bruxism includes the forms of clenching teeth during the day or night, in the absence of medical causes (Kato, 2001). The secondary bruxism could be associated with a clinical, neurological or psychiatric disorder, related to iatrogenic (use of withdrawal of substances or medication) or another sleep disorder (Bader et al., 2000; Falisi et al., 2014).

According to Kuhn and Türp (2017), behavioral problems, sleep conditions, excessive use of digital media and inappropriate eating habits can be considered risk factors for bruxism in children and adolescents. In fact, children with sleep bruxism can have poor sleep quality, sleeping less than 8 hours a night (Serra-Negra et al., 2017). Light and sound stimuli, direct and indirect, can be considered predisposing factors to bruxism in children (Serra-Negra et al., 2014). The association of inappropriate eating habits with excessive use of media, which may be directly linked to the polymorphism in the dopamine D2 receptor, may trigger the onset of bruxism (Ramos-Lopaz et al., 2018).

In this context, biological rhythm could play a role in the etiology of bruxism (Serra-Negra et al., 2017; Bach et al., 2019). Biological rhythm consists of the physiological and behavioral expression that contains a regular periodicity, for example, the secretion of hormones, the sleep-wake cycles, and the regularity of feeding (Schimitt et al., 2010; Mondin et al., 2017). Disruptions in the biological rhythm may cause emotional and behavioral changes and negative consequences on sleep-wake rhythm (Barnard and Nolan 2008; Giannotti et al. 2002; García, 2014).

The global pandemic COVID-19, which started in 2020, determined a new factor possibly influencing sleep due to mandatory social isolation at home, as a public health measure to mitigate the population's infection (Blume et al., 2020; Korman et al., 2020). Such a measure could change the lifestyle of individuals (Wilder-Smith et al., 2020) with possible negative consequences for well-being, therefore influencing the sleep/wake cycle and circadian rhythms (Brooks et al., 2020; Rajkumar, 2020).

Considering the central regulation of sleep bruxism, variables responsible for the biological rhythm disturbance in children could help to clarify the multifactorial etiology involved (Bach et al., 2019). Based on this premise, this study aimed to verify whether children with sleep bruxism presented changes in their biological rhythm related to sleep, daily routine activities, social behavior and eating, and to explore the possible factors involved.

Methodology

This is a cross-sectional observational study carried out with a convenience sample composed of 178 parent/guardian-child dyads. It was conducted during the period of the COVID-19 pandemic, from October 2020 to November 2021.

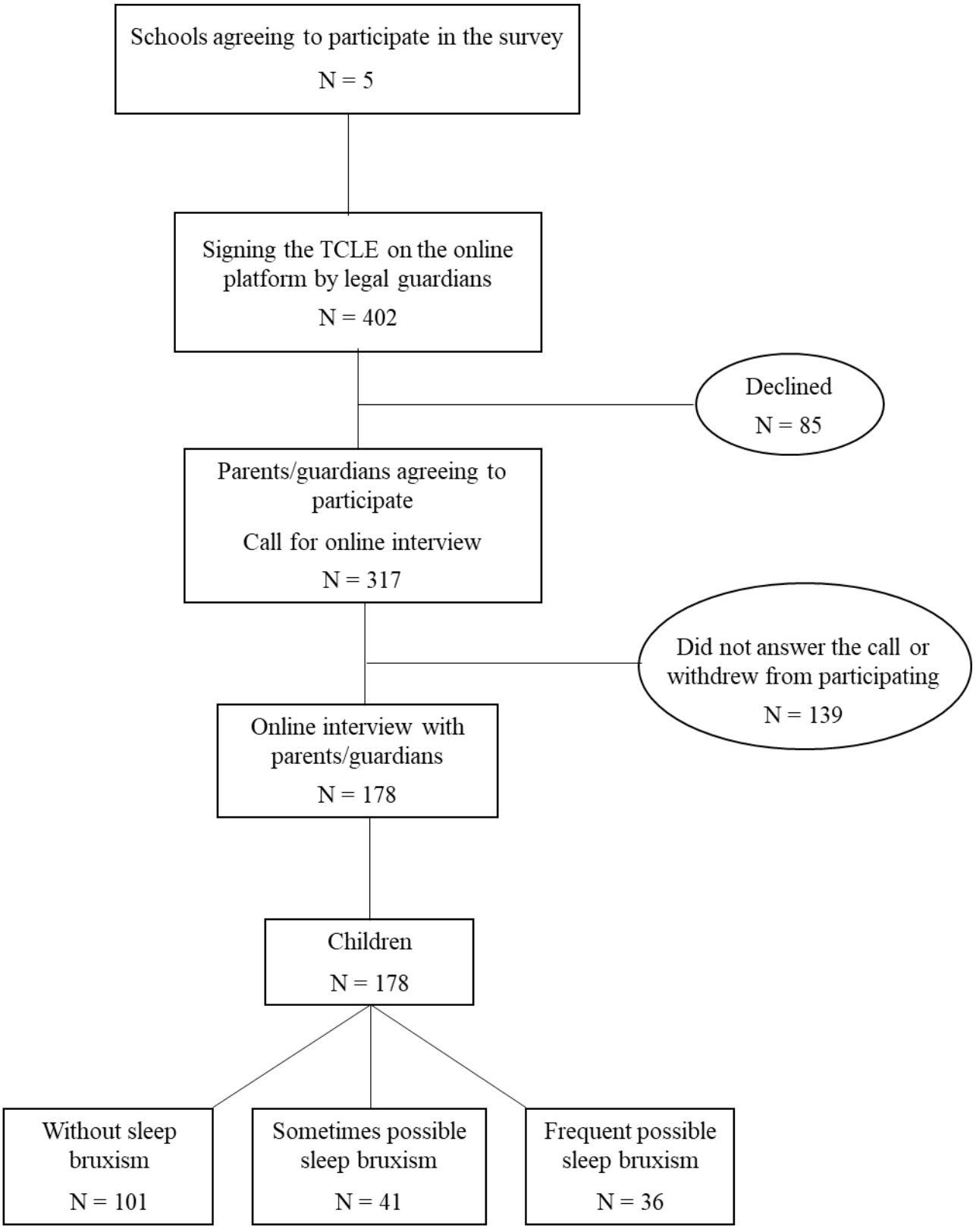
Ethical aspects

The project was submitted to the Research Ethics Committee (CEP) of the Piracicaba Dental School, University of Campinas (FOP-UNICAMP) and approved with CAAE opinion number 3618619.6.0000.5418 (Annex 1). The parents/guardians signed the Free and Informed Consent Term (TCLE) on the Google forms digital platform, as detailed below.

Study Design

First, the São Paulo State Department of Education of Piracicaba city, SP, Brazil, was contacted to obtain authorization for access the state schools. After this step, the directors and coordinators were contacted by telephone to obtain authorization to enter the schools and send the documents related to the research. In the end, a total of 5 participating schools were obtained. Then, the respective directors were asked to provide the contacts of children of both sexes, aged six to 14 years, and their parents/guardians; the accesses of the WhatsApp groups of the classrooms were obtained. Following, parents/guardians of children received an invitation to participate in the study and a link to access the TCLE on the Google forms digital platform, to indicate whether they agreed to participate (Figure 1).

Figure 1- Sample Flowchart



Those who agreed to participate signed the ICF digitally and provided personal contacts, as asked in the invitation. Thus, a 20-minute online interview with parents/guardians was asked and the day and time choose by them were informed to the examiner. During this interview the inclusion and exclusion criteria were considered.

As inclusion criteria children should be healthy, while exclusion criteria were children with mental retardation or psychiatric disorders, high complexity systemic problems (diabetes, hypertension, kidney problems and/or heart problems) and parents who would not understand or could not answer the questions.

The online interview was characterized as semi-structured and divided into 3 moments: (1) Anamnesis; (2) Biological Rhythm Assessment and (3) Food Diary Reminder. The interview was recorded, with the respective agreement by the parents/guardian. The answers were verbally informed, and the video saved on google drive.

(1) Anamnesis

Parents/guardians verbally replied to the following information: Personal data of the child and legal guardian, socioeconomic information (parents' education, marital status, professional status, family income), child's medical history, presence or absence of menarche in girls, dental history (report of dental problems, information on oral hygiene, history of dental trauma and history of early loss of a tooth; type of dentition), child's weight and height and frequency of physical activities (Appendix 1).

In addition, the following information was obtained:

a. Routine: child’s activities along the day, from the moment she/he woke up until bedtime during the 5 days of the week and during the weekends.
b. Assessment of the place where the child rests: presence or absence of lights on in the child's room during sleep, absence or presence of noise, with whom the child slept, the distance from the parent's room, whether the door was open or closed during sleep.
c. Assessment of the use of technological means (devices): device types to which the child had access (cell phones, tablets, computers, televisions, and video games) and the frequency of use during the total day (hours) were informed.
d. Assessment of possible sleep bruxism (Lobbezoo et al., 2018): three questions were addressed:
    i. Does your child grind his/her teeth during sleep?
    Answer: Never, sometimes, or always.

ii. How many times a week in the last month? (If answer i, was positive)
Answer: 1 time a week, 2 times a week, 3 times a week or more than 4 times a week.

iii. When waking up in the morning or at night, your son/daughter has a locked jaw and/or pain in the jaw?
Answer: Yes or No

e. Assessment of clenching:

I. Has your child been clenching his teeth while awake?

Answer: Yes or No

Sleep bruxism was classified as "possible" when there was a positive report from parents/guardians (Lobbezzo et al., 2018). The frequency of bruxism was considered as "sometimes" when the child ground teeth 1-2 times a week and "frequent" when the child ground three or more times a week.

(2) Biological Rhythm

The scale Biological Rhythms Interview for Assessment in Neuropsychiatry for Kids (BRIAN-K), translated into Portuguese by Berny et al. (2018), has been used to measure the biological rhythm disruption in Brazilian children and adolescents (Annex 2). This scale consists of 20 items, which were answered verbally by the parent/guardians. Items 1 to 17 correspond to child's difficulties in maintaining the biological rhythm in the last 15 days, in four domains: sleep, routine activities, social rhythm and eating pattern. Responses were categorized on the Likert scale from 0 to 3, with 0 = no difficulty; 1 = little difficulty; 2 = quite difficult; 3 = a lot of difficulty. Items 18, 19 and 20 assess whether the child displays a predominantly diurnal or nocturnal rhythm. Items 18 and 19 report, respectively, the part of the day parents/guardians feel that the child is more willing/active and more concentrated/productive to perform daily activities: 1= morning; 2 = afternoon; 3 = at night; 4 = no specific shift. Item 20 informs whether the child switched from daytime to nighttime and the responses were categorized on a Likert scale from 1 to 4: 1 = never; 2 = rarely; 3 = almost always; 4 = always. In all domains, higher scores indicate greater difficulty in maintaining the biological rhythm.

In case of doubts from parents/guardians, the researcher helped them in a standardized way, clarifying the item.

(3) Food Diary Reminder

Parents/guardians were asked to verbally inform the food record, which included a list of all food and drinks consumed within 24 hours, that is, the day before the interview, describing the times and amounts, until the moment of the interview (Appendix 2). For the present study, the frequency of sugary foods consumed per day was considered.

Statistical analysis

In the statistical analysis, the categorical variables were demonstrated by absolute and relative frequencies and numerical variables by means, standard deviations and medians and intermediate quartiles.

The ANOVA one way and the Tukey test (α=0.05) were used to assess the differences between the three groups of children with and without bruxism; for data without normal distribution, it was used Kruskal-Wallis test. Moreover, Mann-Whitney test was applied for comparisons between two variables when indicated. The scores of the 17 questions of BRIAN-K scale were summed, as well as the items of each domain, to obtain continuous scores.

To verify the association between sociodemographic factors and those related to sleep characteristics, ordinal logistic regression models were constructed, with the dependent variable being the order of sleep bruxism, without, sometimes and frequent. First, it was selected the independent categorical variables whose *P*-values in the bivariate analysis were less than 0.25, considering the inter- and intra-group comparisons. For continuous variables, a univariate ordinal logistic regression was constructed and those with *P*-values less than 0.25 were also selected. After, the selected independent variables were included in two models of multivariate ordinal logistic regression. The first model included the sociodemographic characteristics as the independent variables, and the second model included those related to sleep characteristics, breathing, screen time, and clenching teeth during wakefulness reported by the parents/guardians as the independents. For this, the assumption of proportional odds was verified using the test of parallel lines, considering *P*-values greater than 0.05, because the null hypothesis states that the slope coefficients in the model are the same across response categories (and lines of the same slope are parallel). Moreover, the assumption of multicollinearity was also verified, considering the variance inflation factor (VIF) less than 10 and tolerance around or less than one, meaning that the independent variables were not correlated. Independent variables with a *P*-value <0.05 in the final models were found significantly associated with the

order of possible sleep bruxism. The statistical software JAMOVI (version 2.3.9, retrieved from https://www.jamovi.org) was used, considering the significant level as alpha equal to 0.05.

Results

Table 1 shows the descriptive statistics for the sociodemographic variables. It was observed that the number of boys and girls was similar in the total sample, but the number of girls without possible sleep bruxism was significantly higher than boys (Chi-square, $P = 0.154$). Moreover, the number of boys and girls who presented "sometimes possible sleep bruxism" or "frequent possible sleep bruxism" was similar (Chi-square, $P > 0.05$). Height and weight did not show significant differences between groups. Only about 7% of the sample was underweight, differing significantly from the other weight status, while half of the sample was overweight or with obesity (49.44%). However, there was no significant difference in weight status between the children with or without possible sleep bruxism (Chi-square, $P > 0.05$). Regarding the marital status and education of the mothers, there was a great variability, but most were married and had about 11 years of schooling (High School).

The values for the BRIAN-K scale are in Table 2. For overall sample, the difference occurred between children with frequent possible sleep bruxism and without possible sleep bruxism, the first ones with higher values. In the first domain, children with sometimes and frequent possible sleep bruxism showed significant higher values than children without bruxism, and those did not differ from each other. For the other domains, no significant differences were found.

Table 1 –Sociodemographic characteristics of children and mothers and respective intra- andinter-group comparison

			Overall (N = 178)	Without possible sleep bruxism (N = 101)	Sometimes possible sleep bruxism (N = 41)	Frequent possible sleep bruxism (N = 36)	Between groups
Children							
Sex [n (%)]	Girls		99 (55.62)	64 (63.37)	19 (46.34)	16 (44.44)	$\chi 2$
	Boys		79 (44.38)	37 (36.63)	22 (53.66)	20 (55.56)	*P*=0.153
		$\chi 2$	*P*=0.134	*P*=0.007	*P*=0.639	*P*=0.505	
Age (years)	Mean (SD)		10.14 (1.97)	10.24 (1.98)	10.22 (2.04)	9.78 (1.88)	ANOVA one way *P*=0.524
	Median (25%-75)		10.21 (8.42-11.92)	10.42 (8.42-11.83)	9.83 (8.50-12.08)	9.54 (8.33-11.43)	
	Range		6.17-14.42	6.33-14.42	7.00-13.58	6.17-13.33	
Weight (Kg)	Mean (SD)		41.53 (14.30)	41.44 (13.54)	43.12 (16.13)	39.97 (14.39)	ANOVA one way *P*=0.634
	Median (25-75%)		38.95 (30.00-49.00)	39.00 (30.00-50.00)	39.00 (32.00-48.40)	38.45 (30.00-46.25)	
	Range		19.00-84.00	21.00-82.00	19.00-80.00	21.00-84.00	
Height (cm)	Mean (SD)		1.43 (0.16)	1.43 (0.17)	1.43 (0.15)	1.40 (0.16)	ANOVA one way *P*=0.656
	Median (25-75%)		1.42 (1.30-154)	1.43 (1.30-1.55)	1.40 (1.30-1.54)	1.40 (1.30-1.47)	
	Range		1.05-1.82	1.05-1.82	1.17-1.80	1.15-1.75	
BMI	Mean (SD)		20.11 (4.75)	19.91 (4.22)	20.71 (5.75)	19.97 (5.00)	Kruskal-Wallis *P*=0.920
	Median (25-75%)		19.45 (16.52-22.81)	19.29 (16.85-22.23)	19.51 (15.62-24.87)	19.66 (17.19-21.38)	
	Range		11.72-37.10	12.49-33.14	12.43-34.63	11.72-37.10	

Table 1 continued

			Overall (N = 178)	Without possible sleep bruxism (N = 101)	Sometimes possible sleep bruxism (N = 41)	Frequent possible sleep bruxism (N = 36)	Between groups
Weight Status [n (%)]	Underweight		12 (6.74)	6 (5.94)	2 (4.88)	4 (11.11)	Fisher's exact test *P*=0.780
	Normal weight		78 (43.82)	48 (47.52)	16 (39.02)	14 (38.89)	
	Overweight		43 (24.16)	23 (22.77)	10 (24.39)	10 (27.78)	
	Obesity		45 (25.28)	24 (23.76)	13 (31.71)	8 (22.22)	
		χ2	*P* <0.001	*P* <0.001	*P*=0.014	*P*=0.014	
Mothers							
Marital Status [n (%)]	Single		42 (23.60)	23 (22.77)	9 (21.95)	10 (27.78)	Fisher's exact test *P*=0.594
	Married		87 (48.88)	55 (54.46)	16 (39.02)	16 (44.44)	
	Divorced		21 (11.80)	10 (9.90)	7 (17.07)	4 (11.11)	
	Widow		5 (2.81)	3 (2.97)	1 (2.44)	1 (2.78)	
	Others		23 (12.92)	10 (9.90)	8 (19.51)	5 (13.89)	
		χ2	*P* <0.0001	*P* <0.001	*P*=0.007	*P* <0.001	
Educational Status [n (%)]	1º Degree		38 (21.30)	23 (22.77)	9 (22.00)	6 (16.67)	χ^2 *P*=0.937
	2º Degree		102 (57.30)	57 (56.44)	24 (58.54)	21 (58.33)	
	Graduated		38 (21.30)	21 (20.79)	8 (19.51)	9 (25.00)	
			P <0.001	*P* <0.001	*P*=0.003	*P*=0.005	

Table 1 continued

		Overall (N = 178)	Without possible sleep bruxism (N = 101)	Sometimes possible sleep bruxism (N = 41)	Frequent possible sleep bruxism (N = 36)	Between groups
Family Income* [n (%)]	< 1	21 (11.80)	14 (13.86)	3 (7.32)	4 (11.11)	Fisher's exact test *P*=0.461
	Between 1 to 2	68 (38.20)	41 (40.59)	17 (41.46)	10 (27.78)	
	Between 3 to 4	51 (28.65)	27 (26.73)	14 (34.15)	10 (27.78)	
	> 4	38 (21.35)	19 (18.81)	7 (17.07)	12 (33.33)	
		P <0.001	*P* <0.001	*P*=0.003	*P*=0.261	

SD – Standard deviation

* Wage per month – One wage = R$ 1100.00, approximately US$ 220.00 (during 2021, 1 US$ was approximately R$ 5.00)

χ^2 – chi square; corresponding *P*-values in each column mean intra-group comparisons for proportions (χ^2 adherence)

Table 2 – Descriptive data for BRIAN-K scores for overall sample and groups and the respective comparisons

BRIAN-K		Overall (N= 178)	Without possible sleep bruxism (N = 101)	Sometimes possible sleep bruxism (N =41)	Frequent possible sleep bruxism (N =36)	Between groups
Total scale Questions 1-17	Mean (SD)	15.46 (9.32)	13.91 (8.25) ^{A}	16.76 (10.32) ^{AB}	18.38 (10.34) ^{B}	ANOVA one way *P*=0.0305 Tukey test $P < 0.05$
	Median (25%-75%)	13.00 (8.00-22.75)	11.00 (8.00-20.00)	14.00 (8.00-25.00)	16.50 (10.25-28.00)	
	Range	1.00-43.00	1.00-42.00	1.00-35.00	2.00-43.00	
First Domain Sleep	Mean (SD)	4.44 (3.50)	3.67 (3.21) ^{A}	5.39 (3.72) ^{B}	5.53 (3.61) ^{B}	ANOVA one way *P*=0.0035 Tukey test $P < 0.05$
	Median (25%-75%)	4.00 (2.00-6.00)	3.00 (1.00-6.00)	5.00 (3.00-8.00)	5.50 (3.00-8.00)	
	Range	0.00-14.00	0.00-14.00	0.00-12.00	0.00-13.00	
Second domain Routine activities	Mean (SD)	4.49 (3.03)	4.37 (2.78)	4.15 (3.00)	5.25 (3.63)	ANOVA one way *P*=0.2269
	Median (25%-75%)	4.00 (2.00-7.00)	4.00 (2.00-6.00)	4.00 (2.00-6.00)	4.50 (2.00-8.00)	
	Range	0.00 – 12.00	0.00-11.00	0.00-11.00	0.00-12.00	
Third domain Social rhythm	Mean (SD)	3.07 (2.64)	2.74 (2.28)	3.61 (3.11)	3.94 (2.93)	Kruskal-Wallis *P*=0.3173
	Median (25%-75%)	3.00 (1.00-5.00)	3.00 (1.00-4.00)	3.00 (1.00-5.00)	3.50 (1.00-5.25)	
	Range	0.00-12.00	0.00-9.00	0.00-12.00	0.00-11.00	
Fourth domain Eating pattern	Mean (SD)	3.44 (3.05)	3.13 (2.82)	3.61 (3.05)	4.08 (3.59)	ANOVA one way *P*=0.2480
	Median (25%-75%)	3.00 (1.00-5.00)	2.00 (1.00-4.00)	3.00 (1.00-6.00)	3.50 (1.00-6.25)	
	Range	0.00-12.00	0.00-12.00	0.00-10.00	0.00-12.00	

Different superscripts capital letters in columns mean significant difference between groups (respective lines in bold fonts)

For predominant rhythm (Table 3), it was observed that for overall children, the most willing/active period was the afternoon, like the no specific shift. Inter and intra-groups comparisons showed no significant differences in periods in which children were more willing/active.

Regarding the periods in which children were more concentrated/productive, for the overall sample and children without possible sleep bruxism, the morning and afternoon periods were the most frequent, whereas for those with possible sleep bruxism, there was no specific period. The distribution of children between the groups was similar.

The intragroup comparisons showed that the proportion of children who never changed day to night was significantly higher for overall sample and for the groups without or with frequent possible sleep bruxism, whereas for the group with sometimes bruxism, never or seldom were similar. The proportion of children who change day to night often or always was significantly lower than those who never or seldom change, except for children with frequent bruxism.

Table 3 – Sample distribution in accordance with the predominant rhythm of the BRIAN-K scale (questions 18, 19, and 20) and the respective comparisons for overall sample and between groups

BRIAN-K		Overall (N= 178)	Without possible sleep bruxism (N = 101)	Sometimes possible sleep bruxism (N =41)	Frequent possible sleep bruxism (N =36)	Between groups (*P*-values)
Question 18 More willing/active [n (%)]	Morning	33 (18.54)	16 (15.84)	8 (19.51)	9 (25.00)	χ^2 *P*=0.812
	Afternoon	51 (28.65)	31 (30.69)	13 (31.71)	7 (19.44)	
	Night	37 (20.79)	22 (21.78)	8 (19.51)	7 (19.44)	
	No specific shift	57 (32.02)	32 (31.68)	12 (29.27)	13 (36.11)	
	χ^2 (*P* values)	*P*=0.0336	*P>0.05*	*P>0.05*	*P>0.05*	
Question 19 More concentrated/ productive [n (%)]	Morning	62 (34.83)	37 (36.63)	12 (29.27)	13 (36.11)	*Fisher's exact test* *P*=0.685
	Afternoon	65 (36.52)	40 (39.60)	13 (31.71)	12 (33.33)	
	Night	22 (12.36)	11 (10.89)	7 (17.07)	4 (11.11)	
	No specific shift	29 (16.29)	13 (12.87)	9 (21.95)	7 (19.44)	
	χ^2 (*P* values)	*P*<0.0001	*P*<0.0001	*P*>0.05	*P*>0.05	
Question 20 Change day to night [n (%)]	Never	122 (68.54)	75 (74.26)	23 (56.10)	24 (66,67)	*Fisher's exact test* *P*=0.130
	Seldom	39 (21.91)	18 (17.82)	15 (36.59)	6 (16.67)	
	Often	10 (5.62)	4 (3.96)	2 (4.88)	4 (11.11)	
	Always	7 (3.93)	4 (3.96)	1 (2.44)	2 (5.56)	
	χ^2 (*P* values)	*P*<0.0001	*P*<0.0001	*P*<0.0001	*P*<0.001	

χ^2 - chi square; corresponding *P*-values in each column mean intra-group comparison for proportions (χ^2 adherence)

The variables related to sleep, breathing, screen time, sugary food consumption, and clenching teeth are described in Table 4. It is possible to observe that no difference between groups occurred, except for clenching teeth since group with sometimes possible sleep bruxism presented a higher proportion of children who parents/guardian reported clenching teeth during wakefulness. On the other hand, the intragroup comparisons showed that for overall sample and children without possible sleep bruxism, the proportion of children with nasal breathing informed by parents/guardians was higher than oral breathing. The same happened for lights on in children's bedroom and presence of noises near the children's house. Despite the respective absolute values for children with sometimes and frequent sleep bruxism were higher, they did not reach statistical significance. Intragroup comparisons showed that the number of children with or without reported clenching during wakefulness was similar only for those with sometimes sleep bruxism.

Interesting to note, that the screen time was similar between groups both on working days and weekend, with significant higher values for working days.

The times a day that children consumed sugary foods were similar between the groups, but the number of children who consumed 3 to 5 times a day was significantly higher than at other times. In addition, the intra- and inter-group comparisons for hours of sleep and sugary food consumption before bedtime were not significantly different.

Table 4 – Descriptive data for variables related to sleep, breathing, screen time, sugary food consumption, and clenching teeth for overall sample and groups and the respective comparisons

			Overall (N= 178)	Without possible sleep bruxism (N = 101)	Sometimes possible sleep bruxism (N =41)	Frequent possible sleep bruxism (N =36)	Between groups (*P* values)
Breathing [n (%)]	Nasal		115 (64.61)	68 (67.33)	25 (60.98)	22 (61.11)	χ^2 *P*=0.685
	Oral		62 (34.83)	32 (31.68)	16 (39.02)	14 (38.89)	
		χ^2	*P*<0.001	*P*<0.001	*P*=0.160	*P*=0.182	
Children's bedroom lights [n (%)]	Lights on		108 (60.67)	64 (63.37)	25 (60.98)	19 (52.78)	χ^2 *P*=0.535
	Lights off		70 (39.33)	37 (36.63)	16 (39.02)	17 (47.22)	
		χ^2	*P*=0.004	*P*=0.007	*P*=0.160	*P*=0.739	
Noisy places near the children's house [n (%)]	Yes		64 (35.96)	34 (33.66)	15 (36.59)	15 (41.67)	χ^2 *P*=0.668
	No		114 (64.04)	67 (66.34)	26 (63.41)	21 (58.33)	
		χ^2	*P*<0.001	*P*=0.001	*P*=0.086	*P*=0.317	
Screen time Working days (hs)	Mean (SD)		26.33 (15.76)	27.53 (15.79)	24.72 (13.54)	24.76 (18.02)	ANOVA one way *P*=0.511
	Median (25% - 75%)		25 (15 - 36.83)	26.83 (15 - 40)	24 (16.83 - 35)	20.50 (11.37 - 35)	
	Range		0 – 60	0 - 55	0 - 80	0 - 80	
Screen time Weekend (hs)	Mean (SD)		7.54 (6.82)	8.11 (7.14)	8.04 (6.20)	5.38 (6.29)	ANOVA one way *P*=0.101
	Median (25% - 75%)		6.75 (0 - 13)	7 (1 - 14)	8 (2 - 12)	2 (0 - 9.38)	
	Range		0 – 24	0 - 24	0 - 19	0 - 21	
Screen time: working days x weekend			*P*<0.001	*P*<0.001	*P*<0.001	*P*<0.001	Mann-Whitney

Table 4 continued

			Overall (N= 178)	Without possible sleep bruxism (N = 101)	Sometimes possible sleep bruxism (N =41)	Frequent possible sleep bruxism (N =36)	Between groups (P values)
Hours of sleep	Mean (SD)		9.66 (1.90)	9.74 (1.89)	9.42 (2.02)	9.69 (1.83)	ANOVA one way
	Median (25% - 75%)		9.50 (8.50 - 11)	9.50 (8.50 - 11)	9.50 (8.00 - 11)	10 (8.38 - 11.04)	*P*=0.658
	Range		3.50 – 16	3.5 - 15	5.5 - 16	5.5 - 13	
Sugary food consumption (times a day) [n (%)]		Never	5 (2.8)	2 (2.0)	0	3 (8.3)	χ^2
		1	17 (9.6)	9 (8.9)	6 (14.6)	2 (5.6)	*P*=0.567
		2	35 (19.7)	20 (19.8)	6 (14.6)	9 (25.0)	
		3	34 (19.1)	21 (20.8)	8 (19.5)	5 (13.9)	
		4	39 (21.9)	21 (20.8)	8 (19.5)	10 (27.8)	
		5	33 (18.5)	20 (19.8)	7 (17.1)	6 (16.7)	
		6	7 (3.9)	4 (4.0)	3 (7.3)	0	
		7	6 (3.4)	2 (2.0)	3 (7.3)	1 (2.8)	
		8	1 (0.6)	1 (1.0)	0	0	
		9	1 (0.6)	1 (1.0)	0	0	
		χ^2	*P*<0.001	*P*<0.001	*P*=0.994	*P*=0.598	

Table 4 continued

			Overall (N= 178)	Without possible sleep bruxism (N = 101)	Sometimes possible sleep bruxism (N =41)	Frequent possible sleep bruxism (N =36)	Between groups (P values)
Sugary food consumption before bedtime [n (%)]	Yes		106 (59.6)	61 (60.4)	24 (58.5)	21 (58.3)	$\chi 2$ P=0.966
	No		72 (40.4)	40 (39.6)	17 (41.5)	15 (41.7)	
		$\chi 2$	P=0.001	P=0.037	P=0.274	P=0.317	
Clenching teeth during wakefulness	Yes		43 (24.2)	16 (15.8)	17 (41.5) *	10 (27.8)	$\chi 2$ * P=0.005
	No		135 (75.8)	85 (84.2)	24 (58.5)	26 (72.2)	
		$\chi 2$	P<0.001	P<0.001	P=0.274	P=0.008	

χ^2 - chi square; corresponding *P*-values in each column mean intra-group comparison for proportions (χ^2 adherence)

* Means statistical significance between groups in the respective line

Tables 5 and 6 include the results of multivariate ordinal logistic regressions, considering the order for possible sleep bruxism as the dependent variable. Categorical variables with *P*-values less than 0.25 for inter- and intra-groups comparisons (Tables 1, 3, and 4) were included into the final models. The same criterion was applied for continuous variables according to univariate models (Supplementary Table 1). The second domain and question 18 of the BRIAN-K scale were forced into the final model. In addition, variables that did not meet the assumptions of ordinal logistic regression were not included in the models, since presented multicollinearity into the models.

Sociodemographic variables were not associated with possible sleep bruxism, considering the *P*-values greater than 0.05 and confidence intervals containing the value 1 in the respective model (Table 5).

The second model of multivariate ordinal analysis (Table 6) showed that the first domain of the BRIAN-K scale, which is related to sleep difficulties, was significantly associated with possible sleep bruxism. In this context, as the values of the first domain increase, i.e., more sleep difficulties, the chance of a child having possible sleep bruxism more frequently increases (OR=1.20). Furthermore, the chance of children to increase the frequency of possible sleep bruxism if they clench their teeth during wakefulness was about twice as high (OR=2.04). Unexpected, other variables related to sleep and sugary food consumption showed no association with possible sleep bruxism.

Table 5 - Multivariate ordinal logistic regression analysis for possible sleep bruxism, as the dependent variable and sociodemographic variables, as the independents

Model Coefficients – Possible sleep bruxism (order: without, sometimes, frequent)							
						95% Confidence Interval	
Predictor	Estimate	SE	Z	*P*	OR	Lower	Upper
Sex (children):							
Masculine – Feminine	0.429	0.307	1.399	0.162	1.54	0.84	2.81
Weight status (children)							
Underweight - normal	0.539	0.640	0.842	0.400	1.71	0.47	5.99
Overweight- normal	0.351	0.380	0.921	0.357	1.42	0.67	2.99
Obesity - normal	0.289	0.391	0.739	0.460	1.34	0.62	2.88
Mother educational status							
1º Degree – 2º Degree	-0.088	0.389	-0.225	0.822	0.92	0.42	1.95
Graduated – 2º Degree	0.029	0.408	0.072	0.943	1.03	0.46	2.28
Mother marital status:							
Single – Married	0.608	0.427	1.422	0.155	1.84	0.79	4.27
Divorced – Married	0.735	0.477	1.543	0.123	2.09	0.81	5.31
Others – Married	0.459	0.440	1.042	0.297	1.58	0.66	3.75
Family income (wage per month):							
Less than 1 – between 1 to 2	0.045	0.548	0.082	0.935	1.05	0.34	3.01
Between 3 to 4 – between 1 to 2	0.513	0.396	1.295	0.195	1.67	0.77	3.66
More than 4 – between 1 to 2	0.764	0.462	1.654	0.098	2.15	0.87	5.36

Nagelkerke's (R^2N) = 0.040
VIF = 1.03 - 1.08 Tolerance 0.923-0.967 Proportional odds $P>0.05$
Variables not included – did not meet ordinal logistic regression assumptions

Table 6 - Multivariate ordinal logistic regression analysis for possible sleep bruxism as the dependent variable, and variables related to sleep, screen time, sugary food consumption, and clenching teeth as the independents

Model Coefficients – Possible sleep bruxism (order: without, sometimes, frequent)							
						95% Confidence Interval	
Predictor	Estimate	SE	Z	*P*	OR	Lower	Upper
First domain - Sleep	0.184	0.062	2.969	**0.003**	1.20	1.07	1.36
Second domain - Routine activities	0.024	0.060	0.404	0.686	1.03	0.91	1.15
Third domain - Social rhythm	-0.035	0.081	-0.429	0.668	0.97	0.82	1.13
Fourth domain - Eating pattern	-0.005	0.067	-0.075	0.940	1.00	0.87	1.13
Q 18: More willing/active							
Afternoon - Morning	-0.749	0.491	-1.527	0.127	0.47	0.18	1.24
Night – Morning	-0.979	0.571	-1.716	0.086	0.38	0.12	1.14
No specific shift – Morning	-0.413	0.458	-0.903	0.366	0.66	0.27	1.63
Q 19: More concentrated/productive							
Afternoon - Morning	-0.375	0.422	-0.888	0.375	0.69	0.30	1.57
Night – Morning	-0.759	0.609	-1.247	0.212	0.47	0.14	1.52
No specific shift – Morning	0.375	0.470	0.798	0.425	1.46	0.58	3.67
Q 20: Change day to night							
Seldom - Never	0.209	0.412	0.506	0.613	1.23	0.55	2.77
Often - Never	0.915	0.752	1.217	0.224	2.50	0.56	11.06
Always - Never	0.222	0.846	0.263	0.793	1.25	0.21	6.37
Breathing:							
Mouth - nose	0.122	0.332	0.366	0.714	1.13	0.59	2.16
Children's bedroom lights:							
No – yes	0.340	0.343	0.990	0.322	1.41	0.72	2.76
Noisy places near the children’s house							
No – yes	-0.084	0.354	-0.237	0.813	0.92	0.46	1.85
Screen time - working days (hs)	-0.007	0.011	-0.637	0.524	0.99	0.97	1.01
Screen time - weekend (hs)	-0.036	0.026	-1.372	0.170	0.97	0.92	1.02
Sugary food consumption before bedtime							
No – yes	-0135	0.342	-0.396	0.692	0.87	0.44	1.7
Clenching teeth during wakefulness							
Yes– No	0.710	0.360	1.975	**0.048**	2.04	1.00	4.13

Nagelkerke’s (R^2N) = 0.114 VIF 1.04-1.37 Tolerance 0.73-0.96 Proportional odds $P>0.05$
Variables not included – did not meet ordinal logistic regression assumptions
SE - standard error OR – odds ratio

Discussion

The present study aimed to verify whether children with sleep bruxism present changes in their biological rhythm, regarding sleep, daily routine activities, social behavior and feeding and the possible associated factors, such as sociodemographic variables, weight status, sleep characteristics and clenching teeth during wakefulness reported by parents/guardians. The possible association between sleep bruxism with the variables responsible for the interruption of the biological rhythm in children could help to clarify the multifactorial picture of bruxism, in addition to being a tool for possible diagnoses (Bach et al., 2019).

It was observed that the number of boys with possible sleep bruxism was the same as that of girls, corroborating previous studies (Bach et al., 2019; Castelo et al., 2012), disagreeing with Restrepo et al. (2021). Nevertheless, sleep bruxism prevalence in children has presented a greater variability, with a commonly described decrease with age and no gender differences, due to different methodologies concerned to age groups studied, as well as the different frequencies of self-reported sleep bruxism (Manfredini et al., 2013). Geographical variation among studies exist in the epidemiology of parental-reported sleep bruxism in children and cultural rules and standards could explain the variability in prevalence (Van Selms et al., 2019). Moreover, in a recent systematic review (Ferrari-Piloni etal., 2022), it was considered also that the prevalence does not vary between sexes, presumably due to individual factors rather than regional or collective ones.

The frequency of children with possible bruxism was almost half of the total sample, (43.26%), that can be considered high on comparing with other studies, as stated in the systematic review by Soares et al. (2020). This high frequency could be attributed to routine change due to the confinement determined by COVID 19 pandemic, influencing sleep, schedules and feeding. According to Sohrab (2019), the increase in cases of bruxism may be related to reduced contact with other children, increased pressure arising from the new context of online classes and the absence of team sports in this period of social confinement. In addition, uncertainty regarding factors such as the origin of SARS-COV-2, the government's ability to prevent the spread of the disease, and the severity of the risks cause considerable family stress, with emotional and financial consequences that could influenced children behavior (Ferreira et al., 2009; VHO, 2020). However, we cannot yet confirm such an association, as no study with a longitudinal design has addressed aspects related to sleep in children, or the association between the period of social isolation and clinical factors related to dentistry (Lima et al., 2022).

Regarding the anthropometric assessment (weight and height), half of the sample was overweight or obese. This in line with the high prevalence of overweight/obesity children in Brazil, agreeing with a projection made by the Ministry of Health in 2018 indicating that in the year 2022, the number of obese children in Brazil would be around 46.5% (https://www.gov.br/saude). The Covid-19 pandemic, period in which the present data was collected, can also aggravated the situation, and had an important impact on the diet of children and adolescents, in addition to the increase in sedentary lifestyle (Zabetakis et al., 2020).

Considering the sleep-obesity relationship and the biopsychosocial characteristics involved (Barragán et al. 2021) plus the sleep bruxism, which is an activity of the masticatory muscles that obviously occurs during sleep, the weight status could be an important factor in this context. However, no significant association was found between the children's BMI and weight status with possible sleep bruxism, agreeing with Juliatte et al. (2022) who observed no respective association in adults assisted by the public health system. The lack of association in the present study could be attributed to the fact that despite the high frequency of overweight and obesity in the sample, the children did not present comorbidities. Although the relationship of sleep bruxism and the presence of comorbidities has been emerging (Segù et al. 2020), it must be remembered that sleep bruxism is considered a sleep behavior rather than sleep disorder (Lobbezoo et al. 2018; Manfredini et al. 2019).

The results showed that sociodemographic variables were not different among groups, neither associated with possible sleep bruxism, probably due the homogeneity of the sample in those aspects, agreeing with Sampaio et al. (2018) and Lam et al. (2012). The evaluation of different social strata could point out the influence of socio-demographic factors on sleep bruxism, as done by Manfredini et al. (2017).

In BRIAN-K total scale, children with sleep bruxism had higher scores on biological rhythm variables in general, meaning that they were having more difficulties in maintaining the biological rhythm than children without sleep bruxism. For identify the factors that were determining high scores for total BRIAN-K scale, the respective domains were compared among groups and only first domain, sleep, showed higher significant values for children with possible sleep bruxism, as found previously (Bach et al., 2019). Difficulty in maintaining sleep rhythm may be related, for example, to trouble waking up, feeling unrefreshed with the number of hours of sleep and having no regular bedtime, as assessed in first domain of the BRIAN-K scale. In fact, it has been observed that sleep bruxism can determine the cited sleep problems (Carra et al., 2011) and can be associated with reduced sleep

time (Serra-Negra et al., 2017). These changes may be associated with the fact that sleep bruxism occurs in conjunction with sleep disturbances, body movements, breathing problems, increased muscle activity and heart rate disturbances, which can directly affect a child's ability to have a good night sleep. (Oliveira et al., 2015). It must be consideredthat sleep disturbances can affect physical, behavioral and cognitive functioning, and children are vulnerable to the effects of inadequate amount or poor quality of sleep (Beebe et al., 2011).

Although, in general, children with sleep bruxism had high scores in the other domains (activity, food and social), there were no significant differences between groups. These findings disagree with Bach et al. (2019) who state that children with sleep bruxism had greater difficulty in maintaining rhythm in all domains of BRIAN-K scale. Probably, the divergent results could be due to the pandemic period of COVID-19, since the confinement could have influenced or restricted the daily activities, socialization, and feeding, which are accessed in BRIAN-K scale by domains 2 to 4. Consequently, the predominant rhythms were similar between children with and without possible sleep bruxism. Most children were more active in the afternoon or did not have a specific shift, corroborating the findings of the first domain, related to sleep maintenance and its influence on feeling refreshed in the morning. Furthermore, most were more concentrate/productive during the day. Regarding the change day to night, most children never changed, but a higher proportion of those with sometime possible sleep bruxism who changed seldom was observed, maybe due to poor sleep, which influenced factors must be determined (Lages et al., 2021).

The sample distribution related to sleep, such as lights on or off, sleep hours, noises near the house did not differ between groups. These were unexpected results, firstly because noises, light stimulus, and sleep time less than 8 hours have been considered influencing factors in children with sleep bruxism (Serra-Negra et al., 2017); secondly to the fact that BRIAN-K scores for sleep domain was higher for groups with possible sleep bruxism. Nevertheless, this is still a controversial study since environmental factors did not have influence on triggering sleep bruxism (Serra-Negra et al., 2016), as found in the present study. Perhaps the different designs between studies could explain the divergent results. Additionally, screen use, sugary consumption, and breathing were not different between groups. Interesting to note that mean screen time during workdays was significantly higher than weekend, that can be due to the online classrooms when the data were collected. High media consumption has been identifying as an influence factor on sleep bruxism (Suwa et al., 2009; Restrepo et al., 2021), but in the present study the needs of using technology in general to meet the needs during the pandemic,

could justify the findings. It has been stated also that sugar consumption can be associated with sleeping and behavior disorders, that in turn can be associated with possible sleep bruxism (Restrepo et al., 2021) altering the circadian rhythm (Becker et al., 2015). Dopamine is involved in etiology of sleep bruxism and sugar and screen time can affect its neurotransmission (Scariot et al., 2019). Nevertheless, the frequency of sugar consumption and consumption before bedtime were similar, diverging from Restrepo et al. (2021) who observe a positive association between possible sleep bruxism and increase-to-increase sugar-consumption. In the study by Restrepo et al. (2021) the Health Behaviour in School-Aged Children Food-Frequency Questionnaire was applied, which could obtain more details about the foods consumed, whereas in the present study only the frequency was considered.

This is in line with the present result related to the association of clenching during wakefulness with possible sleeping bruxism, since the odds ratio showed that children who present clenching during wakefulness are 2.35 times more likely to have sleep bruxism. This result agrees with Duarte et al. (2019), who found that schoolchildren presented the chance to have possible sleep bruxism about three times. Clenching teeth is a sign of awake bruxism, but it was not considered awake bruxism per se in the present methodology, since the respective diagnose requires a more precise assessment, as commented above, such as reports of clenching for one-two weeks and the frequency of the behavior (Raphael et al., 2016 Lobbezoo et al., 2018, Dias et L., 2021

In a systematic review, Castroflorio et al. (2015), sought to identify the risk factors associated with sleep bruxism in children, obtained through a regression analysis that sleep disorders showed more strong association with sleep bruxism. This is in line with the present result related to the association of first domain of BRIAN-K scale with possible sleeping bruxism, meaning that how much is the difficulty to maintain sleep rhythm, more the probability to trigger possible sleep bruxism with more frequency. Previous studies report that possible sleep bruxism is more common in children with sleep deprivation and micro-arousals (Serra-Negra et al, 2012; Bortoletto et al, 2017). This can be explained by the fact that the absence of restful sleep can predispose children to increased anxiety and stress (Guo et al, 2018), consequently increasing the likelihood of sleep bruxism. In this context, it must be remembered that the period of pandemic could be contributed to sleep disturbances.

The present study had limitations related to the lack of a definite sleep bruxism diagnosis. However, the assessment of sleep bruxism using reports by parents/guardians, including frequency, was in accordance with the latest International Consensus on Bruxism

(Lobbezoo et al., 2018), thus ensuring reasonableness of the data obtained. Moreover, the period in which the research was carried out (COVID-19 pandemic) implied in some loss of data and participants, but the interviews with parents/guardians were carried out carefully on a digital platform, getting confident information. Other limitation was related to the fact this is a cross-sectional study, consequently, it was not possible to establish causality. The period of the COVID-19 pandemic may have had influence on the variables studied. Therefore, post-pandemic longitudinal studies are required to establish the cause-effect of factors related to possible sleep bruxism.

Concluding, children with possible sleep bruxism had greater difficulty in maintaining biological rhythm, specifically in maintaining sleep. The increase in the scores of the first domain of the Brian-K scale, related to sleep characteristics, plus the report of parents/guardians that their children clenched their teeth during wakefulness increased the chances of them having a possible sleep bruxism more frequently.

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Supplementary table – Univariate ordinal logistic regression for continuous variables

Model Coefficients – Possible Bruxism (order: without, sometimes, frequent)							
						95% Confidence Interval	
Predictor	Estimate	SE	Z	*P*	OR	Lower	Upper
Age	-0.072	0.074	-0.977	0.329	0.93	0.80	1.07
Body mass index (BMI)	0.012	0.030	0.41	0.682	1.01	0.95	1.07
Brian-K total	0.0402	0.0156	2.58	0.01	1.04	1.01	1.07
First domain	0.133	0.042	3.20	0.001	1.14	1.05	1.24
Second Domain	0.053	0.049	1.08	0.28	1.05	0.96	1.16
Third domain	0.093	0.053	1.74	0.082	1.10	0.99	1.22
Fourth domain	0.080	0.048	1.67	0.095	1.08	0.99	1.19
Screen time - working days (hours)	-0.011	0.010	-1.16	0.248	0.99	0.97	1.01
Screen time - weekend (hours)	-0.038	0.022	-1.71	0.088	0.96	0.92	1.01
Sleeping hours	-0.036	0.076	-0.48	0.635	0.97	0.83	1.12
Sugary food consumption (times a day)	-0.062	0.086	-0.72	0.47	0.94	0.79	1.11

SE -Standard Error
OR – Odds Ratio

3 CONCLUSÃO

De forma geral, as crianças com bruxismo do sono apresentaram escores totais mais altos na escala de BRIAN-K, ou seja, apresentaram mais alterações no ritmo biológico que as crianças sem bruxismo. O domínio 1 (sono) da escala Brian-K e o relato sobre a criança apertar os dentes durante a vigília tiveram associação significativa com a presença do possível bruxismo do sono, significando que foram fatores influenciadores no aumento da frequência deste comportamento.

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APÊNDICES

APÊNDICE 1 – Ficha de Anamnese

FACULDADE DE ODONTOLOGIA DE PIRACICABA
UNIVERSIDADE ESTADUAL DE CAMPINAS -UNICAMP

Anamnese

Data da avaliação ____/____/_____

1. **Identificação**

Nome da Criança:
_____

Data de Nascimento: ____/____/_____ Idade: _____ Gênero: (F) (M)
Endereço:
_____

Bairro: _____ Cidade:_____

Telefone: ( )_____ Celular: ( )_____

Nome da Mãe:
_____

Estado Civil: ( ) Solteira ( ) Casada ( ) Divorciada ( ) Viúva ( ) Outros

Grau de Escolaridade: ( ) Sem escolaridade ( ) 1º Grau ( ) 2º Grau ( ) Superior

Profissão:
_____

Nome do Pai:
_____

Estado Civil: ( ) Solteiro ( ) Casado ( ) Divorciado ( ) Viúvo ( ) Outros

Grau de Escolaridade: ( ) Sem escolaridade ( ) 1º Grau ( ) 2º Grau ( ) Superior

Profissão:
_____

Renda Familiar Total:

_____

2. História Médica

Requer cuidados sistêmicos: ( ) Sim ( ) Não

Quais? _____

Problemas de saúde

atuais_____

Tem história de alergia? ( ) Sim ( ) Não

Se sim, qual?_____

Toma alguma medicação? ( ) Sim ( ) Não Quais?_____

_____

Respira mais pela: ( ) Boca ( ) Nariz

(Meninas) Já menstruou? ( ) Sim ( ) Não

A criança pratica atividade física? ( ) Sim ( ) Não

Frequência:

_____

3. História Odontológica

Higiene Bucal: ( ) Escova ( ) Fio Dental ( ) Outros

Frequência: ( ) 1 vez ao dia ( ) 2 vezes ao dia ( ) 3 vezes ao dia ( ) Outros

Responsável pela escovação: ( ) Pais ( ) Criança ( ) Ambos

Informação de higiene bucal: ( ) Sim ( ) Não

Problemas Dentários Atuais

( ) Cárie

( ) Dor de dente: ( ) Ao comer ( ) Espontânea ( ) À noite

( ) Abscesso: ( ) Inflamação ( ) Febre

( ) Dentes manchados

( ) Sangramento gengival

( ) Traumatismo

( ) Outros:

_____

Tipo de Dentição:

( ) Decídua ( ) Mista

3. Rotina da Criança

RELATE EM POUCAS PALAVRAS O QUE A CRIANÇA FAZ NO SEU DIA A DIA

SEGUNDA-FEIRA	
TERÇA-FEIRA	
QUARTA-FEIRA	
QUINTA-FEIRA	
SEXTA-FEIRA	
SÁBADO	
DOMINGO	

4. Local onde a criança dorme:

No quarto da criança há luzes ligas quando ela vai dormir? ( ) Sim ( ) Não

Se sim, qual(is) seria? ( ) Banheiro ( ) Moldem de internet ou TV ( ) Luz da TV

( ) Luz do corredor ( ) Luz da luminária ( ) Luz do computador ( ) Luz do celular

( ) Outro: _____

Próximo à sua casa há proximidade com ruídos (Casas noturnas; bares entre outros) ?

( ) Sim ( ) Não

Onde a criança dorme: ( ) Quarto dos pais ( ) Quarto da criança ( ) Outro, qual?_____

Com quem a criança dorme? ( ) Sozinha ( ) Com os irmãos ( ) Com os pais ( ) Outro

Qual é a distância do quarto da criança para o quarto dos pais? ( ) Ao lado ( ) Em frente

( ) No andar de cima ( ) No andar de baixo ( ) Outro: _____

Como fica a porta do quarto da criança quando ela dorme? ( ) Aberta ( ) Fechada ( ) Outro

5. Acesso a aparelhos eletrônicos

A criança tem acesso a celular ? ( ) Sim ( ) Não

Se sim, com qual frequência? ( ) 1 hora por dia ( ) 2 a 3 horas por dia ( ) mais de 4 horas por dia

A criança tem acesso a tablets? ( ) Sim ( ) Não

Se sim, com qual frequência? ( ) 1 hora por dia ( ) 2 a 3 horas ( ) mais de por dia 4 horas por dia

A criança tem acesso ao computador (para trabalhos ou jogos) ? ( ) Sim ( ) Não

Se sim, com qual frequência? ( ) 1 hora por dia ( ) 2 a 3 horas por dia ( ) mais de 4 horas por dia

A criança assiste televisão? ( ) Sim ( ) Não

Se sim, com qual frequência? ( ) 1 hora por dia ( ) 2 a 3 horas por dia 4 horas ( ) mais de por dia

A criança joga videogame? ( ) Sim ( ) Não

Se sim, com qual frequência? ( ) 1 hora por dia ( ) 2 a 3 horas por dia ( ) mais de 4 horas por dia

A criança tem acesso a outro aparelho eletrônico não citado acima? ( ) Sim ( ) Não

Se sim, qual?

_____

Se sim, com qual frequência? ( ) 1 hora por dia ( ) 2 a 3 horas por dia ( ) mais de 4 horas por dia

6. Diagnóstico para um provável / possível bruxismo

6.1- Seu filho/filha Range os dentes enquanto dorme?

( ) Nunca ( ) Às vezes ( ) Muitas vezes

- Quantas vezes por semana no último mês aproximadamente?

( ) Pelo menos 1 vez semana ( ) 2 vezes na semana ( ) 3 vezes na semana

( ) Mais de 4 vezes na semana

6.2- Ao acordar pela manhã ou noite, seu filho/filha apresenta mandíbula travada e/ou dor na mandíbula?

( ) Sim ( ) Não

6.3- Seu filho tem algum problema de abrir a boca quando:

( ) Conversa ( ) Boceja ( ) Grita ( ) Outro:_____

6.4 Seu filho/filha aperta os dentes enquanto acordado (enquanto estuda, joga videogame, mexe no computador ou assine TV)? ( ) Sim ( ) Não

7. Avaliação Antropométrica

	1ª medida	**2ª medida**	**3ª medida**	**Média**
Peso (Kg)				
Altura (m)				
IMC (Kg/m2)				

ANEXOS

ANEXO 1– Parecer do Comitê de Ética e Pesquisa da FOP-UNICAMP

UNICAMP - FACULDADE DE ODONTOLOGIA DE PIRACICABA DA UNIVERSIDADE DE CAMPINAS - FOP/UNICAMP

PARECER CONSUBSTANCIADO DO CEP

DADOS DA EMENDA

Título da Pesquisa: Bruxismo e ritmo biológico em escolares da região de Piracicaba
Pesquisador: CAMILA RITA VICENTE MARCELIANO
Área Temática:
Versão: 5
CAAE: 23618619.6.0000.5418
Instituição Proponente: Faculdade de Odontologia de Piracicaba - Unicamp
Patrocinador Principal: Financiamento Próprio

UNICAMP - FACULDADE DE ODONTOLOGIA DE PIRACICABA DA UNIVERSIDADE DE CAMPINAS - FOP/UNICAMP

Continuação do Parecer: 4.270.256

TCLE / Termos de Assentimento / Justificativa de Ausência	Assentimento12anos.pdf	09/10/2019 10:22:07	CAMILA RITA VICENTE MARCELIANO	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	Assentimento.pdf	09/10/2019 10:17:10	CAMILA RITA VICENTE MARCELIANO	Aceito
Outros	3comentarioseticos.pdf	09/10/2019 10:00:28	CAMILA RITA VICENTE MARCELIANO	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	4tcle.pdf	09/10/2019 09:54:22	CAMILA RITA VICENTE MARCELIANO	Aceito
Projeto Detalhado / Brochura Investigador	Projetodetalhado.pdf	09/10/2019 09:48:27	CAMILA RITA VICENTE MARCELIANO	Aceito

Situação do Parecer:
Aprovado

Necessita Apreciação da CONEP:
Não

PIRACICABA, 11 de Setembro de 2020

Assinado por:
jacks jorge junior
(Coordenador(a))

UNICAMP - FACULDADE DE ODONTOLOGIA DE PIRACICABA DA UNIVERSIDADE DE CAMPINAS - FOP/UNICAMP

Continuação do Parecer: 3.773.022

TCLE / Termos de Assentimento / Justificativa de Ausência	4TCLE_resposta.pdf	16/11/2019 12:23:31	CAMILA RITA VICENTE MARCELIANO	Aceito
Outros	CEPcompleto.pdf	16/10/2019 18:15:19	Leny Cecilia Faro Pereira	Aceito
Cronograma	cronograma.pdf	13/10/2019 14:40:41	CAMILA RITA VICENTE MARCELIANO	Aceito
Folha de Rosto	folhaderosto.pdf	13/10/2019 14:39:34	CAMILA RITA VICENTE MARCELIANO	Aceito
Declaração de Pesquisadores	52Declaracaodospesquisadores.pdf	13/10/2019 14:37:04	CAMILA RITA VICENTE MARCELIANO	Aceito
Declaração de Instituição e Infraestrutura	52Declarainstituicao.JPG	13/10/2019 14:34:45	CAMILA RITA VICENTE MARCELIANO	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	Assentimento12anos.pdf	09/10/2019 10:22:07	CAMILA RITA VICENTE MARCELIANO	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	Assentimento.pdf	09/10/2019 10:17:10	CAMILA RITA VICENTE MARCELIANO	Aceito
Outros	3comentarioseticos.pdf	09/10/2019 10:00:28	CAMILA RITA VICENTE MARCELIANO	Aceito
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Situação do Parecer:
Aprovado

Necessita Apreciação da CONEP:
Não

Continuação do Parecer: 3.773.022

PIRACICABA, 16 de Dezembro de 2019

Assinado por:
jaoks jorge junior
(Coordenador(a))

ANEXO 2- Escala de BRIAN-K (Biological Rhythm Interview Assessment In Neuropsychiatry for Kids)

BIOLOGICAL RHYTHM INTERVIEW ASSESSMENT IN NEUROPSYCHIATRY – VERSÃO KIDS (BRIAN-K)				
Considerando a rotina da sua família, assinale a opção que melhor descreve a conduta da criança nos últimos 15 dias. **(0) nenhuma (1) pouca (2) bastante (3) muita**				
SONO	**0**	**1**	**2**	**3**
1. Qual é o grau de dificuldade da criança para acordar no mesmo horário na maioria dos dias?	0	1	2	3
2. Qual é o grau de dificuldade da criança para sair da cama depois de despertar?	0	1	2	3
3. Qual é o grau de dificuldade da criança para sentir-se descansada com o número de horas que dorme (ter desempenho normal em tarefas diárias como brincar e realizar atividades na escola).	0	1	2	3
4. Qual é o grau de dificuldade da criança para se acalmar nos momentos de descanso?	0	1	2	3
5. Qual é o grau de dificuldade da criança para dormir no mesmo horário das pessoas que mora?	0	1	2	3
ATIVIDADES	**0**	**1**	**2**	**3**
6. Qual é o grau de dificuldade da criança para terminar as atividades que faz na escola?	0	1	2	3
7. Qual é o grau de dificuldade da criança para terminar as atividades habituais (fazer a tarefa da escola, guardar os brinquedos depois de brincar, etc.)?	0	1	2	3
8. Qual é o grau de dificuldade da criança para manter o ritmo e persistência em atividades físicas (como praticar um esporte, fazer atividade física na escola)?	0	1	2	3
9. Qual é o grau de dificuldade da criança para cumprir suas tarefas (da escola, arrumar o quarto, etc.) no horário habitual?	0	1	2	3
SOCIAL	0	1	2	3
10. Qual é o grau de dificuldade da criança para se comunicar com amigos e familiares em horários adequados?	0	1	2	3
11. Qual é o grau de dificuldade da criança para usar de forma equilibrada aparelhos eletrônicos como videogame, TV, computador, etc. (sem que isso prejudique seu contato com as pessoas com quem convive, ou gaste um número de horas desproporcionais em relação aos seus outros afazeres)?	0	1	2	3
12. Qual é o grau de dificuldade da criança para manter a rotina adotada pelas pessoas com quem convive (familiares, vizinhos, amigos)?	0	1	2	3
13. Qual é o grau de dificuldade da criança para disponibilizar tempo e atenção para as pessoas com quem convive (familiares, vizinhos, amigos)?	0	1	2	3
ALIMENTAÇÃO	0	1	2	3
14. Qual é o grau de dificuldade da criança para manter o horário das refeições (café da manhã, almoço, lanche e jantar)?	0	1	2	3
15. Qual é o grau de dificuldade da criança para realizar todas refeições (café da manhã, almoço, lanche e jantar)?	0	1	2	3
16. Qual é o grau de dificuldade da criança para manter a mesma quantidade de alimento ingerido regularmente?	0	1	2	3
17. Qual é o grau de dificuldade da criança para consumir, com moderação, estimulantes (achocolatado, café, coca-cola) ou doces, independente do turno?	0	1	2	3
RITMO PREDOMINANTE Considerando a rotina da sua família, assinale a opção que melhor descreve a conduta da criança nos últimos 12 meses. **(1) manhã (2) tarde (3) noite (4) não há turno específico**				
	1	**2**	**3**	**4**
18. Em qual parte do dia você tem a impressão de que a criança se sente mais disposta e ativa?	1	2	3	4
19. Em qual parte do dia você tem a impressão de que a criança está mais concentrada e produtiva?	1	2	3	4
(1) nunca (2) raramente (3) quase sempre (4) sempre				
	1	**2**	**3**	**4**
20. A criança tem trocado o dia pela noite?	1	2	3	4

ANEXO 3- Comprovante de submissão no Jornal Clinical Oral Investigations

UNICAMP

Maria Beatriz Duarte Gavião <mbgaviao@unicamp.br>

Track the status of your submission to Clinical Oral Investigations

Research Square <info@researchsquare.com> 30 de junho de 2022 09:14
Para: "Dr. Maria Beatriz Duarte Gavião" <mbgaviao@unicamp.br>

Dear Dr. Maria Beatriz Duarte Gavião,

Congratulations on your manuscript submission to Clinical Oral Investigations. In partnership with Springer Nature, Research Square provides a private dashboard, where you can track the status of your manuscript (POSSIBLE SLEEP BRUXISM AND BIOLOGICAL RHYTHM IN SCHOOL CHILDREN) that is under consideration at Clinical Oral Investigations. To access your dashboard and start tracking the progress of your manuscript through peer review, please log in to your account:

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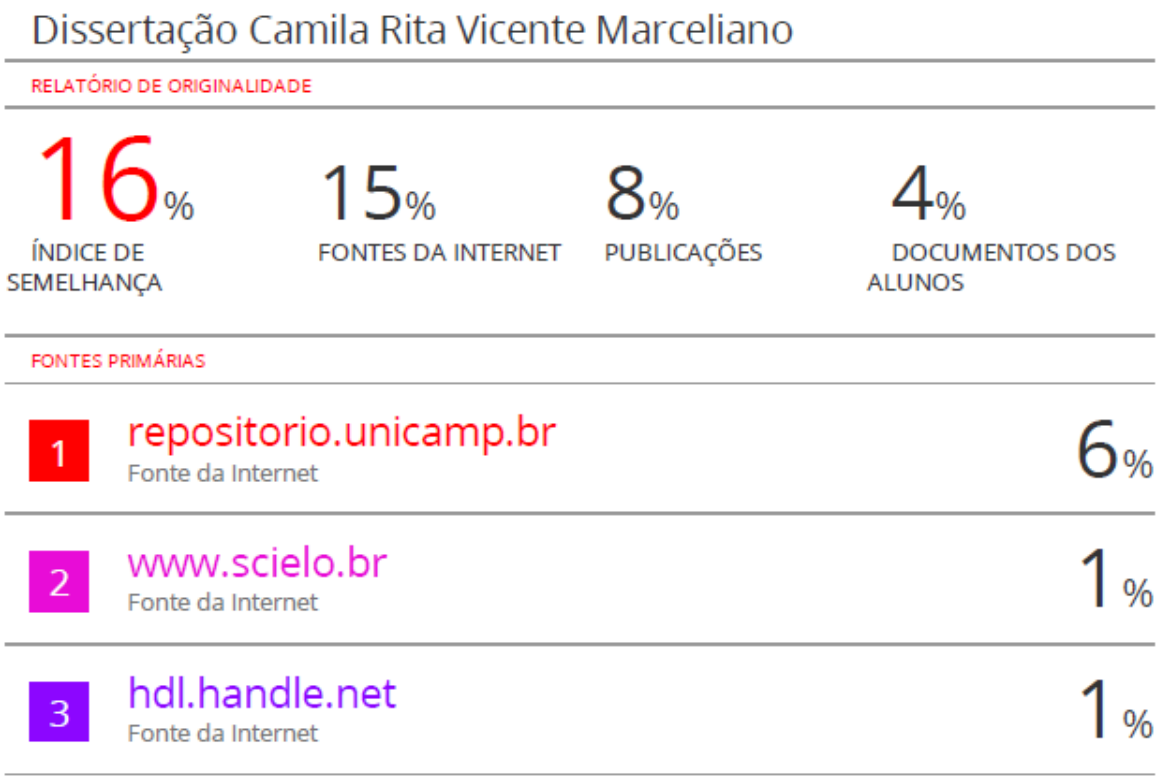
Submission title: POSSIBLE SLEEP BRUXISM AND BIOLOGICAL RHYTHM IN SCHOOL CHILDREN

RSID: rs-1811662

ANEXO 4- Verificação de originalidade e prevenção de plágio



Dissertação Camila Rita Vicente Marceliano

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