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**Gabriela García Alvarez**  
Master's in Sciences Student,  
Universidad Autónoma de Nuevo  
Leon, Facultad de Odontología,  
Monterrey, Nuevo Leon, 64460 ZIP,  
Mexico

**Rosa Isela Sanchez Najera**  
Professor, Universidad Autónoma de  
Nuevo Leon, Facultad de  
Odontología, Monterrey, Nuevo Leon,  
64460 ZIP, Mexico

**Ricardo Peñaloza Cuevas**  
Professor, Universidad Autónoma de  
Yucatan, Facultad de Odontología,  
Merida, Yucatan, 97000 ZIP, Mexico

**Ruben Armando Cardenas Erosa**  
Professor, Universidad Autónoma de  
Yucatan, Facultad de Odontología,  
Merida, Yucatan, 97000 ZIP, Mexico

**Francisco Guadalupe Arreguin  
Ceniceros**  
Professor, Universidad Autónoma de  
Nuevo Leon, Facultad de  
Odontología, Monterrey, Nuevo Leon,  
64460 ZIP, Mexico

**Sergio Nakagoshi Enriquez**  
Professor, Universidad Autónoma de  
Nuevo Leon, Facultad de  
Odontología, Monterrey, Nuevo Leon,  
64460 ZIP, Mexico

**Sergio Ignacio Lopez Tovar**  
Dentistry Student, Universidad  
Autónoma de Nuevo Leon, Facultad  
de Odontología, Monterrey, Nuevo  
Leon, 64460 ZIP, Mexico

**Juan Manuel Solis Soto**  
Professor, Universidad Autónoma de  
Nuevo Leon, Facultad de  
Odontología, Monterrey, Nuevo Leon,  
64460 ZIP, Mexico

**Corresponding Author:**  
**Gabriela García Alvarez**  
Master's in Sciences Student,  
Universidad Autónoma de Nuevo  
Leon, Facultad de Odontología,  
Monterrey, Nuevo Leon, 64460 ZIP,  
Mexico

## Sleep bruxism in children: An overview and current update

**Gabriela Garcia Alvarez, Rosa Isela Sanchez Najera, Ricardo Peñaloza Cuevas, Ruben Armando Cardenas Erosa, Francisco Guadalupe Arreguin Ceniceros, Sergio Nakagoshi Enriquez, Sergio Ignacio Lopez Tovar and Juan Manuel Solis Soto**

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### Abstract

Sleep bruxism (SB) is an oral parafunction characterized by grinding or clenching the teeth during sleep.

**Objective:** To analyze the most recent literature about sleep bruxism in children, about its diagnosis, signs, and symptoms, as well as its relationship with anxiety, stress, behavior problems and its treatment.

**Methodology:** Articles on sleep bruxism in children were analyzed in the PubMed, ScienceDirect and Google academic databases with an emphasis on the last 5 years. It was carried out with the words "Sleep bruxism in children", "diagnosis", "symptoms", "treatment" and "stress".

**Results:** Polysomnography has been found to be the effective diagnostic test method for SB in children, in addition, a report by the parents and a correct anamnesis are required to obtain the final diagnosis. The most prevalent signs and symptoms are dental wear and headaches, related to anxiety, stress and behavior problems, due mainly to the presence of habits and emotional changes during childhood, which alter sleep and develop bruxism. The treatment is not yet well established, recent studies have shown the efficacy of the use of homeopathic therapy as an alternative treatment, as well as orthodontic, psychological and physiotherapy interventions.

**Conclusion:** SB can affect the general health, growth, and quality of life of the child, therefore it is very important to know the diagnosis, signs, and symptoms, as well as the treatment alternatives.

**Keywords:** Sleep bruxism in children, anxiety, dental wear, stress, grinding

### 1. Introduction

Sleep bruxism (SB) is an oral parafunction with high incidence in young children that can perpetuate into adulthood. It is of multifactorial etiology that includes pathophysiological and psychological factors [2,3]. It is characterized by grinding or clenching of teeth during sleep that is associated with excessive or intense sleep arousal activity [4], which can affect the child's general health, growth, and quality of life [5].

Sleep bruxism in children is of concern to parents, due to the noise produced during tooth grinding, as this not only wears down the teeth, but also manifests other comorbidities such as headaches, sleep disorders, sleep breathing disorders, poor sleep hygiene and behavioral disorders. Therefore, the intervention of a multidisciplinary team is recommended for its therapeutic management [4,6], which is why it should be identified and treated by the dentist, in collaboration with the otolaryngologist and pediatrician [5]. As well as orofacial pain specialists, pediatric psychiatrist and psychologist [3].

Data on treatment of sleep bruxism in children are limited, so future studies with an adequate design, conducted in a significant number of patients, and based on standardized and developed diagnostic criteria are needed. Currently, there are articles with information of great interest for possible new diagnostic methods and treatments. In this paper we analyzed the most recent literature on sleep bruxism in children, particularly on its diagnosis, signs and symptoms, its relationship with anxiety, stress and behavioral problems, and its treatment.

## 2. Materials and methods

Articles on the subject published through the PubMed, SCOPUS and Google Scholar databases were analyzed, with emphasis on the last 5 years. The quality of the articles was evaluated using PRISMA guidelines, i.e., identification, review, choice and inclusion. The quality of the reviews was assessed using the measurement tool for evaluating systematic reviews (AMSTAR-2). The search was performed using Boolean logical operators AND, OR and NOT. It was realized with the words "bruxism", "sleep bruxism", "diagnosis", "symptoms", "treatment" and "stress". The keywords were used individually, as well as each of them related to each other.

## 3. Results & Discussion

### 3.1 Diagnosis

The incidence of sleep bruxism is very high, so proper diagnosis is of utmost importance. Among the diagnostic methods for SB is polysomnography, this is considered the gold standard method, which is a systematic process used to collect physiological parameters during sleep. To obtain it, a device called polysomnogram (PSG) is used, and its components are: the electroencephalogram, electrooculogram, electromyogram, electrocardiogram and pulse oximetry, these components with the help of air flow and respiratory effort of the patient, help to evaluate the underlying causes of sleep disorders [7]. In addition to this method is the diagnosis through the report by the parents of the children [8].

In a study, it was found that SB in children detected only by polysomnography without parental report is not a reliable method of detection, and vice versa, parental report alone is not a reliable method, therefore, both methods are needed for the correct detection of the pathology [9]. Within the parental report it is important to take a complete medical history of the child, since it has been reported in studies that children with lip and object biting habits, headaches and poor sleep quality have a higher probability of severe sleep bruxism [10, 11], for which it is necessary to include as many questions as possible related to the aforementioned factors.

Because the intake of medications such as duloxetine, paroxetine, venlafaxine, barbiturates and methylphenidate could be associated with sleep bruxism [12], its use should be included in the medical history, in addition to a section on psychological aspects of the child, since a strong association has been found between SB and psychological factors [13, 14, 15]. Therefore, it is necessary for the pediatric dentist to collaborate through interdisciplinary interventions with otolaryngologists, pediatricians and psychologists [15, 16], in order to obtain a better diagnosis.

Thanks to advances in technology, there is the possibility of using ultra-wideband (UWB) radar to measure sleep in children. Although the current performance is not yet sufficient for clinical use, UWB radar is a promising method for noncontact sleep analysis in children [17]. However, further studies for the approval and use of this diagnostic method are still lacking.

Polysomnography has been found to be the effective and most common method of diagnostic testing for sleep bruxism in children, however, due to the multifactorial etiology of SB, parental report and correct anamnesis are needed in order to obtain the proper diagnosis for each patient.

### 3.2 Signs and Symptoms

The most prevalent clinical signs and symptoms of the masticatory system presented in children with sleep bruxism

are dental wear and headaches [18]. Some studies have found that childhood stress and the habit of nail biting or biting objects are important signs to be taken into account in children with SB and have also found a close relationship of stress level with school attendance responsibility [16, 19].

Another sign to consider is the presence of attention deficit hyperactivity disorder, since recent literature has shown that children with this disorder are more likely to develop bruxism during sleep than those who do not [20]. In addition, it is necessary to detect if the child presents other disorders such as: anxiety, nervous reaction, psychological, emotional symptoms and mental health problems [14, 15, 2].

Recent studies have found that the presence of bruxism causes muscular and stomach pain, and that these children are awake longer after the onset of sleep, than children who do not have bruxism, which affects sleep hygiene in children with SB [9]. Other associated factors found are heredity, night sweats, nocturia, oral breathing and snoring, which seem to have a significant correlation with bruxism [22, 23]. Something similar was found in a recent study, in which, they associated that SB may be affected by nocturnal agitation and nightmares in children, as these sleep characteristics affect the internal biological clock and alter the sleep pattern [24].

On the other hand, a relationship has been found between sleep bruxism and the intake of medications such as duloxetine, paroxetine, venlafaxine, barbiturates, and methylphenidate. However, the overall quality of the evidence was considered very low and, therefore, caution is recommended [12]. There is a strong correlation between the time the child spent on any electronic device and high sugar consumption, where it is concluded that these factors represent a risk in terms of increased frequency of SB [25]. A large number of signs and symptoms related to SB in children have been found, of which the most prevalent are dental wear and headache, in addition to a close relationship with stress and oral habits. Other factors such as the intake of certain medications, screen time and high sugar intake also play a role.

### 3.3 Relationship with Anxiety, stress and behavioral problems.

Available research suggests that sleep disturbance is quite common in children with anxiety disorders, although the association between sleep disturbance and anxiety in children remains unclear. Despite this limitation, a reciprocal relationship between sleep quality and anxiety seems to be well established [26]. After multivariate analysis, the association between anxiety, depression and sleep bruxism in children became statistically insignificant, whereas the association with anxiety sensitivity persisted [27].

The results of one study suggest that behavioral and emotional problems in children should be taken into account, as these may be triggers for bruxism [28]. Similarly, Brancher *et al.* associated that emotional and behavioral problems were associated with a higher prevalence of sleep bruxism in school-aged children [29]. Other factors that have been found in the development of SB are high levels of stress and lack of responsibility in schoolchildren [16], as well as anxiety about separation from parents when attending school [30, 31]. In relation to these factors, another study found that childhood stress and the habit of nail biting or biting objects are important signs to be taken into account [16]. Also, among children with stress, 67.3% had sleep bruxism, and they found that children with a history of nail and object biting were more likely to have SB, so they concluded that the presence of

these habits can be a sign of stress and other psychological problems including tension and anxiety, and that these in turn help to detect the presence of SB [16].

In one study Alouda *et al.* concluded that any child who bites his nails, drools in his sleep, snores, complains of headaches, muscle cramps and colic is more than twice as likely to be a night bruxer than a child who does not have these habits, so it is recommended that the child's parents seek a multidisciplinary approach to treat the child's worrisome behavior by consulting with a pediatric dentist, an orofacial pain specialist, a pediatric psychiatrist and a psychologist [3]. It was found that children, mostly in school children, who present any sleep disturbing factor such as high levels of stress, anxiety, presence of any habit or emotional changes influenced by the environment in which they develop, are more likely to develop SB.

### 3.4 Treatment

Data on treatments for sleep bruxism in children are limited [32]. There are several intervention and treatment options available to inhibit or reduce bruxing activity, however, the indications, contraindications, and side effects of each treatment option should be evaluated individually and carefully, as it should be kept in mind that bruxing is not considered a disorder in healthy individuals [33, 34].

In one study Chisini *et al.* observed that there was a reduction in bruxism and bruxism-associated headaches in studies using hydroxyzine, trazodone, and flurazepam medication. In addition to the use of these medications, treatment was supplemented with orthodontics, psychological and physiotherapy interventions, in which they observed a significant reduction in rhythmic masticatory muscle activity with the use of the occlusal splint. Alternative treatments such as homeopathic medicines (medicinal extracts such as *Melissa officinalis* L) were also included. However, the results of these alternative treatments were inconclusive with regard to the reduction of bruxism [33]. In relation to these results, Lerardo *et al.* obtained that hydroxyzine therapy showed greater efficacy on sleep bruxism, while flurazepam and *Melissa officinalis* therapies presented lower degrees of association with a decrease in sleep bruxism symptoms [32].

On the other hand, Silva *et al.* conducted a study on the use of homeopathic therapy, in which they concluded that due to the successful results they obtained, the use of homeopathics should be seen as an alternative to treat sleep bruxism and decrease the associated symptoms in children [35]. In addition to these investigations, a more recent study on homeopathic therapy combined *Melissa officinalis* with *Phytolacca decandra*, to potentiate the effect, however, they observed that *Melissa Officianalis* showed promising results in the treatment of sleep bruxism in children, while combining both showed no better results [36].

It has been shown in recent literature that the use of Diazepam for SB in adults has been successful, therefore Mostafavi *et al.* conducted a clinical trial to see if it was also effective in children, nevertheless, no different results were found in the trial between children who received Diazepam doses and children who received placebo doses [37].

Another treatment alternative is Methylphenidate [38], in a study conducted by Chin and collaborators observed that after 6 months of treatment with Methylphenidate (MPH), the results were successful. Polysomnography showed a significant increase in total sleep time and indicated a significant reduction in bruxism and snoring in cases with attention deficit hyperactive disorder [39].

In addition to the treatment alternatives already mentioned, the intervention of a multidisciplinary team is recommended for therapeutic management [40, 41], including an orofacial pain specialist, a pediatric psychiatrist, and a psychologist [3].

Because the treatment of sleep bruxism in children is not yet well established, recent studies have demonstrated the efficacy of using homeopathic therapy based on *Melissa officinalis* L as an alternative treatment or the use of drugs such as hydroxyzine, trazodone or flurazepam, as well as orthodontic, psychological and physiotherapy interventions. Therefore, nowadays the treatment is based on the anamnesis of each patient, awaiting future studies that provide new treatment alternatives.

### 4. Conclusions

Polysomnography is the most effective method of diagnostic testing for SB in children, which to obtain the final diagnosis requires a report from the parents and a correct anamnesis. There are a large number of signs and symptoms that are related to sleep bruxism in children, the most prevalent of which are dental wear and headache. Factors such as anxiety, stress, and behavioral problems in the presence of habits and emotional changes in the child are closely related. The treatment is not yet well established, however, the efficacy of medications such as hydroxyzine and even the use of homeopathic therapy as an alternative treatment has been demonstrated, as well as being supported by orthodontic interventions, physiotherapy and psychological therapy, in order to reduce the symptoms of SB. Therefore, nowadays the treatment is based on the anamnesis of each patient, while awaiting future studies that provide new treatment alternatives.

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