# Sleep Bruxism in Children: Prevalence and Multidisciplinary Therapy

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## Summary

Bruxism is defined as a non-functional habit of the masticatory system, characterized by tooth grinding or clenching, which may occur during sleep or wake-time. The etiology has been defined as multifactorial, and several factors are reported in the literature, such as physiological, psychological, neurological or local (i.e. oral habits). In dental clinic is relatively common to observe excessive wear on tooth surfaces, associated with joint and muscle discomfort, especially in deciduous teeth. In this context, the aim of this study is summarizing the available knowledge in the literature about the diagnosis and treatment of the sleep bruxism in children. For this, the literature was search using PubMed and Medline database from 2000 to present. The keywords used were "sleep bruxism", "children", "prevalence" and "treatment". The most widely therapeutic modalities used were restorative treatments, psychological therapy, drug prescription and physiotherapy. The use of occlusal splints has been less reported, and it is necessary a follow up period to evaluate their effectiveness. Alternative therapies are acupuncture, homeopathy, use of hydroxyzine, hypnotherapy and botulinum toxin. It can be concluded that there is no definitive treatment for sleep bruxism in children, being difficult to establish a standard treatment for all patients.

*Key Words: Sleep Bruxism, Child, Prevalence, Therapeutics*

## Introduction

Bruxism consists in a movement characterized by tooth grinding, attrition or clenching [1]. According to the International Classification of Sleep Disorders, the bruxism is a movement disturb related to sleep, characterized by repeated contractions of the masticatory muscles [2], resulting in grinding or clenching of the teeth [3]. Although some similarities can be found between wake-time and sleep bruxism, differences related to state of consciousness and oral motor excitability are present [4]. In the wake-time bruxism, the individual is often not aware of the habit, and is frequently related to vicious habit; on the other hand, sleep bruxism is an unconscious activity of clenching or grinding the teeth, producing sounds while the individual is sleeping [5]. In sleep bruxism, there are exacerbated occlusal forces during the parafunctional activity in periods of no conscience. These occlusal forces were not inhibited by cortical and subcortical proprioceptive mechanisms and, thus, a lot of signs and symptoms in masticatory system may be observed, possibly because of a higher arousal threshold of tissues [3].

Although the etiology of sleep bruxism is still unknown, some aspects such as local, systemic, psychological and hereditary factors are attributed. [6]. There are studies that showed a strongly correlation between stress/anxiety and sleep bruxism in children [7,8]. In addition, association between bruxism and sleep-disordered breathing (i.e. airway obstruction due to tonsillar hyperplasia, and obstructive sleep apnea) was reported; it was showed a decrease in sleep bruxism in children after a tonsillectomy or adenotonsillectomy performed to treat respiratory disorders [9,10]. The child may develop bruxism after the eruption of central incisor deciduous, resulting in gum's lacerations in cases that the antagonist teeth had still not erupted [11]. Also, the same study reported that bruxism is more severe in preschool children, due to structural and functional characteristics of deciduous dentition, although also appear in older children and in the permanent dentition.

The most common signs and symptoms are the wear of the occlusal/incisal surfaces, fracture of cusps and restorations, pulpal hypersensitivity, tooth mobility, pain and temporomandibular joint disorders, masseter hypertrophy, headache, among others [1]. The diagnosis of bruxism in children is a challenge, taking into account that depends on the parents' perception of grinding or clenching of the teeth during sleep, and also a complete clinical examination [12]. A very useful clinical tool for evaluation pediatric non-respiratory disorders sleep is polysomnography (PSG) [13]. The PSG monitors many body functions, such as muscle activity, and is obtained by electrodes placed in masseter and temporal muscles to diagnosis sleep bruxism. The main finding in these patients is rhythmic or tonic activity of the masseter and/or temporal muscles during sleep [13,14]; however, the use of PSG is limited due to high cost [13].

The knowledge of etiological factors and clinical characteristics of bruxism in childhood is essential to possibility an early diagnosis, allowing that pediatricians, dentists and psychologists establish a multidisciplinary treatment [15]. In this context, the aim of this study was to conduct a literature review to assess and analyze the scientific evidence about the main characteristics of sleep bruxism in children, emphasizing the importance of therapies for the parafunction in children.

## Prevalence of Sleep Bruxism in Children

The prevalence of sleep bruxism in children is not precisely established in the literature. Different studies showed a prevalence ranging from 6.5% to 15.1% [16,17], while others found 22% to 28% [18,19] in children. An epidemiological study of 3.047 children aged 6 to 12 years showed a prevalence of sleep bruxism of 20.5% [20]. Thus, it is believed that sleep

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bruxism is common in children, although it is not uncommon in adults; also, there is decrease prevalence in elderly [21]. This progressive decline was also reported by another study [22] in which it was found a linear decrease with age, with prevalence of 19% in children ranging 3-10 years, 13% in adolescents and young adults, and 3% in individuals above 60 years.

According some authors, bruxism is more frequent in females [23]. On the other hand, other studies had no statistically significant between the genders [24,25] showing a controversial prevalence in literature.

It was reported that the sleep bruxism in children may be associated with the presence of syndrome, psychological disorders or other systemic changes [26-28]. A high prevalence in anxious children was found by several authors [7,29]. Previous study [30] evaluated 43 children ranging 1-7 years with sleep bruxism, and noted that 72% had scores of significant anxiety; in addition, a child with bruxism had 16 times more likely to be anxious.

A study in Boston evaluated 864 children with an average age of 8 years, and the prevalence of bruxism was 38% [31]. It was found that a child with psychological disorder was 3.6 times more likely to develop this parafunction. It is interesting to report that children that have parents with history of bruxism increased the probability to develop bruxism in 1.8 times, similar to other [25] that found an increase of 2.6 times in children whose parents had a history of bruxism. It was also observed a relationship between frequent episodes of migraine and sleep bruxism in children, with a prevalence of 25% of cases [26]. Studies have found a higher prevalence of sleep bruxism in individuals with Down syndrome when compared to individuals without cognitive impairment [28,32]. However, a study [27] evaluated 180 children, randomized into three groups: without cognitive impairment, with Down syndrome, and with cerebral palsy. They revealed that the prevalence of bruxism was 24%, with no significant difference between the groups.

In this context, it can be observed a wide variation in the prevalence of sleep bruxism in children, due to methodological differences between studies [33], the presence of associated syndromes [27], as well as the parents' difficulty in identifying this disorder in children [34], resulting in a probably underestimated prevalence due to the difficulty in diagnosis [35].

## Therapeutic Approaches

Although the high prevalence of sleep bruxism and its effects during childhood, there are few studies related to multidisciplinary therapeutic approaches to sleep bruxism in children. Considering that this para function has a complex etiology, it is difficult to establish a standard treatment, and discuss about the therapies approaches is of utmost importance.

A multidisciplinary treatment involves specially dentistry, medicine, physiotherapy and psychology. The dentists usually act through restorative procedures and occlusal splints. In some specific cases, systemic treatment using pharmacological prescriptions is necessary, associated with medical and psychological support [36]. However, it is believed that sleep bruxism in children is self-limited and rarely requires intervention [34].

**Restorative procedures**

Studies have shown that premature contacts and occlusal changes are not factors that contribute to development of bruxism [36]. However, bruxism can cause wear in the occlusal/incisal surfaces, and also fracture of cusps and restorations [1], resulting in aesthetical and functional impairment, and changes in the vertical dimension of the patient. Thus, the intervention by the dentist in order to prevent future complications is very important.

When a patient with sleep bruxism has a severely compromised occlusal condition, either by wear, caries or tooth loss, it is necessary to restore the masticatory system in order to reestablish occlusal stability and, consequently, aesthetic and functional pattern [37].

**Occlusal splint**

The most common treatment for bruxism in dentistry is the rigid occlusal splint, although the use in children is controversial, due to the paradigm on restricting the growth of the alveolar process [12]. However, these authors related to growth and development of the jaws reported that transverse or sagittal changes do not appear until beginning of mixed dentition.

The aim of the occlusal splints is to protect the dental structure by the avoidance of wear and, consequently, loss of the vertical dimension of the teeth [38]. In addition, this device provides comfort to the patient, occlusal stability, prevent the occurrence of muscle hyperactivity, pain reduction, and results in a better arrangement of temporomandibular joints [39]. Treatment may also help prevent bad temperament and poor scholastic performance [40].

It was evaluated the effect of occlusal splints for treating sleep bruxism in 36 children aged between 3 and 6 years [12]. After two years of follow up, it was observed that the occlusal splint was not effective in reducing the signs of bruxism, but reduced the mouth open deviation. On the other hand, an evaluation of occlusal splint in children with bruxism was conducted and after 90 days of follow up, it was found that 89% of children do not realize tooth grinding or clenching during sleep, the headache was absent in all children and all parents reported an improve in child's moon when they wake [38].

**Pharmacology therapy**

The use of analgesic, anti-inflammatory, muscle relaxants, benzodiazepines, precursors of catecholamines and beta-adrenergic antagonists may reduce the frequency of sleep bruxism in adults [41]. However, there are still no clinical trials evaluating the efficacy of these medications in pediatric patients. Thus, these drugs should be used carefully, according to the necessity of the patient. Therefore, it is important that other therapeutic strategies in order to control the sleep bruxism in children should be considered.

**Psychological therapy**

It was reported in literature a reduction in symptoms of bruxism when factors such as anxiety and stress are treated, either with psychological or pharmacology therapy [7,42]. It was reported that children with bruxism are more anxious than those without this parafunction [42]. The chance of

children with psychological problems develop bruxism has been reported in 36% and 40% [31,43].

An evaluation of the behavioral of 29 children (mean age of 8.8 years) diagnosed with bruxism concluded that 82.76% of children needed psychological or psychiatric evaluations [44]. In addition, 20.70% had significant physical and psychological manifestations of stress, suggesting that emotional and behavioral problems may be a risk factor for development of bruxism in children.

The psychological techniques are effective, and this treatment is very important especially in anxiety children in order to do not have a recurrence of parafunction. The psychological therapy is realized through counseling, hypnosis, relaxation exercises and biofeedback [45].

**Physiotherapy**

It is known that tooth grinding or clenching results in muscle hyperactivity, leading to damage in the muscle fibers and surrounding tissues [46]. Thus, therapeutic strategies aim to reduce the muscle hyperactivity by massage of the masticatory and neck muscles, and stretching exercises increase the range of movements, decreasing pain and allowing a better mandibular rest position [47].

Controlled cycles of relaxation and contraction of different muscle groups, diaphragmatic respiration training and imagination (mental construction of images and relaxing activities) are some techniques of relaxation therapy that aim to promote a high awareness of muscle tension [48]. However, the literature is not conclusive to define the best strategy for physiotherapy treatment of sleep bruxism in children [49].

**Botulinum toxin**

The botulinum toxin is widely known for its cosmetic use in intramuscular injections to reduce facial wrinkles, and its main application is directed to therapeutic purposes [50]. Its use has been widely used in dentistry in the treatment of bruxism, masseter hypertrophy, temporomandibular disorders, asymmetry of smile, and marked gingival exposure [51,52].

Botulinum toxin is an endotoxin produced by the bacterium Clostridium botulinum that acts by blocking the neuromuscular transmission through decreased acetylcholine release, resulting in decreased movement control and muscle hypertonicity [53].

Studies indicate its use in the treatment of bruxism in adults, although clinical trials should be realized to confirm its effectiveness and evaluate its safety in long-term use. For the treatment of sleep bruxism in children, the use of botulinum toxin is not indicated, considering the possibility of causing damage to the face growth and also the correct positioning of the teeth, having been considered a very invasive approach [54].

**Acupuncture**

Acupuncture is used to decrease the activity of the masticatory muscles and, therefore, reducing the parafunctional movements of bruxism [55]. However, studies should be conducted to observe the effectiveness of this therapy for bruxism. Currently, there are no studies in the literature that evaluate the treatment of sleep bruxism in children with acupuncture.

**Hydroxyzine**

Hydroxyzine is a potent H1 receptor inverse agonist that has strong anxiolytic, mild antiobsessive and antipsychotic properties; is generally administered as an antihistamine to treat anxiety in children [56]. There are few studies evaluating its effect in the treatment of sleep bruxism in children [57,58]. A case series study reported that hydroxyzine decreases the frequency of sleep bruxism in children, and no serious adverse effect was reported [57]. In addition, a randomized clinical trial evaluated the efficacy of treatment for sleep bruxism in 30 children with hydroxyzine, and found that it is effective and safe, but further studies should be realized [58].

## Conclusion

The sleep bruxism has a high prevalence in children, and the professional must be aware to early diagnosis, in order to avoid the damage of masticatory system. The literature is still controversial in relation to the treatment of sleep bruxism in children and, therefore, the patients should be evaluated carefully and a personal and multidisciplinary treatment planning should be performed. The difference in results among studies on sleep bruxism in children demonstrates the need to encourage future research on this subject.

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