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# ORTHODONTIC IMPLICATIONS OF BRUXISM IN PEDIATRIC PATIENTS: A SISTEMATIC REVIEW

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## Abstract

The aim of this article is to systematically review the literature to identify risk factors associated with bruxism. A methodical examination was carried out based on following database: PubMed, Web of Science, Embase, Scopus, Medline. The investigated articles denote three groups of etiologic factors involved in the precipitation of bruxism: pathophysiologic factors, psychologic factors and morphologic factors.

## Introduction

The term "bruxism" was first introduced by Marie Pietkiewicz. This condition is common in children. Bruxism, defined as "the habitual non-functional forceful contact between occlusal tooth surfaces", is unintentional, disproportionate grinding and clenching of teeth during non-functional activities of the masticatory system. Bruxism can occur during the day or the night. Awake and sleep bruxism have different manifestations, with the former characterized by clenching type activity and the latter by a combination of clenching and grinding type activity. The unlike type of bruxism could have a different aetiology and be influenced by different local and systemic factors. Sleep bruxism should be distinguished by awake bruxism that is mainly related to stress/anxiety reactivity and expressed as a jaw muscle clenching tic. Wake bruxism is very rare with little or no sound during clenching rather than the loud involuntary grinding that characterizes sleep bruxism. Aetiology of bruxism has remained controversial. Psychological problems, stress, depression, hostility and anxiety were claimed to be related to bruxism. Malnutrition, calcium, magnesium and vitamin deficiencies, chronic and parasitic colon diseases, consistent and recurrent dysfunction of urinary system, mouth breathing, asthma, pubertal hormonal changes and hypothyroidism are among other related factors. Defective restorations and amplified distance between centric occlusion and centric relation were claimed to be the most important occlusal factors related to bruxism. Reported complications include dental attrition, headaches, temporomandibular joint

dysfunction and soreness of the masticatory muscles. Other trauma to the dentition consist of thermal hypersensitivity, tooth hypermobility, damage of the periodontal ligament and periodontium, hypercementosis, fractured and pulpitis. A clinical diagnosis of bruxism does not allow to discriminate awake from sleep-related bruxism, but has the potential advantage that it may rapidly provide preliminary data which can be further investigated in subsequent polysomnographically-controlled studies. Unfortunately, polysomnographic studies are expensive and adequately equipped sleep laboratories are not numerous. Based on these premises, the purpose of the present study was to conduct a systematic review of the existing literature to determine the relationship between risk factors and bruxism (specially sleep bruxism) symptoms in children (most frequently affected).

## Materials and Methods

The authors searched PubMed, Web of Science, Embase, Scopus, Medline computerized literature database, supplemented by manual searching of reference lists from each relevant paper identified. The selected articles were evaluated according to the following criteria: studies assessing the relation between risk factors and bruxism, studies assessing the diagnosis of bruxism, studies assessing any therapeutic intervention on bruxer, studies analysing patients suffering from SB (sleep bruxism). The following exclusion criteria were applied: lack of standardized measures of bruxism evaluation; lack of effective statistical analysis; studies on patients with systematic disorders, TMJ disorders, oral habits. Non-English language literature and unpublished data were not included. The main search terms were - bruxism - tooth wear - child - adolescent - anxiety - muscular hyperactivity -sleep disorder -.

## Review

Bruxism's aetiology is still unknown and controversial: many theories have been developed. The etiological significance of occlusal factors is debatable, and most investigators today believe that psychological factors

play the major role in promoting and perpetuating the parafunctional habit. Recent investigations sponsored the role of psychic factors in the aetiopathogenesis of parafunctional activities. A relationship between stress and emotional tension and bruxism, especially during awake, surely exists, but few works in the literature investigated the possible presence of psychopathological symptoms in bruxers. When approaching to the study some methodological problems occur. The first problem is represented by the assessment and diagnosis of bruxism itself. Polysomnography represents the standard of reference for the diagnosis of sleep bruxism but, unfortunately, the possibility of employing sleep laboratories is limited by the high costs and by the complexity of studies designs. Therefore, clinical diagnostic criteria have been validated, to make generalization of results of works on clinically diagnosed bruxism easier. A clinical diagnosis of bruxism does not allow to discriminate awake from sleep-related bruxism, but has the potential advantage that it may rapidly provide preliminary data which can be further investigated in subsequent polysomnographically-controlled studies. However, on the basis of results from the present investigation, the aetiology of bruxism is still controversial. Many authors claim a multifactors cause.

Three groups of etiologic factors can be distinguished.

1) Pathophysiologic factors: it has been claimed that bruxism is part of an arousal response, thus linking sleep-related bruxism to the field of sleep disorders. There is also evidence that, in younger children, bruxism may be a consequence of the immaturity of the neuromuscular system. The involvement of dopaminergic system has also been reported to explain sleep bruxism. During wakefulness, dopamine has a role in the execution of movement and in maintaining vigilance; during sleep the dopaminergic system is probably minimally active at the exception of brief period of arousal related movements such as periodic limb movements. Other pathophysiologic factors that have been implicated in bruxism in adolescent and adult are the effects of alcohol, drugs, trauma, medication, disease and, specially, cigarette smoking. Second hand smoke exposure presented a strong association with sleep bruxism.

2) Psychologic factors: aspects such as stress and personality, may be related to bruxism. Separation anxiety, panic symptoms, stress sensitivity, anxious expectation agoraphobia, hypochondria have influence upon the pathophysiology of bruxism. Level of stress and personality type have been included in the aetiology of bruxism, but the exact contribution of this

factors remains debatable. Sleep disturbances, such as sound and light stimuli and reduced sleep time (< 8h) presented the strongest correlations with sleep bruxism, together with neuroticism.

3) Morphologic factors: dental occlusion and anatomy of the orofacial skeleton are thought to be involved in the aetiology of bruxism. Occlusal discrepancies, identified as a slide between returned contact position and intercuspal position, were considered the most common cause of bruxism, but more recently the role of occlusion has been contested. All these observations must be interpreted according to current theories about bruxism as a centrally mediated multifactorial disorder which could share some neurological deficits with other centrally mediated disturbances. Therapeutic approaches can include occlusal adjustment of dentition, use of interocclusal appliances, behaviour modification and pharmaceuticals. A bite plan covering the occlusal surfaces of all teeth should be used by patient suffering from bruxism to prevent continuous abrasion.

## Conclusions

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Considering the problems intrinsic in modern society, bruxism is becoming an increasingly common condition in children. In treating this parafunctional habit, clinicians play a leading role in determining possible etiological factors. The authors of the present study believe that an early diagnosis of bruxism can help prevent subsequent problems in the orofacial pain and facial structures and general health of children.

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