

Bruxism in children: Etiological causes, correlation with intestinal parasitic infestations, diagnosis and treatment criteria

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Abstract

Bruxism is defined as a repetitive activity of the masticatory muscles, characterized by teeth clenching or gnashing and/or tapping and rocking. The etiology is multifactorial: mainly central (neuropathic disorder and anxiety) but also genetic and local (posture, mouth breathing). In children, bruxism is very frequent and is not always considered pathological. Several factors have been considered in the etiology of bruxism in children, among which infestations by intestinal parasites, suggested by some authors. It may be one of several symptoms of general pathology. Diagnosis is based mainly on the history and examination of tooth wear and its evolution over time (photos and dental casts). Severity criteria are based on the intensity (number of dental attrition facets) as well as on the context found in the child: anxiety, ventilation problems, and fragility of dental structures. Bruxism management is multidisciplinary and depends on the etiological diagnosis. The objective of this article is to highlight the correlation between bruxism and intestinal parasites and to identify the etiologies, the diagnostic criteria, and the therapeutic scheme of bruxism in children. Publications and research on this subject are few and not consensual. The therapeutic course of action is not clearly defined and the research concerning them remains experimental.

Keywords: Bruxism; Multifactorial etiologies; Intestinal parasites; Therapeutics

1. Introduction

There are many classifications and definitions of bruxism. They have varied widely for several decades. In 2013, an international consensus was reached on a simple and pragmatic definition of bruxism as repetitive masticatory muscle activity characterized by clenching or grinding of the teeth (teeth gnashing) and/or tilting or thrusting of the mandibles. It can be specified as sleep bruxism, night bruxism or wakening bruxism [1]. The etiology is multifactorial: mainly central (neuropathic disorder, anxiety), but also genetic and local (posture, mouth breathing). The diagnosis is based on the history and the examination of the tooth wear and its evolution over time (photos and dental casts). Bruxism's correct management requires the elimination of all causes. These causes include intestinal parasites that could be the reason for this discomfort.

1.1. Etiological causes of bruxism in children

The etiology of bruxism may involve many contributing factors, sometimes associated between them. It can be mainly not only central (neuropathic disorder, anxiety) but also genetic and local (posture, mouth breathing). Bruxism can also be a symptom of a general pathology such as a psychiatric one or due to side effects of medication [2], hence the distinction between two forms of bruxism, namely primary bruxism (B I) and secondary bruxism (B II) (fig 2 and 3).

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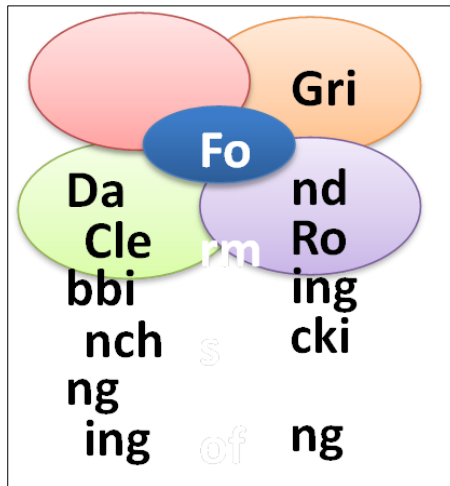


Figure 1 Four elements producing bruxism

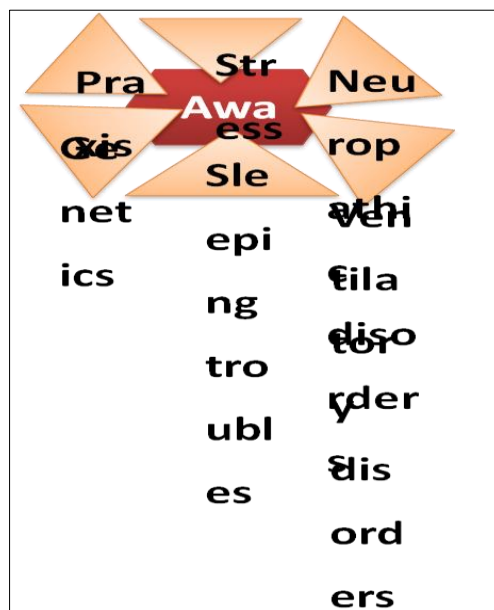


Figure 2 Hexagonal model of bruxism etiologies

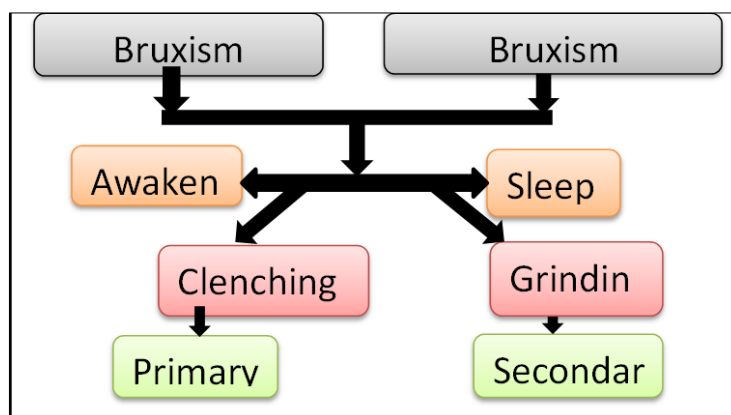
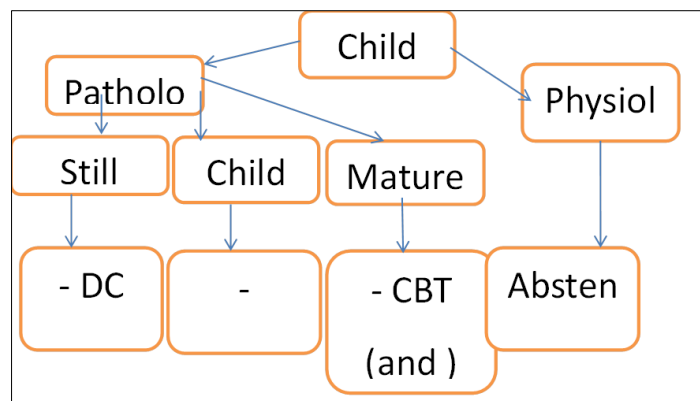


Figure 3 Types of bruxism and their etiologies

Table 1 Different criteria to explore for a diagnosis of bruxism in children

exo oral clinical examination	endo oral clinical examination	additional examinations
Retrognathia, micrognathia, macroglossia, tonsil hypertrophy, Mallampati score III and IV	Examination of teeth, occlusion, tonsils and vegetations (Mallampati score)	Dental casting photography: visualize and objectify wear facets
Presence of rings	Evaluation of the pathological wear of dental surfaces (BEWE index)	Panoramic radiography: visualize the evolution of temporary and permanent teeth, define the dental age and anomalies
Collapsed nostrils, half-open lips	Presence of dental fractures, hypermobility, pulpitis, necrosis or hypersensitivity	Evaluation of salivary secretion
Anterior and low head posture	Occlusion examination: class II or posterior reverse, retro or micrognathia	Polysomnography (PSG) Electromyography (EMG)
Enlarged masseter muscles	Tooth impression on the inner cheek or lateral border of the tongue	Use of BRUX Checker
Anxious attitude	Restless or anxious attitude	

Table 2 Decision tree for the management of bruxism in children



1.2. Correlation between intestinal parasite infestations and bruxism in children

In our article, we retain two distinct manifestations of bruxism commonly recognized that are sleep bruxism (SB) and wakening bruxism (WB) [2, 3]. Authors such as Kato and a little later Lavigne added the notion of differentiation between idiopathic primary bruxism and iatrogenic secondary bruxism [4, 5].

The idiopathic form corresponds to physiologically based chewing muscle reactions. It is not related to neurological or psychiatric disorders and would be a reaction of the autonomic and cerebral nervous systems during periods of sleep instability. Nocturnal bruxism often begins after the first teeth come out. The prevalence of bruxism in early childhood is 14-20% [3].

In the current literature, two theories of factors causing bruxism are controversially discussed:

- The first theory consists of external or peripheral etiological factors that are based on malocclusions or occlusal imbalance, side effects of medications;
- The second theory groups together the central or main causes, such as neuropsychiatric illness and neuropathic sequel of medical or traumatic causes [5, 6].

Table 3 Treatment options according to the etiology of bruxism in children

Comprehe		Bucco-	
Stress and neuro	Praxis and ventilat	Ge	Dental sensitivi
pathic	ory	ne	ties,
- Sleep hygiene advice	- ENT examination	tic	structur
- Assessment by sleep specialist	- Exclude upper airway obstruction, diagnosis of etiologi	DFO asses smen	- Specific Odontolo gical treatmen t
- Referral to psychol ogist	es (soft tissue hypertrophy)	t: possi ble maxil lary expa nsion	- Suspicion of GERD: gastroent erologist opinion
			- Food hygiene advice

Nowadays, these theories play only a minor role in the diagnosis, contrary to the physiopathological factors that have become the mainstay of the diagnosis of bruxism [7, 8]. Multiple factors have been considered in the etiology of bruxism in children, among which infestations with intestinal parasites, suggested by some authors.

Indeed, the presence of parasites in the body can lead to nocturnal teeth grinding. The female of the parasites migrates during the night to find a place to lay her eggs. This often happens near the anus, which makes the child itchy and nervous. This restlessness during sleep causes tooth grinding [9].

Bruxism due to intestinal parasites is attributed to nonspecific proteins secreted by the parasites during their various life stages. These proteins often have toxic effects. Symptoms such as nervousness, insomnia, and teeth gnashing are

generally attributed to *Enterobius vermicularis*, *Ascaris lumbricoides*, and other parasites. Intestinal parasites are generally classified into helminths, protozoa, and arthropods, with helminths being the most important because of their prevalence and severity of verminous poisoning. The most common pathogenic intestinal parasites in children are *Enterobius vermicularis* and *Giardia lamblia* [7].

A recent study conducted by researchers at the University of Mississippi examined the prevalence of intestinal parasites in a group of 155 children with bruxism compared to a control group of 158 children without bruxism. The results showed more intestinal parasites in the former group of children than in the latter.

Another study of more than 2,000 children aged from 2 to 14 years living in rural Iran found that the prevalence of bruxism was significantly higher among children infected with parasites than among those who were not.

It is therefore important that more research have to be done to determine the exact mechanism by which parasites cause bruxism, as both bruxism and intestinal parasites may share common underlying causes. It is therefore important to diagnose parasitic infestations early on to prevent them from inducing discomfort leading to sleep bruxism over time.

1.3. Diagnostic criteria and treatment regimen

Most diagnostic criteria for bruxism in children are subjective observation, clinical history, and systematic clinical examination, such as tooth wear and anxiety. However, as these symptoms are not specific to bruxism, many false positives and false negatives occur [10]. In addition, certain local factors can maintain the parafunction: ventilation and sleep posture disorders in particular [11]. Polysomnography would be a reliable tool, but only during the active phases of bruxism. The diagnosis is based on several elements: questioning of the parents, medical history, exo- and endo-oral examination, and, in some cases, electromyographic recording (EMG) or polysomnography (PSG) (Table 1). The minimal criteria for the diagnosis of bruxism are the following:

- Grinding or clenching of the teeth during sleep and;
- One or more of the following:
 - Abnormally worn teeth
 - Bruxism-related noises
 - Discomfort in the mandibular muscles [12].

The treatment of bruxism in children is not clearly defined. It is based on the etiology and can be psychological and/or physiological [13]. (Tables 2 and 3).

2. Conclusion

Current data in the literature indicate a prevalence of bruxism in children of about 20%. However, the lack of consensus on the subject, the lack of coherence in the organization of study protocols, and the variability of the diagnostic means used explain the difficulty in defining a concise and clear diagnostic protocol for bruxism in children.

Bruxism can be a sign of comorbidity, and in this case, the dentist who makes the diagnosis must refer the child for global treatment before dental treatment, which must be adapted to the child's etiologies, behavioral and cognitive realities.

Bruxism can also be a symptom of a parasitic infection. However, it is one of many symptoms. While the presence of intestinal parasites may be the cause of bruxism, the reverse is not necessarily true. In case of unexplained teeth gnashing, it is, therefore, possible to check for the presence of parasites in the child's body to treat this source of bruxism.

Compliance with ethical standards

Authors' contributions

Adidéme Monique EZIN: Conceptualization, Writing original draft, & editing. Rachid BOUDI: Writing, review & editing. Hakima CHHOUL: Supervision, Validation, & review.

Disclosure of conflict of interest

The authors declare that they have no conflict of interest

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