

Bruxism in Periodontics-An Overview

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Abstract

Bruxism is a parafunctional habit involving involuntary clenching or grinding of teeth during sleep or wakefulness. It has a multifactorial etiology, including central nervous system factors, psychological stress, genetic predisposition, and environmental influences. Clinically, bruxism presents with abnormal tooth wear, tooth sensitivity, gingival recession, tooth mobility, and symptoms of masticatory muscle and temporomandibular joint disorders. Radiographic findings may include cortical thickening, increased mandibular bone density, and alterations in gonial angle morphology. Diagnosis is based on patient history, clinical signs, and instrumental methods, with polysomnography considered the gold standard for sleep bruxism. Management focuses on tooth protection, reduction of muscular activity, and control of contributing factors. Bruxism does not directly cause periodontal disease but may aggravate existing periodontal conditions.

Keywords: *Bruxism; Habits; Clenching; Grinding; Periodontitis*

Introduction

Bruxism is an unconscious oral habit of dysfunctional rhythmic pressing, clenching, and grinding of the teeth when executing actions that are not part of the masticatory function and cause occlusal trauma. Speech, breathing, chewing, and swallowing are examples of normal physiological tasks that are unrelated to this oral parafunctional activity.

This parafunctional habit is often first noticed when a patient visits the dentist for the first time. One of the most common clinical findings is abnormal tooth wear, which may result from clenching and grinding of the teeth. However, tooth wear alone is not a definite indicator of bruxism, as similar wear can also occur due to other factors such as frequent consumption of acidic foods or improper tooth-brushing techniques, leading to erosion and/or dental abrasion [1].

Bruxism is a common condition in the general population and usually presents as clenching or grinding of the teeth. It is considered a parafunctional habit that varies in intensity and occurs periodically. The tendency to brux tends to reduce with age, although it is commonly observed across different age groups [2].

Definition

Bruxism is the involuntary grinding, clenching, or gnashing of teeth which may occur unconsciously during the day or while you're asleep. Bruxism results in weakened and worn down teeth, tired and sore jaws, and increased tooth sensitivity. Although bruxism may be a result of a number or different conditions, stress is the most common cause of bruxism.

Classification of bruxism

1. Based on circadian phenotype:

- Sleep bruxism
- Awake bruxism.

2. Based on etiology:

- Primary bruxism(idiopathic)
- Secondary bruxism(iatrogenic).

3. Based in clinical presentation:

- Mild bruxism
- Moderate bruxism
- Severe bruxism.

4. Based on motor activity type:

- Phasic bruxism
- Tonic bruxism
- Mixed.

Etiology of bruxism

Bruxism is thought to have multiple causes, including psychological factors, physical changes in the body and issues related to the brain and body functions.

1. **Multifactorial nature:** Bruxism doesn't happen because of just one reason. Instead, it is caused by a mix of different factors, including physical changes in the body, brain activity, mental health, genetics, and the environment around us [3].
2. **Central/Pathophysiological factors:**
 - Neurotransmitter systems: Problems with neurotransmitters, particularly those related to dopamine, are thought to play a role [3].
 - Basal ganglia dysfunction: Issues in the basal ganglia circuits may lead to increased motor activity linked to bruxism [4].
 - Sleep arousal response: Many instances of bruxism, especially while sleeping, happen during brief awakenings (short changes to lighter sleep) that come with sudden muscle psychological and psychosocial factors [5].
 - Stress, anxiety and emotional strain: One of the most significant connections is with stress from social situations [5].

- Personality traits: People who are competitive, aggressive, rushed or hyperactive are more likely to grind their teeth while awake [5].



Figure 1

3. Morphological/Peripheral factors:

- Malaligned teeth, also known as malocclusion, is considered as a cause of teeth grinding but now it's thought to have a smaller impact. However, it might still play a part for some people.
- Missing teeth, improper occlusal contact or other issues with the structure of teeth and face could also lead to bruxism in certain situations [3].

4. Genetic or family factors:

- Bruxism shows familial aggregation.
- This inherited risk probably works together with other triggers from the environment or behavior [6].

5. Environmental and lifestyle risk factors:

- Substance abuse: Smoking, coffee and alcohol are linked to a higher incidence of bruxism.
- Drugs: Anti-anxiety medications, some psychiatric medications (such as selective serotonin reuptake inhibitors, or SSRI) and medications may cause or worsen bruxism [6].

- 6. **Neurological and medical conditions:** Bruxism may be linked to neurological conditions such as Parkinson's disease, Rett syndrome, etc [3].

Clinical features of bruxism

Clenching or grinding of the teeth patients may gnaw, clench or grind their teeth constantly often without realizing it [4].

Prolonged teeth grinding places continuous stress on the teeth, leading to smooth, flat wear facets on the chewing surfaces. Over time, the enamel wears away and exposes the underlying dentin, making the teeth more vulnerable. Fine cracks may appear in the tooth structures, dental restorations can chip or fracture, and notched defects known as abfractions may develop near the neck of the teeth due to repeated excessive forces [4].

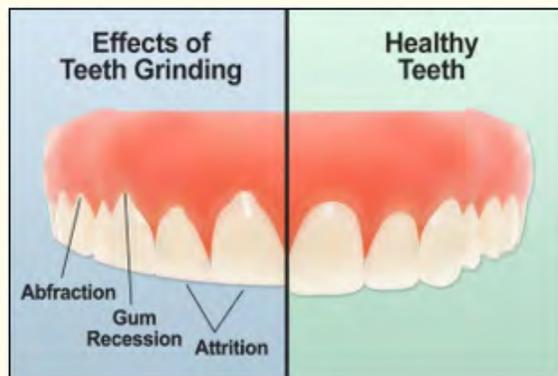


Figure 2

Gingival recession is commonly seen, along with increased tooth mobility due to widening of the periodontal ligament. Scalloped indentations on the tongue, caused by constant pressure against the teeth, are also frequently observed [6].

When the jaw muscles are overworked, they may appear enlarged-especially the masseter or temporalis muscles when the person clenches their teeth. These muscles often feel tender or tired when touched. The jaw may not open fully and symptoms like clicking, popping or even locking of the jaw joint can occur all pointing to excessive strain on that jaw system [7].

Many patients mainly complain of morning headaches around the temples, along with stiffness or pain in the jaw. Facial pain or earache is also common, and the teeth may feel sensitive, especially to hot or cold foods. Sleep is often disturbed, with partners reporting grinding noises at night. These symptoms tend to worsen during periods of stress and are often associated with a strain on the periodontal tissues [8].

Radiographic features of bruxism

Bruxism, commonly known as teeth grinding, often shows its effects on dental x-rays as changes in the lower jaw bone caused by long-standing excessive biting forces. These changes are most clearly seen on panoramic radiographs, where characteristic alternations in the shape and structure of the mandibular bone can be identified [9].

Mandibular cortex changes

In people who grind their teeth, changes are often seen along the inner border of the lower jaw. These include small curved defects, remnants of cortical bone, and areas of increased porosity, all of which are more common in bruxers. In addition, the jaw bone tends to become thicker, especially around the mental and gonial regions, and this thickening is frequently associated with the presence of tiny bony projections or peaks [10].

Bone density increases

Individuals with bruxism tend to show higher gonial index (GI) values, suggesting greater bone mineral density. This increase is more pronounced in males than in females. In addition, radiomorphometric measurements such as the mental index (MI), antegonial index (AI), and panoramic mandibular index (PMI) have been found to be associated with bruxism, indicating that changes in mandibular bone structure may reflect the presence of this habit [11].

Mandibular angle features

Changes in the shape and structure of the mandibular angle, along with new bone formation in this area, can be graded on a scale from 0 (no change) to 3 (severe change). Studies show that individuals with bruxism are about 3.6 times more likely to show these alternations compared to those without the habit. The thickening of the bone or changes in cortical bone density at the mandibular angle [12].

Diagnosis of bruxism

Bruxism is diagnosed by putting together information from the patient’s history, a careful clinical examination, and when needed, special tests. There isn’t a single test that can confirm bruxism on its own, but for sleep bruxism, polysomnography is considered the most reliable and definitive method [13].

Diagnostic levels

It may be possible when it is based only on what the patient reports, probable when these reports are supported by clinical signs, and definite when confirmed with instrumental recordings such as polysomnography. Patient’s descriptions of grinding sounds during sleep, jaw pain, or muscle fatigue are useful for initial screening, and symptoms like temporal headaches are especially sensitive indicators [14].

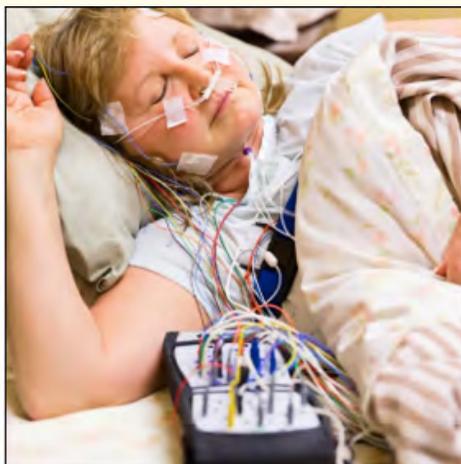


Figure 3

Clinical examination

Shows as worn or flattened chewing surfaces, chipped teeth and loss of enamel. Check for jaw muscle tenderness, enlarged masseter muscles and problems involving the temporomandibular joint. Dental X-rays can reveal supportive findings like bone buildup at the mandibular angle or thickening of the cortical bone, which help strengthen a probable diagnosis [9].

Instrumental methods

Polysomnography (PSG) with audio-video recording is considered the gold standard for diagnosing sleep bruxism. It detects rhythmic masticatory muscle activity (RMMA) during sleep by simultaneously monitoring EEG, EMG, and other physiological signals. In contrast, portable ambulatory devices-such as surface EMG recorders like dia-BRUXO-allow home-based monitoring. These devices measure muscle activity and estimate the number of bruxism episodes per hour, showing a sensitivity and specificity of about 80 - 100% when compared with PSG. To standardized tool for the assessment of bruxism (STAB) combine clinical findings with data from these instrumental recordings [13].

Treatment of bruxism

Bruxism or teeth grinding is usually managed with a mix of approaches based on how severe it is. Treatment focuses on claiming overactive jaw muscles, protecting the teeth from wear, and addressing underlying factors such as stress or lifestyle habits.

Primary treatments

Custom made mouthguards or splints worn at night help protect the teeth and limit jaw clenching, making them the first option recommended for patients. Botox injections can be used for temporary weakening overactive muscles lasting for 3 - 6 months [15].

Stress-reduction approaches such as cognitive behavioral therapy and biofeedback can help lessen episodes that are brought on by anxiety [16].

Medications

Short courses of muscle relaxants taken at night can help reduce discomfort for some people. When stress or anxiety plays a major role and considered as antidepressants or anti-anxiety medications, although their effectiveness can vary from person to person. In severe cases, medications that act on dopamine pathways-such as low-dose pergolide-have shown encouraging results [17].

Targeted physiotherapy that includes jaw-stretching exercises and posture correction helps the jaw muscles work more efficiently and eases pain. In addition, simple lifestyle changes like cutting back on caffeine and alcohol before bedtime can further support effective overall management [18].

Conclusion

Current evidence suggests that bruxism by itself does not directly cause periodontal damage. However, the excessive forces generated during grinding or clenching can place additional stress on the supporting tissues and may aggravate pre-existing periodontal disease.

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