

REVIEW ARTICLE

Bruxism

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Abstract

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Introduction

Tooth grinding is an activity particularly important to the dentist because of breakage of dental restorations, tooth damage, induction of temporal headache and temporomandibular disorders. The term parafunction was introduced by Drum¹ to suggest distinction between occlusal stress exerted during mastication and swallowing and occlusal stress which are brought into action outside of the normal function. Parafunctional activities are non functional oromandibular or lingual activities that includes jaw clenching, bruxism, tooth grinding, tooth tapping, cheek biting, lip biting, object biting etc. that can occur alone or in combination and are different from functional activities like chewing, speaking and swallowing.

The term 'la bruxomanie' was first

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introduced by Marie Pietkiewicz in 1907². It was

latter adopted as 'bruxism' to describe gnashing and grinding of the teeth occurring without a functional purpose. Glossary of Prosthodontic Terms (GPT-8)³ defines bruxism as parafunctional grinding of teeth or an oral habit consisting of involuntary rhythmic or spasmodic non functional gnashing, grinding or clenching of teeth in other than chewing movements of the mandible which may lead to occlusal trauma.

Sleep bruxism is not a disease, but a common sleep disorder. Bruxism is a movement disorder characterized by grinding and clenching of teeth. Etiology of bruxism can be divided into three groups psychosocial factors, peripheral factors and pathophysiological factors. Treatment modalities involve occlusal correction, behavioural changes and pharmacological approach. Bruxism can occur during wakefulness or during sleep. Bruxism during daytime is commonly a semivoluntary 'clenching' activity and is also known as 'Awake Bruxism' (AB) or Diurnal Bruxism (DB). AB can be associated with life stress caused by familial responsibility or work pressure. Bruxism during sleep either during daytime or during night is termed as 'Sleep Bruxism' (SB). SB is an oromandibular behavior that is defined as a stereotyped movement disorder occurring during sleep and characterized by tooth grinding and/or clenching⁴. Sleep bruxism was recently classified as sleep related movement disorder

according to recent classification of Sleep Disorders⁵.



Causes of Bruxism

Teeth grinding is most often associated with mental or psychological problems, such as stress and anxiety but abnormal occlusion is one of the most important triggering factors. Missing or crooked teeth puts extra stress on jaw muscles leading to clenching of teeth. Other causes can be habitual, trauma, allergic reactions and some medical conditions, such as digestive ailment or earache and teething in children. People with other sleeping disorders, such as Obstructive sleep apnoea, are at high risk of sleep bruxism.

Assessment/Diagnosis of Bruxism in the Clinic

Some of the methods to assess bruxism in the clinic are mentioned below:

1. Questionnaires
2. Clinical Findings/Evaluation
3. Tooth Wear

Tooth wear is considered to be analogous to bruxism. The extent of incisal or occlusal wear for a single tooth was evaluated by the following four-point scale:

- 0: no wear or negligible wear of enamel;
- 1: obvious wear of enamel or wear through the enamel to the dentine in single spots;
- 2: wear of the dentine up to one-third of the crown height;
- 3: wear of the dentine up to more than one-third of the crown height; excessive wear of tooth restorative material or dental material in the crown and bridgework, more than one-third of the crown height.

Then, the individual (personal) tooth-wear index (IA) was calculated from the scores of incisal or occlusal wear for each tooth of that individual. Tooth wear is a cumulative record of both functional and parafunctional activities and various factors such as age, gender, diet and bruxism are associated with tooth wear. Erosion by acidic drink is considered to be major contributing factor to tooth wear⁶.

4. Intraoral Appliance⁷: Bruxism activity can be evaluated using the intra-oral appliance and is classified into two groups:
 - Observation of wear facets of the intra-oral appliance^{8,9}
 - Measurement of bite force loaded on the intra-oral appliance¹⁰

Wear Facets on Intraoral Appliance

Holmgren et al¹¹ reported a repetitive wear pattern on the occlusal splint. They observed wear facets on full-arch acrylic resin splints, which reappeared in the same location with a similar pattern and direction, even after adjustment of the splints.

Bruxcore Plate

The Bruxcore Bruxism-Monitoring Device (BBMD) is an intra-oral appliance that was introduced as a device for measuring sleep bruxism activity objectively

Detection of Bite Force

Takeuchi et al¹² developed a recording device for sleep bruxism, an intra-splint force detector (ISFD), which uses an intra-oral appliance to measure the force being produced by tooth contact onto the appliance.

- Masticatory Muscle Electromyographic Recording
- Portable EMG Recording Device
- Miniature Self-Contained EMG Detector–Analyser

A miniature self-contained EMG detector–analyser (BiteStrip) was developed as a screening test for moderate to high level bruxers¹³.

It comprised of EMG electrodes, an amplifier, a central processing unit (CPU) with software, a display which presents the outcome in the morning, a light emitting diode and a lithium battery records the number of masseter muscle activities above a preset threshold. The special feature of this device is that the number of bruxism events can be objectively estimated by simply attaching it to the skin over the masseter muscle.

Polysomnography

Physiological changes related to sleep bruxism (e.g. microarousal, tachycardia and sleep-stage shift) can also be monitored. Hence, a polysomnographic study allows for multidimensional analyses of sleep-related physiological behaviours and studies on sleep laboratory EMG-based assessments are reported to be very reliable. One major limitation is that a change in the environment for sleep may influence the actual behaviour of bruxism. Another is the expense as multiple night recording is to be taken for the occurrence of sleep bruxism varies over a number of nights.

Management of Bruxism

Occlusal Therapy

Occlusal Intervention- Butler¹⁴ described an occlusal adjustment procedure for the treatment of bruxism without a proper theoretical basis. Similarly, Frumker¹¹ formulated a set of principles for a successful occlusal treatment on the basis of an unfounded idea that the better

the occlusal anatomy and function, the easier the bruxers relieve tension in the masticatory and associated musculature

Occlusal Appliances- The second category of occlusal management strategies for bruxism contains the frequency used occlusal appliances. These splints have different names (e.g. occlusal bite guard, bruxism appliance, bite plate, night guard, occlusal device) and slightly different appearances and properties, but in essence most of them are hard acrylic-resin stabilization appliances, mostly worn in the upper jaw. Hard splints are generally preferred over soft splints for practical reasons (e.g. soft splints are more difficult to adjust than hard ones) to prevent inadvertent tooth movements and also because hard splints are suggested to be more effective in reducing bruxism activity than soft splints¹⁵.



Splint made from biostar sheet

Biofeedback

Biofeedback is based on the principle that bruxers can ‘unlearn’ their behaviour when a stimulus makes them aware of their adverse jaw muscle activities (‘aversive conditioning’). This technique has been applied for bruxism during wakefulness as well as for sleep bruxism.

Bruxism During Wakefulness/Daytime (AB)

One of the early publications on the use of biofeedback in the management of bruxism during wakefulness was a prescription by Mittelman¹⁶. He described an EMG technique that provides the daytime clencher with auditory feedback from his/her muscle activity letting him know the degree of muscle activity or relaxation that is taking place

Sleep Bruxism

For the use of biofeedback in the management of sleep bruxism, Cherasia and Parks published a prescription. Their technique used contingent arousal from sleep with actual awakenings

Pharmacological Approach

Drugs that have paralytic effect on the muscles through an inhibition of acetylcholine release at the neuromuscular junction (botulinum toxin) decreases bruxism activity especially in severe cases with comorbidities like coma, brain injury, amphetamine abuse, Huntington's disease¹⁷ and autism.

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