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Bruxism: Information for Dental Practitioners

Colgate Dental Education Programs | Special Topic No.27



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make
history.

Bruxism has been a popular topic in dentistry with research in this field going as far back as the beginning of the 20th century.^{1,2} However, a scientific consensus on the definition of bruxism was reached in 2013 when it was defined as a “repetitive jaw-muscle activity characterized by clenching or grinding of the teeth and/or by bracing or thrusting of the mandible. Bruxism has two distinct circadian manifestations: it can occur during sleep (indicated as sleep bruxism) or during wakefulness (indicated as awake bruxism).”³ Clenching is usually regarded as a forceful closure of opposing teeth in a static relationship between the mandible and maxilla, either in maximum intercuspation or an eccentric position, whereas the act of teeth grinding involves forcefully rubbing the opposing dentition in a mobile maxillomandibular relationship as the lower jaw moves through different lateral or protrusive positions.²

The above definition of bruxism was widely accepted in the field of bruxism research until 2018 when a group of experts reached a consensus to update it by adopting two separate definitions for sleep bruxism (SB) and awake bruxism (AB).⁴ Accordingly, SB has been defined as “a masticatory muscle activity during sleep that is characterized as rhythmic (phasic) or nonrhythmic (tonic) and is not a movement disorder or a sleep disorder in otherwise healthy individuals.” On the other hand, AB has been defined as “a masticatory muscle activity during wakefulness that is characterized by repetitive or sustained tooth contact and/or by bracing or thrusting of the mandible and is not a movement disorder in otherwise healthy individuals.” Since then, this updated definition has been increasingly used by researchers as well as clinicians while its proponents were of the view that concepts of bruxism would further evolve in future.

Treating bruxism in its early stages is crucial in preventing potential dental complications, as there can be various underlying causes of this condition. Accordingly, this information sheet aims to briefly discuss the epidemiology, classification, clinical features, diagnosis, and management of bruxism, with a specific reference to dentistry and its clinical significance.

Epidemiology

A systematic review conducted on the epidemiological studies of bruxism found that the overall prevalence of bruxism was about 8.0-31.4% while that of AB and SB was 22.1-31.0% and 9.7-15.9%, respectively.⁵ It has been shown that bruxism affects males as well as females almost equally, peaks in adolescents and young adults, and declines after the 5th decade of life afflicting the older adults aged ≥60 years, less frequently.^{5,6} The prevalence of sleep

bruxism in children has been reported to have a wide range of 3.5% to 40.6%, due to variations in age groups studied and different frequencies of self-reported SB.⁷ A trend for decreasing prevalence with age and absence of gender differences in SB among children have been consistently observed.⁷ As for bruxism statistics in Australia and New Zealand, there is a dearth of reliable information.

Classification

A review of literature revealed that bruxism has been classified, based on various criteria.⁸

1. Time of occurrence

- Awake bruxism: occurs when an individual is conscious and not sleeping
- Sleep bruxism: occurs when an individual is asleep
- Combined bruxism: can occur in both awake and asleep situations.

2. Aetiology

- Primary/essential/idiopathic bruxism: apparent cause is unknown
- Secondary: can occur as a consequence of medication use, diseases and substance abuse
 - > Medication use: antipsychotic medications including selective serotonin reuptake inhibitors (SSRIs), tricyclic antidepressants and dopamine antagonists; cardio active medications including dopamine
 - > Diseases: coma, icterus (jaundice), cerebral palsy and neurological conditions such as Parkinson’s disease, Down’s syndrome
 - > Substance abuse: overusing amphetamine, cocaine, ecstasy, alcohol and smoking

3. Type of motor activity

- Tonic bruxism: characterized by sustained masticatory muscle contractions lasting for more than two seconds
- Phasic bruxism: brief and repeated masticatory muscle contractions accompanied by ≥3 consecutive bursts of electromyographic activity, with each activity lasting for 0.25-2 seconds
- Combined bruxism: both tonic and phasic episodes occur alternatively

In AB, tonic episodes are dominant while 90% of SB episodes are phasic or combined.

4. Severity

- Mild bruxism: characterized by less frequent occurrence and absence of teeth damage or negative impact on psychosocial functioning
- Moderate bruxism: occurs at night and impairs psychosocial functions mildly
- Severe bruxism: occurs at night and causes teeth damage, temporomandibular disorders, other physical injuries, and significant impairment of psychosocial functioning

Aetiology

Bruxism is regarded as having a multifactorial aetiology albeit causes are, by and large, unknown.⁹ Understanding the origins of bruxism requires a comprehensive exploration of both physiological and psychosocial dimensions, which collectively shed light on the complex nature of this condition.

- Psychosocial factors: several studies have shown that stressful lifestyle is a significant psychosocial risk factor for bruxism, but the evidence remains inconclusive.^{8,9} Emotional stress is widely considered to be the main triggering factor.
- Genetic factors: SB, in particular, has a genetic susceptibility with about 20-50% of individuals having a direct family member with childhood SB.⁹
- Occlusal interferences: usually, occlusal interferences are localised problems that interfere with the normal path of the bite due to the shape of an isolated tooth or group of teeth. These can be twofold.
 - > Premature contact: where one part of the bite meets prior to other parts (e.g., new dental filling with a marginally altered shape or position to the original tooth)
 - > Deflective interference: a dynamic abnormality, where an obstruction to the bite (e.g., over-erupted third molar) can alter the normal path of the bite
- Medications and substance abuse: as mentioned hitherto, antipsychotic and cardio-active medications as well as substance abuse can contribute to bruxism
- Other factors: bruxism can be associated with diseases/conditions like Parkinson’s disease, Down’s syndrome, trauma and torus mandibularis

Clinical Features of Bruxism

Bruxers may present with one or more of the following typical symptoms and signs.¹⁰

Symptoms

- Teeth grinding with a distinct sound that may disturb the bruxer’s sleep partner.
- Pain in the temporomandibular joint (TMJ) and masticatory and cervical muscles

- Morning headaches, particularly in the temporal region
- Tooth sensitivity due to excessive tooth wear
- Increased tooth mobility
- Poor sleep quality leading to fatigue.

Signs

A clinical examination of a bruxer may reveal the following:

- Abnormal tooth wear (Figure 1a)
- Tongue indentations (Figure 1b)
- Recurrent migraines
- Linea alba along the biting plane
- Gum recession
- Presence of mandibular or maxillary tori
- Hypertrophy of masseter muscles
- Reduction of salivary flow
- Repeated breakage of fillings and/or teeth
- Limitation of mouth-opening ability.



Figure 1: Signs of bruxism (a) Tooth wear (b) Tongue indentations

Additionally, diagnostic features that can be determined with the help of radiography may include periodontal changes, widened periodontal ligament space, trabeculation of the alveolar bone and exostosis formation.

Diagnosis

Various methods have been used to assess bruxism by both researchers and clinicians.¹⁰ Some of these methods are briefly discussed below:

1. Questionnaires: One of the commonly employed methods in research and clinical settings to assess bruxism. Questionnaires have an advantage of being applicable to a wide range of people. However, no standardised questionnaire is currently available, and information gathered on bruxism through this method is subjective. Below are some of the commonly used questions:
 - Can anyone hear you grind your teeth at night?
 - Do you feel any fatigue or soreness in your jaw when you wake up in the morning?
 - Do you experience any soreness in your teeth or gums when you wake up in the morning?
 - Do you have temporal headaches when you wake up in the morning?
 - Do you ever notice yourself grinding your teeth during the day?

- Do you ever notice yourself clenching your teeth during the day?

2. Clinical findings: Typically, SB is diagnosed through a combination of factors such as reports of teeth grinding sounds from a sleep partner, evidence of tooth wear, or frequent dental restoration fractures. Additional indicators may include hypertrophy of the masseter muscle, as well as subjective symptoms like pain in the TMJ, headaches, fatigue, or stiffness in the masticatory muscles upon waking.
3. Use of validated clinical diagnostic criteria such as polysomnography (PSG) and electromyography (EMG)
4. Tooth wear or attrition facets
5. Trial oral splints: a repetitive wear pattern on a provisional splint like ‘bruxcore’ bruxism-monitoring device
6. Electrophysiological tools like laboratory-based PSG, are necessary for a conclusive diagnosis of SB, but the high cost and inconvenience associated with PSG make it unsuitable for use in dental settings. Moreover, the unfamiliar environment of recordings could also affect the accuracy of results.

As of late, researchers have been attempting to develop standardised tools such as STAB (Standardised Tool for the Assessment of Bruxism)¹¹ and Bruxism Screener (BruxScreen)¹² to detect bruxism. While STAB is being developed based on subject, clinical and instrumental assessment of bruxism, particularly at an individual level, BruxScreen is comprised of a self-report questionnaire and a clinical assessment form, which is intended for use in large-scale research as well as general dental practice settings. Application of these tools in the field of bruxism is still under investigation.

Management

Bruxism can significantly impact one’s quality of life. It can lead to pathological consequences such as tooth wear, occlusal trauma, and hypertrophy of the masticatory muscles in some patients. Additionally, SB can affect sleep quality of not only the bruxer but also their sleep partner. Therefore, accurate diagnosis is essential for the treatment of bruxism.

Treating bruxism can be challenging for both dentists and patients due to the variability of symptoms, making diagnosis difficult. At present, there is no specific treatment available that can stop SB.² The cause of SB in children is not entirely

known, but factors such as anxiety, stress, malocclusion, and certain medications have been linked to it. Treatment is generally not required unless the condition is severe.¹³

Procedures such as occlusal equilibration, occlusal rehabilitation, and orthodontic treatment to establish proper occlusal relationships, remain to be debatable among dental professionals and researchers. Despite claims of success based on clinical experience, there is a lack of high-quality evidence in the literature to support the effectiveness of these irreversible techniques.¹⁴ Psychotherapy treatments such as habit awareness and habit reversal therapy are sometimes effective. A helpful approach could be to use reminders, such as placing a small piece of chewing gum on the occlusal surface of the molar teeth.⁸

Relaxation techniques, and biofeedback therapy, which has been used as a cognitive-behavioural technique to regulate excessive masticatory muscle activity by providing auditory and/or visual feedback, may also help eliminate bruxism.^{8,15} In general, stress and anxiety play a role in triggering jaw clenching and teeth grinding, which can worsen TMJ-related problems. Psychotherapy offers individuals with an opportunity to acquire coping strategies for stress management and habit reduction, ultimately leading to relief from TMJ discomfort.

Physiotherapy may be recommended if bruxism is associated with muscle pain and stiffness. It may involve exercises, manual therapy, and techniques aimed at improving jaw mobility, reducing pain, and enhancing muscle strength and coordination.

The use of interocclusal appliances, such as occlusal splints and night guards (Figure 2), is the most common method to reduce the negative effects of bruxism. Appliances can differ in their appearance and characteristics, as well as in how they are made. They can be crafted in either a dental clinic or a laboratory and can be composed of either hard or soft materials. Recent studies suggest that interocclusal appliances can be useful in managing SB, but they cannot provide a definitive or curative treatment for bruxism or temporomandibular disorder symptoms.²

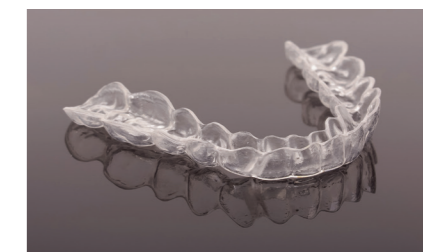


Figure 2: Occlusal splint/night guard

The use of medication for treating bruxism is only recommended for severe cases and for a short duration when other approaches have failed. Pharmacological treatment options include anti-anxiety agents such as SSRIs and tricyclic antidepressants, tranquilizers, sedatives, and muscle relaxants. Diazepam may be prescribed for a few days to manage sleep disturbance and anxiety levels, while low doses of tricyclic antidepressants may be used to reduce the amount of rapid eye movement (REM) sleep.¹⁴

The use of Botulinum toxin (Botox) as a treatment for bruxism has been proposed, but there is limited information regarding its safety and long-term efficacy.⁸ Botox is known to reduce pain via inhibiting the synaptic nerve while relaxing masticatory muscles by inducing paresis of muscles through inhibiting acetylcholine at neuromuscular junctions.¹⁶ A recent systematic review suggests that Botox injections can particularly improve bruxism-related pain and be recommended for bruxers who have not responded well to other treatment methods, including those with difficulties in wearing oral splints and persistent muscle-related issues.¹⁶

References

1. Nadler SC. Bruxism, a classification: critical review. *Journal of the American Dental Association* 1957;54:615-622.
2. Reddy SV, Kumar MP, Sravanthi D, Mohsin AH, Anuhya V. Bruxism: a literature review. *Journal of International Oral Health* 2014;6:105-109.
3. Lobbezoo F, Ahlberg J, Glaros AG, et al. Bruxism defined and graded: an international consensus. *Journal of Oral Rehabilitation* 2013;40:2-4.
4. Lobbezoo F, Ahlberg J, Raphael KG, et al. International consensus on the assessment of bruxism: Report of a work in progress. *Journal of Oral Rehabilitation* 2018;45:837-844.
5. Manfredini D, Winocur E, Guarda-Nardini L, Paesani D, Lobbezoo F. Epidemiology of bruxism in adults: a systematic review of the literature. *Journal of Orofacial Pain* 2013;27:99-110.
6. LT Thayer M, Ali R. The dental demolition derby: bruxism and its impact - part 1: background. *British Dental Journal* 2022;232:515-521.
7. Manfredini D, Restrepo C, Diaz-Serrano K, Winocur E, Lobbezoo F. Prevalence of sleep bruxism in children: a systematic review of the literature. *Journal of Oral Rehabilitation* 2013;40:631-642.
8. Murali RV, Rangarajan P, Mounissamy A. Bruxism: Conceptual discussion and review. *Journal of Pharmacy & Bioallied Sciences* 2015;7:S265-270.
9. Shetty S, Pitti V, Satish Babu CL, Surendra Kumar GP, Deepthi BC. Bruxism: a literature review. *Journal of Indian Prosthodontic Society* 2010;10:141-148.
10. Koyano K, Tsukiyama Y, Ichiki R, Kuwata T. Assessment of bruxism in the clinic. *Journal of Oral Rehabilitation* 2008;35:495-508.
11. Manfredini D, Ahlberg J, Aarab G, et al. Standardised Tool for the Assessment of Bruxism. *Journal of Oral Rehabilitation* 2023;00:1-6.
12. Lobbezoo F, Ahlberg J, Verhoeff MC, et al. The bruxism screener (BruxScreen): Development, pilot testing and face validity. *Journal of Oral Rehabilitation* 2023;00:1-8.
13. Machado E, Dal-Fabbro C, Cunali PA, Kaizer OB. Prevalence of sleep bruxism in children: a systematic review. *Dental Press Journal of Orthodontics* 2014;19:54-61.
14. Lobbezoo F, van der Zaag J, van Selms MK, Hamburger HL, Naeije M. Principles for the management of bruxism. *Journal of Oral Rehabilitation* 2008;35:509-523.
15. Vieira MA, Oliveira-Souza AIS, Hahn G, Bähr L, Armijo-Olivo S, Ferreira APL. Effectiveness of Biofeedback in Individuals with Awake Bruxism Compared to Other Types of Treatment: A Systematic Review. *International Journal of Environmental Research and Public Health* 2023;20.
16. Chen Y, Tsai CH, Bae TH, et al. Effectiveness of Botulinum Toxin Injection on Bruxism: A Systematic Review and Meta-analysis of Randomized Controlled Trials. *Aesthetic Plastic Surgery* 2023;47:775-790.
17. Guaita M, Högl B. Current Treatments of Bruxism. *Current Treatment Options in Neurology* 2016;18:10.
18. Johansson A, Omar R, Carlsson GE. Bruxism and prosthetic treatment: a critical review. *Journal of Prosthodontic Research* 2011;55:127-136.
19. Andersen ML, Araujo P, Frange C, Tufik S. Sleep Disturbance and Pain: A Tale of Two Common Problems. *Chest* 2018;154:1249-1259.

Advising patients on sleep hygiene practices such as avoiding stimulants, limiting physical and mental activity before bedtime, and creating a comfortable sleep environment is a common recommendation. However, while it seems like a reasonable approach, there is no clear evidence to support its effectiveness in reducing bruxism activity.¹⁷

Clinical significance

Bruxism has been associated with various dental problems including tooth wear, dental mobility, changes in oral soft tissues and mandible, as well as the development of temporomandibular disorders (TMD). Additionally, the presence of bruxism can pose technical difficulties during the construction and placement of dental prostheses.¹⁸ The presence of bruxism can create these challenges by subjecting the prosthesis to excessive force and wear, leading to misalignment, potential damage, difficulty in selecting suitable materials, and necessitating frequent adjustments. These challenges can affect the longevity, fit and cost of

dental prostheses. Dental professionals need to consider bruxism when designing and maintaining prostheses for affected individuals.

Managing bruxism requires a collaborative effort from an interprofessional team comprising dentists, mental health nurses, paediatricians, primary caregivers, neurologists, physiotherapists, and psychotherapists, considering that the condition has multiple underlying causes. While there is no cure for nocturnal bruxism, interventions can help reduce the behaviour. The prognosis for most patients is uncertain, as the condition may persist despite treatment.¹⁹

Summary

Bruxism is an evolving concept that is no longer regarded as a sleep or movement disorder in otherwise healthy individuals. Overall, bruxism involves an intricate interplay of physiological, psychosocial and dental factors that contribute to its aetiology. Managing bruxism requires a tailored approach, considering the unique circumstances of each individual, to minimize its impact on oral health and quality of life.

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