



# BRUXISM: A CLINICAL REVIEW

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## INTRODUCTION

Bruxism is the habitual grinding of teeth when the individual is not chewing or swallowing is a wide phenomenon covering different motor phenomena. Recently an international group of experts reached to a decision to define bruxism as a repetitive mandibular jaw-muscle activity which is identified by clenching or grinding of the teeth or by bracing or thrusting of the mandible.<sup>1</sup>

From a historical perspectives, crushing of teeth has been described in the bible while in 1931, dysfunctional mandibular movements were described as bruxism.<sup>2</sup> Bruxism is the term applied to either the static or dynamic contact on occlusion of the teeth at times other than the normal functions such as mastication and swallowing. It is therefore considered a parafunctional habit. It usually occurs unconsciously and spontaneously and may be repetitive at various time intervals.<sup>2</sup>

Bruxism was introduced in the dental literature as “bruxomania” by Marie and Pietkiewkz in the year 1907. This report described the habit of grinding the teeth. The term “bruxism” was introduced in the dental literature by Frohman in 1931. In 1936, Miller suggested that the term “bruxomania” to be used to denote day time habitual grinding of the teeth, while the term “bruxism” to be used to denote nocturnal grinding.

The terms “neuralgia traumatica”, “karolyi-effect” and “occlusal habit neurosis” have all been used to refer to some form of teeth-grinding, clenching, tapping, or pressing of the teeth during day or night. .

American Sleep Disorder Association (1990): “Defines bruxism as tooth grinding or clenching during sleep plus one of the following: tooth wear, sounds or jaw muscle discomfort in the absence of medical disorder”.

American Academy of Orofacial Pain (1996): “Bruxism is specifically defined as diurnal or parafunctional activity including clenching, bracing, gnashing and grinding of the teeth.”

Although important distinctions exist, the term bruxism in the dental literature generally refers to both diurnal and nocturnal grinding unless otherwise specified<sup>4</sup>.

Bruxism can be **Diurnal Bruxism**, referring to conscious or subconscious grinding of teeth, usually during day and could include parafunctional activities such as chewing pencils, nails, cheeks and lips **or Nocturnal Bruxism** referring to a subconscious grinding of teeth characterized by rhythmic patterns of masseter activity and audible sounds that are usually not reproducible during the conscious state. It is associated with Rapid Eye Movement sleep. It can also be of Primary (idiopathic) type that includes day time clenching and sleep bruxism in the absence of medical cause. Or Secondary (iatrogenic) type associated with either neurologic, psychiatric or sleep disorders or with administration or withdrawal of some type of drugs<sup>2</sup>.

### **OCCURRENCE AND PREVALENCE:**

Bruxism may commence with the eruption of the primary dentition in infancy and occurs throughout life, however it increases through the mixed dentition period then decreases with age. Nocturnal bruxism occurs during sleep and is characterized by forceful rhythmic muscle contractions occluding tooth surfaces that produce clicking or grating sounds<sup>4</sup>.

Studies involving self-reporting of clenching of the teeth during waking hours are about 20% whereas during sleeping it is about 10% and grinding of teeth during sleeping can range from 6% to 12%. Other studies demonstrate that bruxism occurs in upto 90% in the general population. Studies indicates that incidence of bruxism is the highest in the first to fourth decade of life and this parafunctional behavior decreases with age. And it show that females and more commonly affected than males.

### **NATURE:**

Bruxism is comprised of rhythmic, yet forceful, mandibular grinding as well as prolonged muscular clenching of the dentition. This sustained dentition in either maximum intercuspation or in an eccentric occlusal position such as an anterior edge-to-edge or canine cusp tip-to-cusp tips relationship.

The average frequency per sleeping period has been reported as five episodes, which occur at almost 90 minutes of time intervals. These episodes have been observed to be in association with the Rapid Eye Movement stages of sleep. Each episodes may have a duration of 8-9seconds. Total average bruxism time per sleeping period has been observed to be 42seconds.<sup>6</sup>

The average working force that can be delivered to a natural tooth is about 175 psi, whereas nocturnal bruxism activity can increase this force to 300 psi with reported cases of 100,000 to 175,000 psi. Mandibular functional activities can generate tooth contact forces of about 17,200 lb-sec/day, and parafunctional activity can generate about 57,600 lb-sec/day. The direction of parafunctional forces with a grinding type of bruxism behavior, is horizontal and not well tolerated because mandibular eccentric movements are involved<sup>6</sup>

**EITIOLOGY:**

The cause of bruxism is still controversial. The cause is multifactorial and overlapping. Several factors, which are responsible for bruxism, are discussed here.<sup>6</sup>

**Psychological Factor:** Bruxism has been shown to be linked to psychological stress as a necessary consequence. Any unsatisfied need or interference with one's satisfaction, which may be experienced as frustration, anger, anxiety or fear may result in tension or possibility of bruxism. Teeth grinding is the manifestation of inability to express emotion such as anxiety, rage, hate, aggression, sadism or libidinous desires in other ways<sup>6</sup>.

**Occlusal Factor:** Occlusal disharmonies act as triggering factors to produce bruxism. Localized highpoints in restorations or improper restorations, naturally occurring occlusal prematurities and malocclusion may cause bruxism. Patient makes a subconscious attempt at performing a self equilibration or adjustment of his or her dentition to remove the occlusal interference, particularly with nocturnal bruxism. If the teeth meet interference or of asymmetric tension, the mandible is moved so that interference is created. The resulting functional occlusion does not coincide with centric occlusal relation. This point of interference before the teeth go into maximal interdigitation has been implicated as the focal point at which bruxism will occur<sup>6</sup>.

**Factors responsible for occlusal interference can be,****Direct :**

- Inharmonious tooth or arch size due to improper restoration.
- Excessive occlusal wear.
- Loss of posterior support.
- Missing teeth.
- Caries.

**Indirect :**

- Gingival hypertrophy
- Alveolar bone loss
- Granulation tissue
- Cysts and Tumors
- Enlarged tuberosities
- External trauma
- Developmental diseases<sup>3</sup>

**Muscular Factor:** For bruxism to occur it is necessary for the masticatory musculature to receive pathological tension for discharge. The first reaction to psychological stress is increased tonicity in preparation for either fright or fight. Then there is a transmission of this energy for discharge trying to reestablish both physical and mental homeostasis. Suppressing the emotions during the day for sociocultural reasons may cause clenching or

grinding, which in turn increase the tension. To the extent that the grinding movements during sleep reduces this tension<sup>2</sup>

#### Others:

- Systemic disease like epilepsy may result in bruxism.
- Patients with cerebral palsy.
- Genetics may also play a role in the etiology of bruxism.

Systemic factors like Gastro-intestinal disturbances, parasitic infections, enzymatic imbalances, persistent recurrent urological dysfunction as abundant calculus formation is seen in children with chronic renal failure demonstrate an elevated level of calculus may be responsible for nocturnal bruxism.<sup>7</sup>

- Histamine release during stress may also act as an agent in initiation of bruxism.
- Also nutritional and vitamin deficiencies have been suggested to be potential factors of bruxism.
- Allergy is also one of the etiologic factors of bruxism. Marks reported 3-fold increase of bruxism in allergic children over non-allergic children. He postulated that nocturnal bruxism may be initiated reflex by increased negative pressure in the tympanic cavity from intermittent allergic edema of the mucosa of the eustachian tubes. This increased pressure may produce reflex action to the jaws by stimulating the trigeminal nuclei in the brain.
- Cervical spine dysfunction is also one of the etiologic factors. This is characterized by restricted mobility of the cervical spine, improper position of the head in the neck and increase in muscle tension of crano-mandibular complex. So tooth contact differs as head posture alters.
- Strict educational attitude of parents may be responsible for bruxism in children.
- Mouth breathing may also be one of the causative factor of bruxism.

The etiology of Bruxism is usually multifactorial or combination of any of the above factors<sup>6</sup>.

The effect of bruxism on the tooth itself dependent on a number of factors.

1. Quantity and quality of bruxism is the primary factor.

The command swallow of saliva: Place a small amount of water beneath the patients tongue tip and ask the patients to swallow and note the mandibular movements.

2. The command swallow of water: Give the patient more water and ask for a swallow. Place the hand over inner temporal muscle pressing lightly with the fingertips against the patient's head during swallowing.
3. The unconscious swallow during mastication: Place more water in patient's mouth and with the hand on the temporal muscle, asks the patient to swallow. After the swallow is completed, turn away from the patient as if examination were over, but retain the hand against the head. Most of the patients will produce an unconscious clearing swallow.

- In normal mature swallow mandible rises as the teeth are brought together during command swallow of saliva and on holding lower lip lightly with the finger, patient can complete the command swallow.

Temporal muscle can be felt to contract in command swallow of water and even during mastication.

- In teeth apart swallow if the lower lip is held lightly with the finger, patient will have the command swallow inhibited by depression of the lip. No contraction of the temporalis muscle will be noticed during command swallow of water<sup>8</sup>.

### Clinical Findings and Diagnosis:

Clinical features:

- ✦ Occlusal and incisal wear of the dentition.
- ✦ Mobility of the teeth that are periodontally compromised.
- ✦ Fracture of teeth as well as restorations.
- ✦ Hypertrophy of superficial belly of the masseter muscle as well as the anterior temporalis muscle.
- ✦ Widening of periodontal ligament itself as demonstrated on radiograph.
- ✦ Tenderness to palpation of masticatory muscles<sup>2</sup>.

### Symptoms:

- ✦ Tight sensation of the masticatory muscles that usually occurs on awakening.
- ✦ Myalgia, miofacial pain or both of the masticatory muscles. The pain is so severe that the patient jumps from examination area once the muscle is touched giving explanation as electric shock in the area.
- ✦ Hypersensitive teeth.
- ✦ Sounds generated from grinding of dentition during sleeping hours as reported by a spouse or roommate<sup>2</sup>.
- ✦ Clicking or locking of temporomandibular joint (usually reported by patient)
- ✦ Tongue or cheek indentation

Diagnosis can be made through the process of obtaining history and a thorough clinical examination. Definitive diagnosis can be made using electrophysiological tools such as polysomnographic or ambulatory recording systems. For dentists, recognition of bruxism is based mainly on the clinical observations, but chairside diagnosis has limitations.

### MANAGEMENT:

Currently there are no specific strategies for the management of bruxism. The dentist's main role is to reduce the associated orofacial sensory complaints (e.g., pain, tooth sounds) and prevent further damage of the orofacial structures (e.g., tooth wear, fracture of dental restorations).

A need emerged to define the best strategies to manage bruxism in the clinical settings.

A 2008 review performed on the topic by Lobbezoo et.al.<sup>1</sup> suggested that most of the papers does not come to a definitive point of suggestion due to low methodological quality.

According to higher quality studies the authors suggested that a common sense ‘**triple P**’ approach, based on a combination of oral appliance i.e. plates, counselling /behavioural strategies for i.e. pep talks and centrally acting drugs i.e. pills is the most commonly suitable strategy to manage bruxism within the current evidence.<sup>1</sup>

Various approaches of management are:

- Dental approaches
- Behavioral and cognitive approaches
- Pharmacological approaches

Dental Approaches: Hard acrylic occlusal splint appliances and soft vinyl mouth guards can be helpful for managing specific orofacial pains and protecting teeth. Soft mouth guards are generally not durable and are contraindicated for long term use. Hard acrylic occlusal splints are more suitable for long-term use. These appliances may be indicated in patients who require protection of their teeth from further damage, to reduce tooth-grinding sounds during sleep or to manage concomitant orofacial pains.

Objectives of occlusal splints are<sup>9</sup>

- Used specially in night-time bruxism
- They are also called splints or discharging plaques
- Built of acrylic, generally the upper unit
- They must fully cover the occlusal surface and the incisal edges of the incisors and canines
- The width of the splint should be about 2 mm and its surface should to be flat.
- Maximum bilateral contacts must be obtained between the lower vestibular cusps and the plaque.
- They are constructed with canine guide so that in laterality they only go into contact with the canines.

Behavioral and Cognitive Approaches: In this approach loud auditory sounds are used to arouse sleep bruxism patients every time masticatory EMG activity exceeds a threshold, determined before sleep. In this way cognitive arousals are given to the patients as a punishment.

Another behavior approach includes arousal and overcorrection procedures. Here patients are awakened when they have bruxing episodes and they are required to perform positive behavior like hand washing, brushing teeth as an overcorrection.

Suggestive hypnotherapy, in which patients are instructed to relax their muscles, will reduce masticatory EMG activity during sleep. Stress management or changing a life style has been suggested if patients are experiencing stress and anxiety. Patients should be instructed to do some respiratory relaxation exercises.

**Pharmacological Approach:** There are no pharmacological treatments for bruxism. Although several drugs have been suggested as useful, they are not recommended for long term use.

Benzodiazepines (e.g., diazepam) and central muscle relaxants (e.g., methocarbamol) taken at bed time have been reported to reduce oromotor activity during sleep. The administration of dopamine precursor, L-dopa reduces sleep bruxism approximately 30% in primary bruxism patients<sup>7</sup>.

### **Other approaches:**

They include Electrical methods and Acupressure techniques.

Electrical Methods- Electrogalvanic stimulation for muscle relaxation are utilized for treatment of bruxism. Ultrasound and TENS are also being investigated.

Acupressure Therapy- In this technique, known areas of the body are manipulated to obtain muscle relaxation<sup>5</sup>.

### **Conclusion**

The present review on bruxism management provides an update with respect to the last paper on the argument (i.e. the 2008 review by Lobbezoo et al.)<sup>(1)</sup> and also suggest that there is not enough evidence to suggest a standard and definite treatment approach for the treatment of bruxism, except only the use of oral appliance such as mouth guards and symptomatic treatment to relief the symptoms, the symptoms associated with the bruxism are clicking sound heard by roomates of the affected person, muscular pain, locking of lower jaws and etc. The non-pharmacological treatments including behavioural and cognitive approach may be useful to some other extent to reduce or subside the Bruxism.

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