

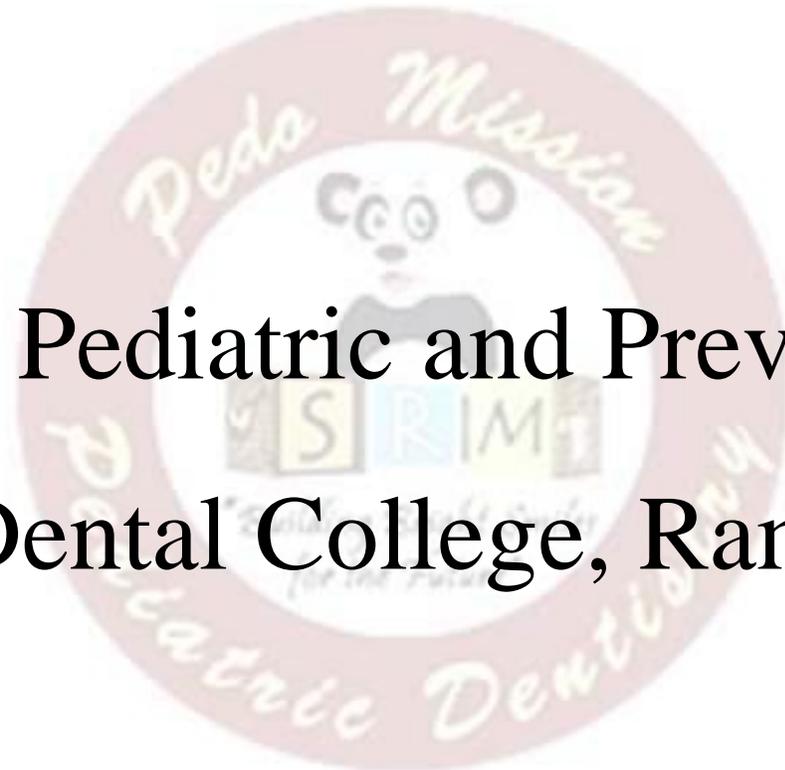


BRUXISM



Department of Pediatric and Preventive Dentistry

SRM Dental College, Ramapuram





DEFINITION



- Bruxism is habitual grinding of teeth when the individual is not chewing or swallowing - RAMFJORD (1966)
- Habitual, nonfunctional, forceful contact between occlusal tooth surfaces, which can occur while awake or asleep. – AAPD (2003)
- Bruxism is defined as ‘the para-functional grinding of teeth’, and as ‘an oral habit consisting of involuntary rhythmic or spasmodic nonfunctional gnashing, grinding or clenching of the teeth, in other than chewing movements of the mandible, which may lead to occlusal trauma’- GPT(2005)
- A repetitive jaw-muscle activity characterized by clenching or grinding of the teeth and/or by bracing or thrusting of the mandible- Lobbezoo et al, 2013



NOMENCLATURE



- 1901: Karolyi M – “traumatic neuralgia”
- 1907: Marie Pietkiewicz – “bruxomania”
- 1931: Frohman – “bruxism”
- 1972: Drum – “emotional loaded parafunction”
- 1971: Ramjford Ash – “centric and eccentric bruxism.”





THEORIES



A) LOCAL/ MECHANICAL THEORIES:

Deviation from the ideal occlusion is a primary factor. Failure of the teeth to intercusate maximum in centric occlusion or failure to obtain a retruded cuspal position in centric relation may contribute to bruxism. Elongated teeth, poor restoration with high points may initiate bruxism (Glaros & Rao, 1977)

B) PSYCHOLOGICAL THEORIES:

Two types of psychological theories are proposed.

1. Freudian psychoanalytical theory, which believes that fixation of child on oral stage may lead to bruxism. It is believed that children who are restrained from aggressive responses begin grinding their teeth.
2. Based on behavior and cognition based principles stating that it is a learned habit.



C) SYSTEMIC OR NEUROPHYSIOLOGICAL THEORIES:

These theories propose that bruxism is primarily a neurophysiological disorder. Nutritional deficiencies and multiple medical conditions, including allergies and hyperthyroidism (cf. Ahmad, 1986; Cash, 1988; Glaros & Rao, 1977). It is also associated with histamine release associated with allergies, cold and stress (Marks, 1980); allergic children being more likely to show occlusal abnormalities than non- allergic children.

The children with cerebral palsy, mentally challenged children, down's syndrome are more likely to engage in bruxism. Various drugs have also been implicated in bruxism. For example, amphetamines and their derivatives have been reported to produce bruxism (Ashcroft, Eccleston, Waddell, 1965; Brandon, 1969)



PREVALENCE



ICSD (1990): Awake bruxism occurs predominantly among females while no gender difference is seen for sleep bruxism

Sari et al (2001) : The prevalence in children is between 14 to 20%.

Liu et al (2005) : Increased prevalence of bruxism (6.5%) seen in 2 – 12 years old children in china

Garede et al (2014): 832 children, 6 to 12 years old in Karad, India and found bruxism (17.3%)

Deepa et al (2015) : 100 children, 3-18 yrs affected with spastic cerebral palsy
Karnataka, India

Increased prevalence of bruxism (54%) in children affected with spastic cerebral palsy
Significant relation between bruxism and amount of sleep



CLASSIFICATION





DEPENDING ON THE TIME



1.SLEEP BRUXISM/NIGHT TIME/NOCTURNAL BRUXISM:

- Subconscious clenching and grinding of the tooth occur, characterized by loud rhythmic pattern of masseter in EMG

2.AWAKE BRUXISM/DAY TIME/DIURNAL BRUXISM:

- Conscious or subconscious grinding of teeth during the day, it is mainly seen in reaction to stress or anxiety and expressed as jaw muscle clenching habit. It occurs along with para-functional habits such as chewing pencils, nails, cheeks and lips. It produces little or no sound during clenching.



According to Lavigne et al, 2008

- By when it occurs:

Awake Bruxism,
Sleep Bruxism
Combined Bruxism

- By etiology

Primary or idiopathic
Secondary- to diseases (coma, cerebral palsy), medications (antipsychotic drugs, amphetamines)

- By motor activity

- Tonic- Muscular contractions for more than 2 sec
- Phasic- Brief, repeated contractions for 0.25- 2 sec
 - Combined- alternating episodes
 - By current or past presence



According to Nelio Veiga et al, 2015

- Primary or Idiopathic
- Physiological- mixed dentition
- Secondary
- Contraction:

Centric
Eccentric

- Duration:

Acute: less than a week
Sub-acute: week- month
Chronic: more than a month



DEPENDING UPTO THE STRESS- OKINURA 1972



- 1.Bruxism associated with stress events
- 2.The non-stress associated bruxism generally has hereditary influence.

DEPENDING UPON MASSETER MUSCLE ACTIVITY:

- 1.Rhythmic, high amplitude, long duration(EMG). This is most commonly associated with grinding, gnashing or tapping behaviors of the teeth.
- 2.Arrhythmic, high amplitude, short duration(EMG). This is commonly associated with teeth clenching



ETIOLOGY



Nadler (1957) gave the following causes of Bruxism

Local factors

Systemic factors

Psychological factors

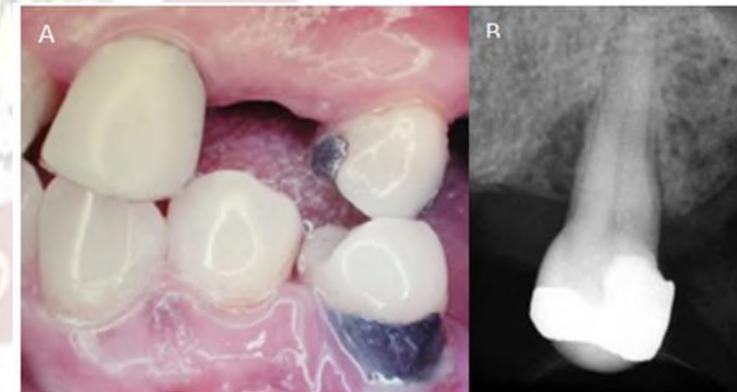
Occupational factors



LOCAL FACTORS



The stomatognathic system are prime factors in development of bruxism [Ash and Ramfjord 1994]

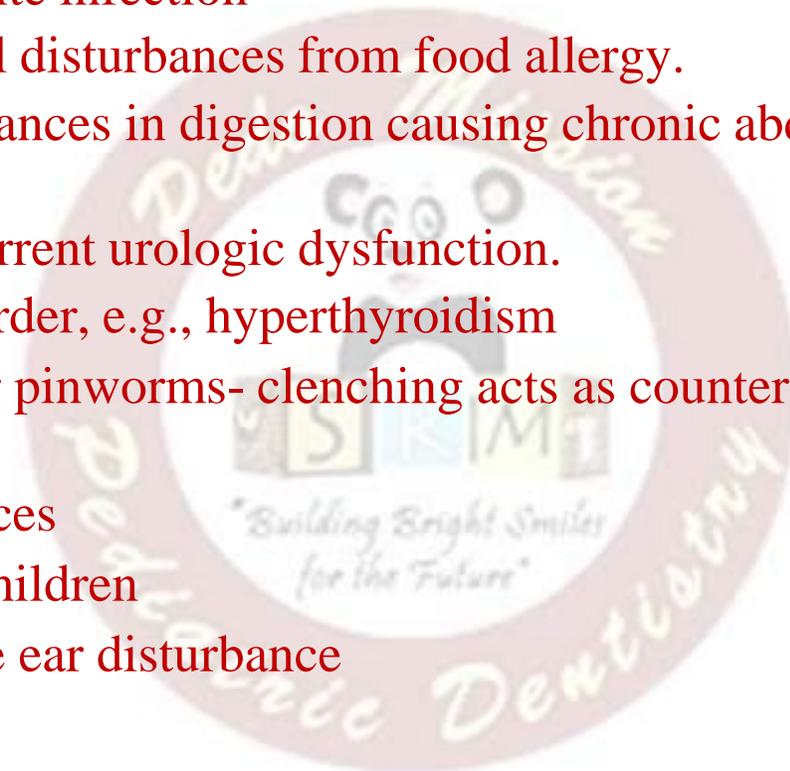




SYSTEMIC FACTORS



- Nutritional deficiencies.
- Calcium and vitamin deficiencies
- Allergic rhinitis or asthma [Marks MB, 1980]
- Intestinal parasite infection
- Gastrointestinal disturbances from food allergy.
- Enzymic imbalances in digestion causing chronic abdominal distress.
- Persistent, recurrent urologic dysfunction.
- Endocrine disorder, e.g., hyperthyroidism
- Anal pruritis or pinworms- clenching acts as counter-irritant to itching
- CNS disturbances
- Hyperkinetic children
- Chronic middle ear disturbance

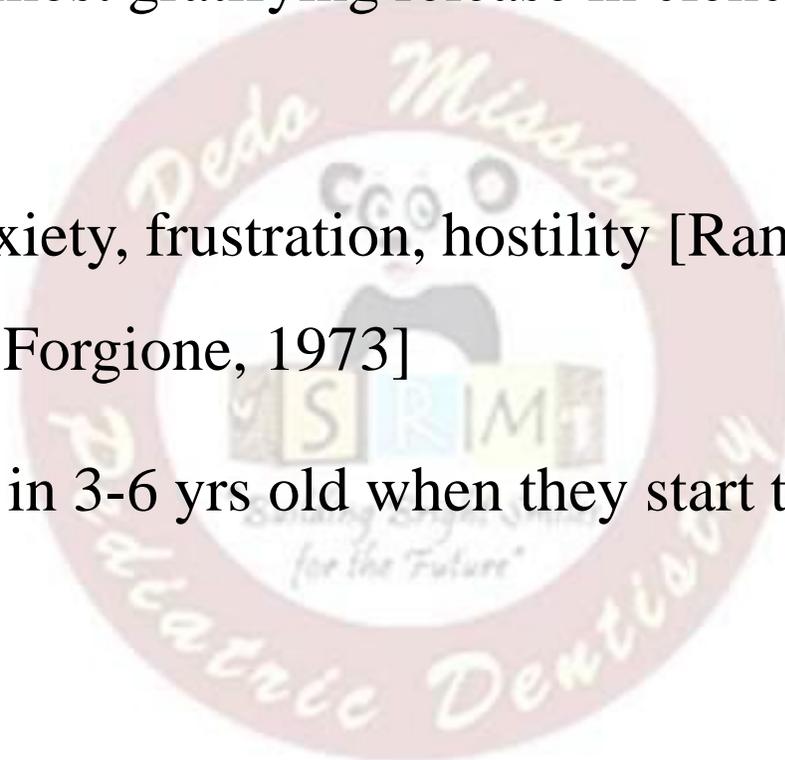




PSYCHOLOGICAL FACTOR



- Most dominant factor.
- Nervous tension finds a most gratifying release in clenching and bruxism.
- Bruxism- response to anxiety, frustration, hostility [Ramfjord. 1961
Meklos 1971,Heller and Forgione, 1973]
- Anxiety becomes higher in 3-6 yrs old when they start their social life.

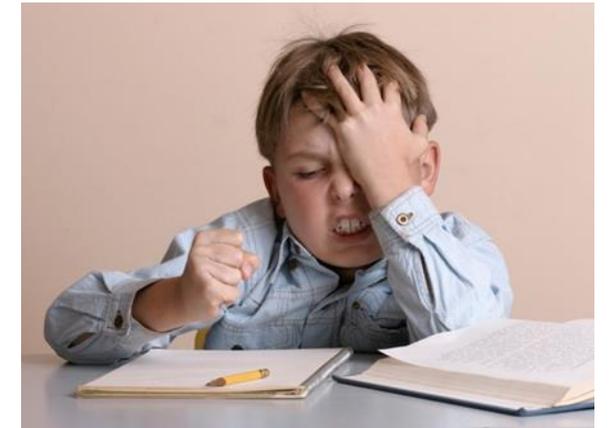




OCCUPATIONAL FACTORS



- Athletes
- Over anxious students/ compulsive over achievers.

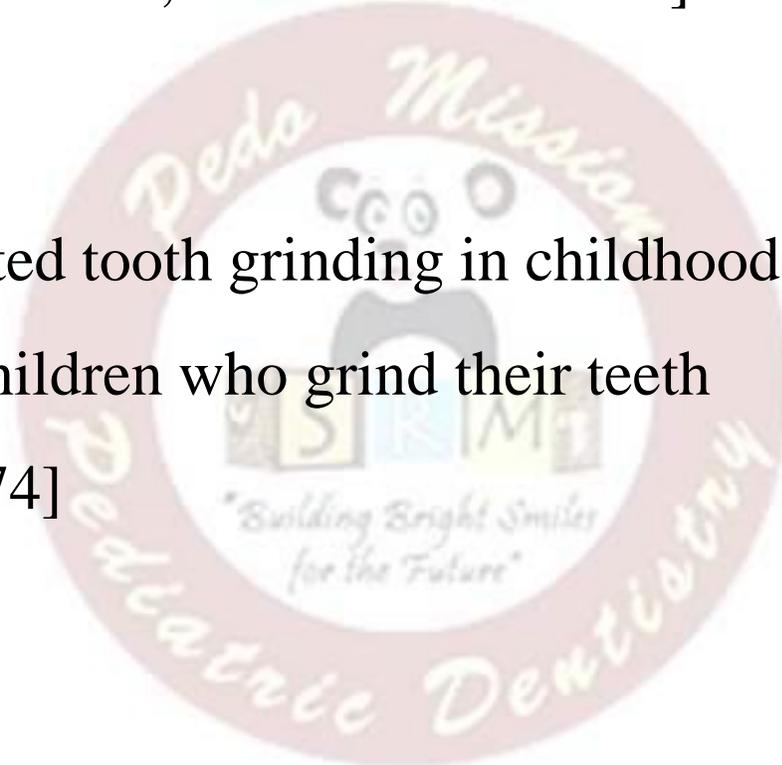




GENETIC FACTORS



- Direct relation between bruxism and heredity [Reding et al 1966, Cheifetz et al 2005, Bahman et al 2010]
- Parents who demonstrated tooth grinding in childhood more frequently have children who grind their teeth [Abe k, Shimakawa 1974]





BRUXISM AND SLEEP DISORDER BREATHING



- Airway obstruction due to tonsillar hyperplasia, obstructive sleep apnea
- Reports suggest that SB is a result of SDB
- It has been postulated that SB is a compensatory mechanism to re-establish muscle tone of the upper airway.
- Sleep Bruxism is more of an arousal response rather than a mechanism to physiologically stabilize the airway in response to OSA events [Bender et al 2016]

PATHOPHYSIOLOGY



Sleep bruxism is related with rhythmic masticatory muscle activity, a specific type of masticatory muscle activity that is characterized by rhythmic, pseudo-masticatory jaw movements. occurring once or twice per hour of sleep, at a frequency of approximately 1 Hz

Bruxism is usually detected because of the effects of the process (most commonly tooth attrition and pain), rather than the process itself.

It has been estimated that during clenching or grinding, the individual might impose a load of over 20 g on a tooth over periods of 2.5 s per clenching. This is far in excess of normal functional stresses and causes.

↑Predominance of the sympathetic nervous system
↓predominance of parasympathetic nervous system

↓8-4 min

↑Activation EEG cerebral cortex
α waves

↓4 s

↑Cardiac and respiratory frequency
↑suprahyoid muscle tone

↓1-s

↑two deep breath

↓

Bruxing episode

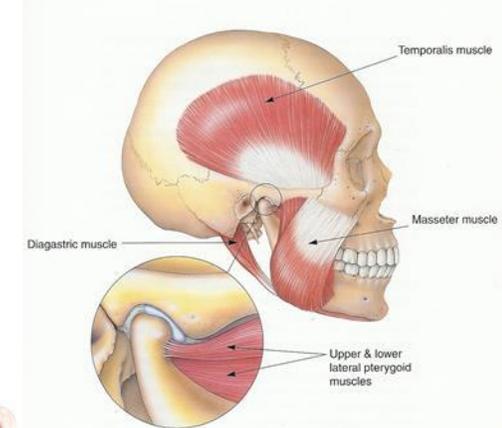


CLINICAL FEATURES



The signs and symptoms of bruxism depends on:

1. Frequency of bruxing
2. Intensity with which the patient is bruxing
3. The age of the patient which may be associated with duration of the habit.

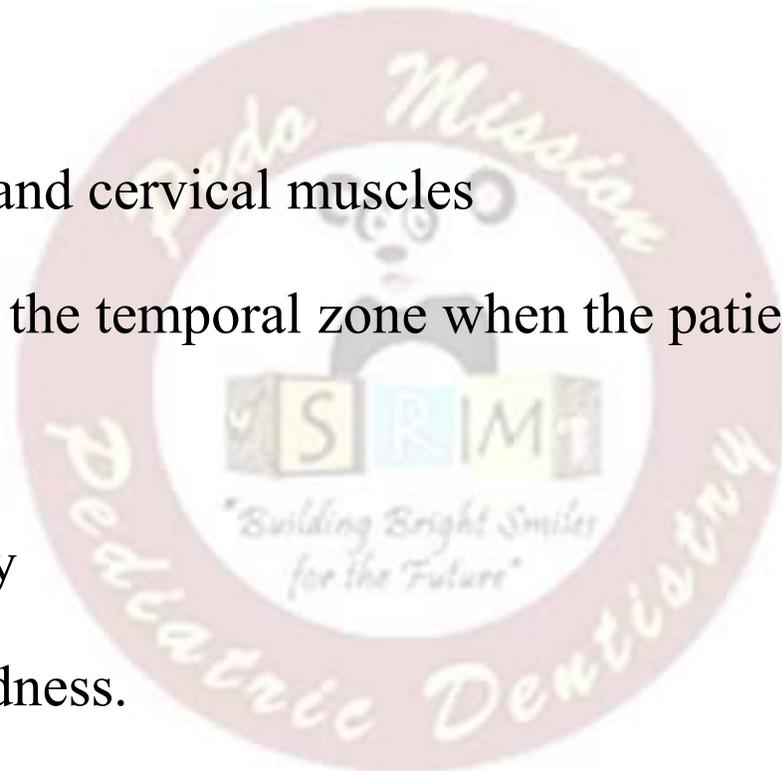




SYMPTOMS



- Grinding of teeth, accompanied by a characteristic sound that may even awaken the Bruxer's bed partner
- Pain in the TMJ
- Pain in the masticatory and cervical muscles
- Headache (especially in the temporal zone when the patient wakes up in the morning)
- Hypersensitive teeth
- Excessive tooth mobility
- Poor sleep quality: Tiredness.





SIGNS



- Abnormal tooth wear
- Tongue indentations
- Linea alba along the biting plane
- Gum recession
- Presence of torus maxillaris and/or mandibularis

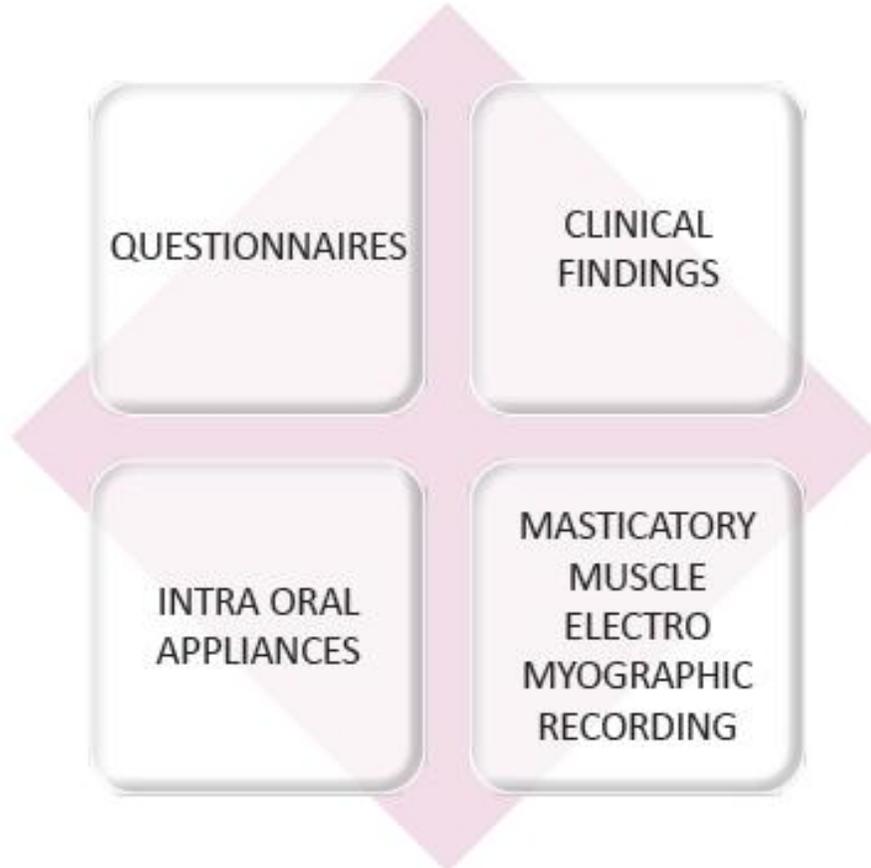
- Increase in muscle activity (this is recorded by the polysomnograph)
- Hypertrophy of masseter muscles
- Reduction of salivary flow
- Breakage of fillings and/or teeth
- Limitation of mouth-opening ability



DIAGNOSIS



- Patient's history- sounds produced by clenching, history of morning facial pain, sensitivity to hot or cold, presence of jaw sounds





QUESTIONNAIRES



- Pintado et al 1997

1. Has anyone heard you grinding your teeth at night?
2. Do you feel your jaw fatigue or sore while waking up?
3. Do you feel your teeth or gums sore on awakening?
4. Do you suffer from temporal headache while awakening?
5. Are you aware of your grinding the teeth during the day?
6. Are you aware of your clenching the teeth during the day?





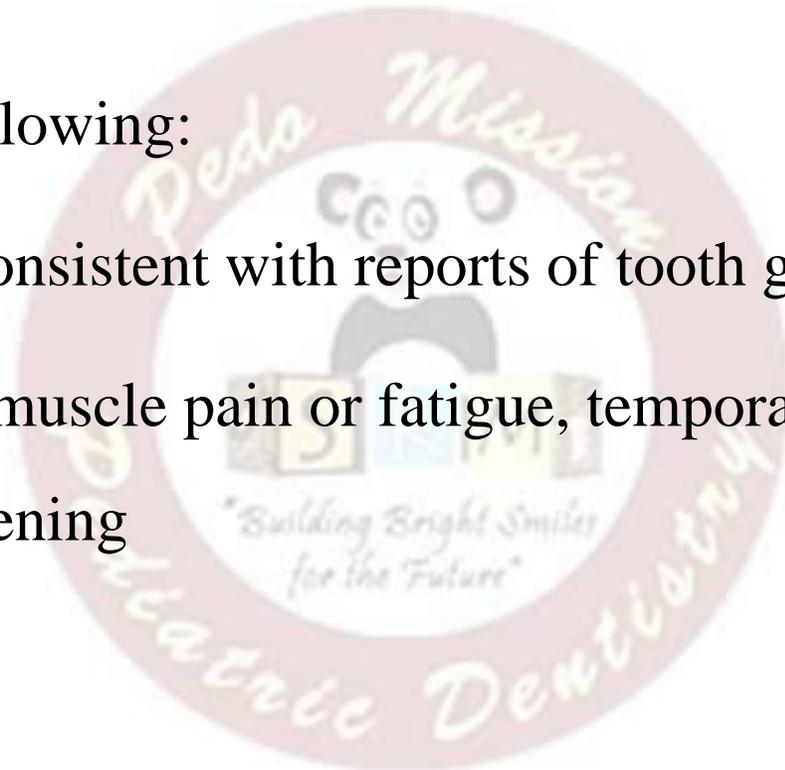
CLINICAL EVALUATION



- Presence of regular or frequent tooth grinding sounds occurring during bruxism

Presence of one of the following:

- Abnormal tooth wear consistent with reports of tooth grinding
- Transient morning jaw muscle pain or fatigue, temporal headache, jaw locking upon awakening





INTRAORAL APPLIANCE



- **BRUXCORE PLATE:**

Intra oral appliance to measure SB objectively. Activity evaluated by counting the number of abraded microdots on its surface and scoring the volumetric magnitude of abrasion



- **INTRA-SPLINT FORCE DETECTOR:**

By forceful tooth to splint contact and measurement of the force. Thin deformation sensitive piezoelectric film embedded 1-2 mm below occlusal surface.



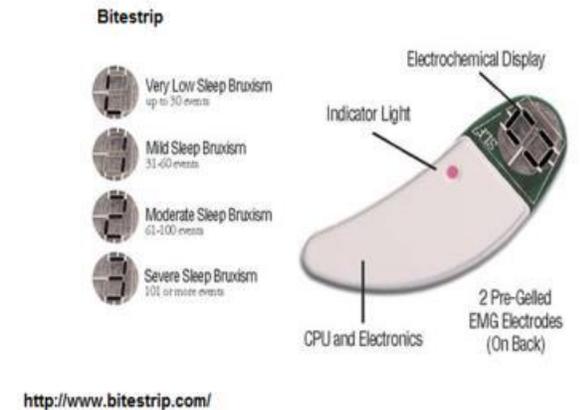
Shochat et al .Validation of the BiteStrip screener for sleep bruxism research gate.2007;104(3).

Baba K, Clark GT, Watanabe T, Ohyama T. Bruxism force detection by a piezoelectric film-based recording device in sleeping humans. J Orofac Pain 2003; 17:58–64



- **BITE STRIP:**

Is a small 7 × 2-cm, lightweight (4 g) device applied to the cheek, over the masseter muscle. The Bite strip consists of 2 electromyographic electrodes, a miniature electromyographic amplifier, realtime analysis hardware and software, a miniature display unit, and a lithium battery. The electrodes pick up electromyographic signals from the masseter muscle, which are amplified, digitized, and analyzed in real time by the onboard microprocessor.



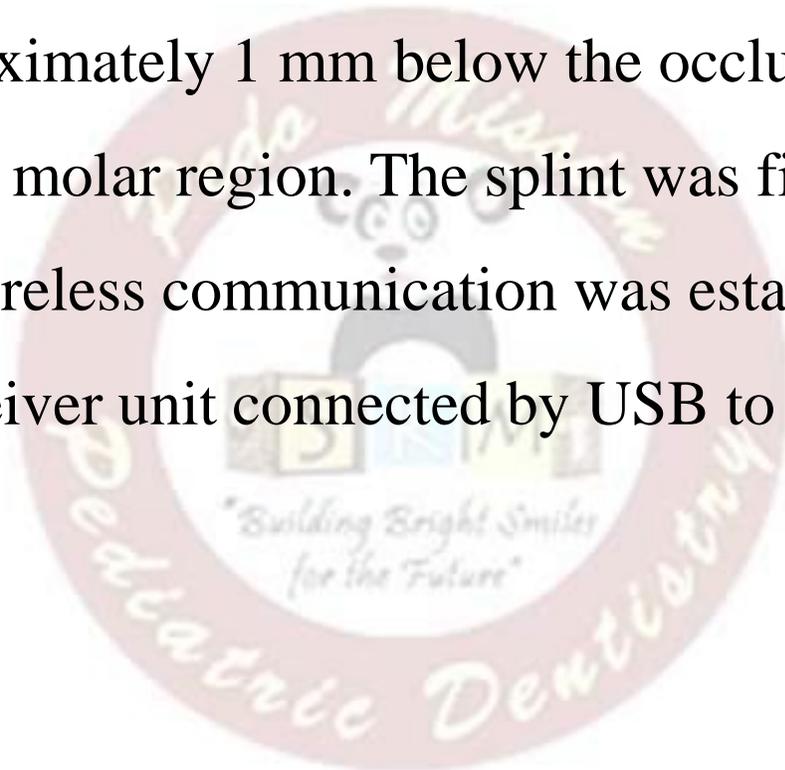
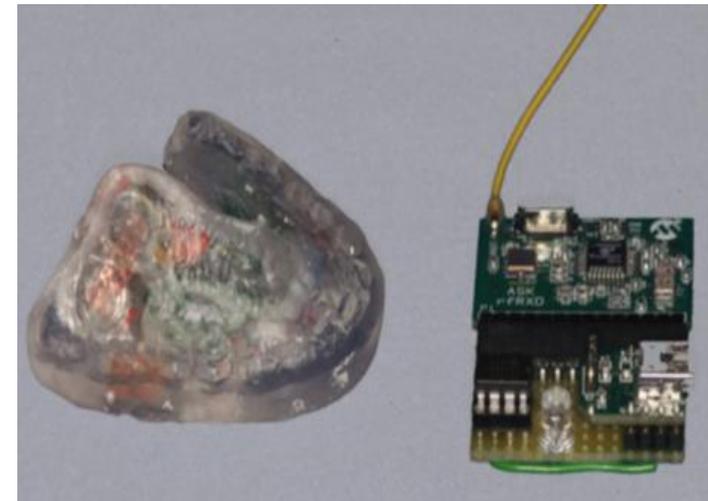
Shochat et al .Validation of the BiteStrip screener for sleep bruxism research gate.2007;104(3).

Baba K, Clark GT, Watanabe T, Ohyama T. Bruxism force detection by a piezoelectric film-based recording device in sleeping humans. J Orofac Pain 2003; 17:58–64



- **SENSOR DETECTION IN OCCLUSAL SPLINT:**

The force sensor was placed within a clear acrylic splint, with the sensor material buried approximately 1 mm below the occlusal surface in the pre-molar/first molar region. The splint was fitted in the mouth of one subject. Wireless communication was established between the splint and a receiver unit connected by USB to a laptop computer





POLYSOMNOGRAPHY



- Gold standard for diagnosis of bruxism
- Permits precise analysis of brain and motor activities
- Offer highly controlled recording environment hence other sleep disorders (e.g. sleep apnoea and insomnia) can be ruled out and sleep bruxism can be distinguished from other orofacial activities (e.g. myclonus, swallowing and coughing)

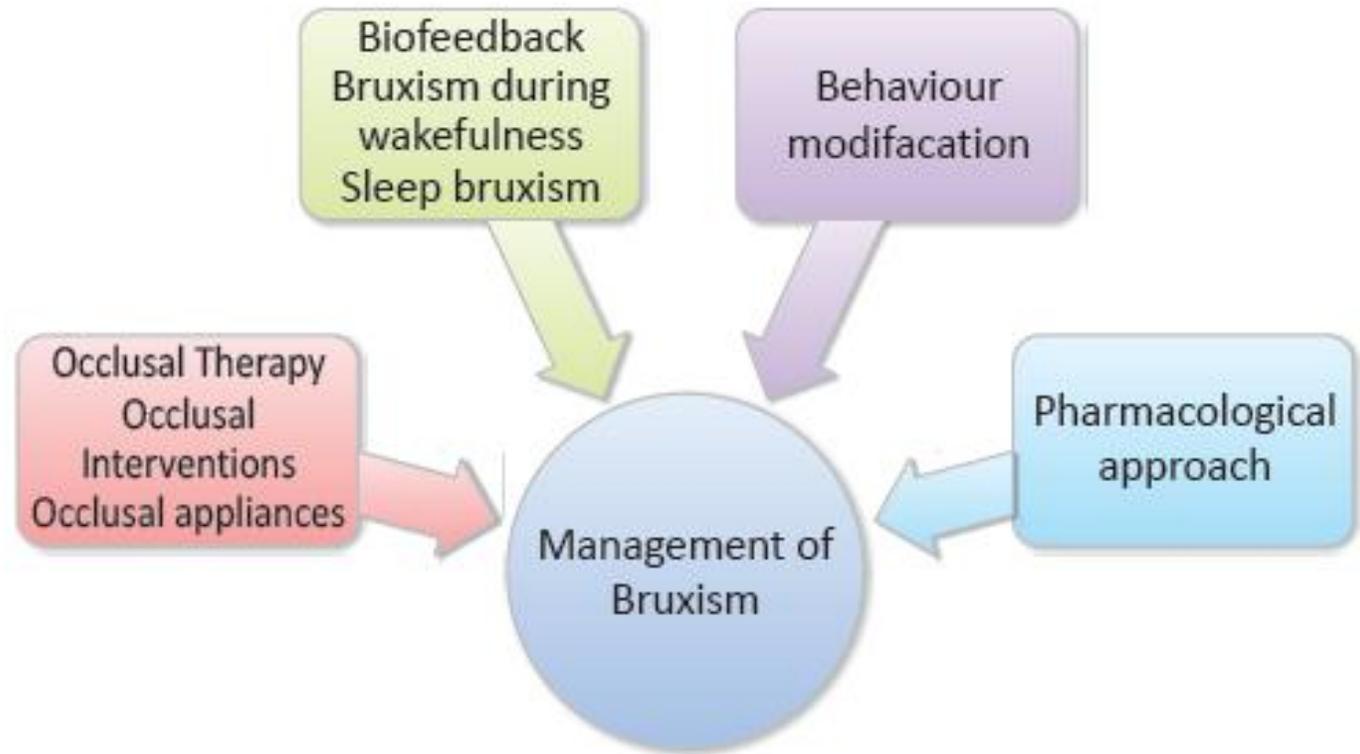




TREATMENT



- Bruxism in children may be a self-limiting condition that may not progress to adult bruxism. Since it is a multi-factorial problem, proper understanding the cause may determine the need and type of the treatment.





GENERAL MEASURE



- Avoidance of factors that trigger bruxism
e.g. Medications: Antidepressants, Calcium channel blockers





BEHAVIORAL TREATMENT



Behavioral treatment includes sleep hygiene measures, biofeedback, relaxation techniques, stress control techniques, and hypnotherapy.

SLEEP HYGIENE MEASURES

Instructions to **correct personal habits** and environmental factors that interfere with sleep quality.





BIOFEEDBACK

- Relaxation technique with concomitant physiological monitoring.
- Invented by Lee Weinstein, 1988
- FDA approved.
- Detects the EMG signal —> sends an audio signal —> disrupts sleep



- **Step 1** – Press the button to turn SleepGuard on
- **Step 2** – Put on the fully-adjustable headband
- **Step 3** – Go to Sleep!



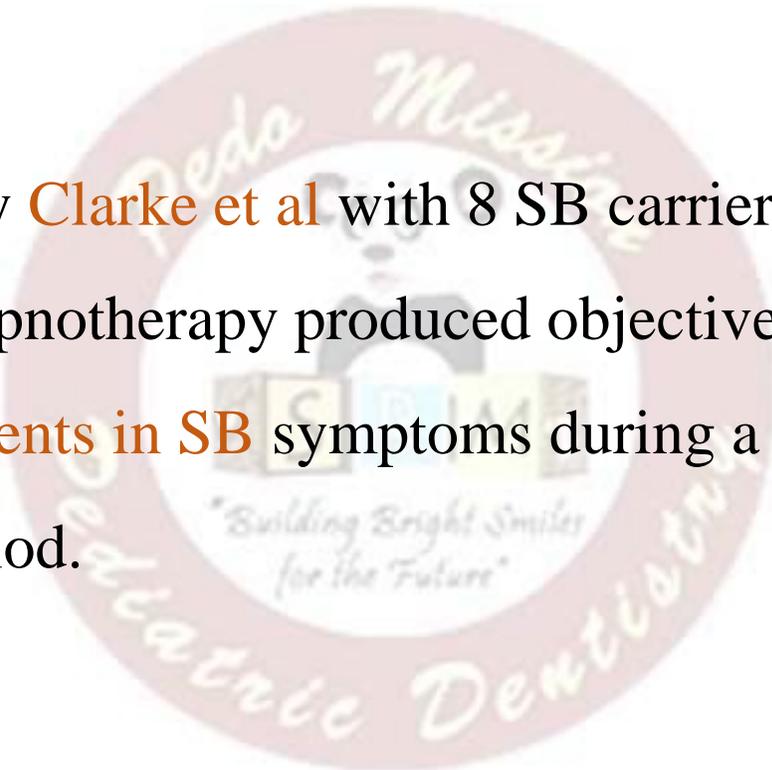
RELAXATION TECHNIQUES

- Jaw relaxation exercises
- Relaxation techniques include specific methods for relaxing mandibular muscles, such as **relaxing the jaw with the lips closed and separated** several times a day and **voluntary clenching and subsequent unclenching of the teeth for five seconds each**; this exercise should be repeated for a total of **five times** per series with **six series per day over a two-week period**.



HYPNOTHERAPY

- Hypnotherapy or self-hypnosis is a **specific relaxation technique**.
- A study conducted by **Clarke et al** with 8 SB carriers demonstrated that hypnotherapy produced objective and subjective **improvements in SB** symptoms during a 36-month follow-up period.





PHARMACOLOGICAL TREATMENT



Pharmacological agents	Efficacy
Muscle relaxants, sedatives, anxiolytics:	
Diazepan	Reduction
Clonazepan	Reduction
Metocarbamol, baclofen	?
Zolpiden	?
Dopaminergic agents:	
L-dopa	Reduction
Bromocriptine	Without studies
Pramipexole / Ropirinole	Without studies
Pergolide	?
Beta-adrenergic agonists:	
Clonidine	Reduction
Antidepressants:	
Amitriptylyne	Exacerbation
SSRI	Exacerbation
Venlafaxine	Exacerbation
Mirtazapine	Without studies
Trazodone	Without studies
Agomelatine	Without studies
Others	
Buspirone	Reduction
Botulinum toxin A	Reduction



- **Amitriptyline:** 25 mg per dose for 7 days [Mohamed et al 1997]
- **Propranolol:** 120 mg per dose [Huynh et al 2006]
- **Gabapentin:** 100 mg for first 3 nights, 200 mg for next 3 nights, 300 mg for 2 months. [Madani et al 2012]
- **Clonazepam:** 1 mg dose 30 min before bedtime [Saletu et al 2005] 0.15 mg for three days [Sakai et al 2016]

Saletu A, Parapatics S, Saletu B, Anderer P, Prause W, Putz H, et al. On the pharmacotherapy of sleep bruxism: placebo- controlled polysomnographic and psychometric studies with clonazepam. *Neuropsychobiology* 2005; 51:214-25.

Huynh N, Lavigne GJ, Lanfranchi PA, Montplaisir JY, de Champlain J. The effect of 2 sympatholytic medications propranolol and clonidine on sleep bruxism: experimental randomized controlled studies. *Sleep* 2006; 29:307-16.



BOTULINUM TOXIN



- Effective treatment for **neurological disorders**
- MOA: Blockage of acetylcholine release into neuromuscular junctions → local chemodenervation → focal muscle weakness
- Promotes **reduction in pain and hypertrophy of masseter and temporal muscles.**
- Clinical effect can be observed within **2-4 days** after injection, lasting for **4 months**





DENTAL TREATMENT



Occlusal adjustment

- Coronoplasty
- High point correction

Occlusal splints (Night guard)

- Reduction of increased muscle tone
- Mechanically protects the teeth
- Constrains bruxing pattern to avoid damage to TMJ, stabilises occlusion by minimal changes in position of the teeth, prevents tooth damage





SLEEP RIGHT DENTAL GUARD



- Invented by **Thomas W Brown, 2015**
- Splintek co. (USA)
- No boil custom dental guards with self adjusting technology





ANTI CLENCHING SUPPRESSION SYSTEM



- Developed by **Nissani, 2000**
- Approved by FDA
- Small prefabricated anterior bite stop- to increase the vertical dimension, protects the tooth from excessive load, decreases activity of elevator muscle while clenching.
- Indicated for migraine, tensional type headache, TMD





RESTORATIVE TREATMENT



In Severe abrasion cases:

- Pulp therapy
- Stainless steel crown





THANK YOU

