Current Concept of Bruxism and its Treatment Options

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Abstract

In our day to day clinical practice we come across a lot of patients suffering from occlusal parafunctional habits or bruxism. Bruxism can be described as nonfunctional abnormal, involuntary contact of teeth, if ignored it leads to occlusal trauma. So for correct diagnosis and treatment a multidisciplinary approach was required in which dentists, psychiatrists, neurologists and physiotherapists play an important role. Causes for bruxism were multifactorial and the treatment modalities were also various. Bruxism can be a major concern for the dentist as they were required to not only diagnose but also intervene in most of the cases of bruxism. And if untreated it leads to destruction of dentition, muscle fatigue & temporomandibular pain. This article discusses the history of the current concepts in the diagnosis and treatment of bruxism.

Keywords: *Bruxism, Sleep hygiene, Splint, Pharmacological, Contingent electric stimulation cure (CES).*

Introduction

Parafunctional habit bruxism has always been amajor concern for dentistsas it causes tooth attrition, fractured restoration, muscle soreness & TMJ pain. In common population bruxism ranges from 8-31% and 14-20% in children[1]. Bruxism was very rarely found in patients above 60 years of age[1]. Usually bruxism does not cause any serious complications in most of the patients, and they seek treatment only if heexperiences unbearable pain. Hence a proper diagnosis and multidisciplinary approach were required for the management of bruxism.

Marie and Pletkiewicz[2] coined the term "bruxomania" from the French word "la bruxomanie,". The term bruxism was coined Frohman[3]. Vanderas defined bruxism as the movement of the mandible which was non-functional and waswith or without an audible sound occurring during the day or night[4]. According to GPT 9, bruxism was defined as "the parafunctional grinding of the teeth; 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".

Bruxism can be classified into diurnal bruxism or awake bruxism and nocturnal or sleep bruxism. Bruxism during day time was known as awake bruxism and in night time was known as sleep bruxism. Awake bruxism was always related to stress, work pressure, & anxiety. Diurnal bruxism was more common in females than males. Whereas, sleep bruxism was considered as a sleep-related movement disorder. Sleep bruxersusually have sleep disorders like snoring and sleep apnoea. No gender difference was found in nocturnal bruxor. But it more prevalent in small children than in adults.

Figure 1: Causes of bruxism

Cause of bruxism:

- Central factors: As describe byMacaluso et al[5] bruxism was closely associated with an arousal response. And arousal response was defined asa sudden change in the depth of the sleep and it was associated with body kinetics, escalated heart rate, respiratory changes and increased muscle activity. In bruxism patients the five subcortical nuclei of basal ganglion were not in co-ordination[6].
- Psychosocial factors: A highly stressful life was a significant risk factor for bruxism. And intoday's prevalent social environment the inability of a person to reveal emotions such as apprehension, despise, & aggression leads to bruxism. And diurnal bruxism was associated with psychological tension due to responsibility & work pressure.

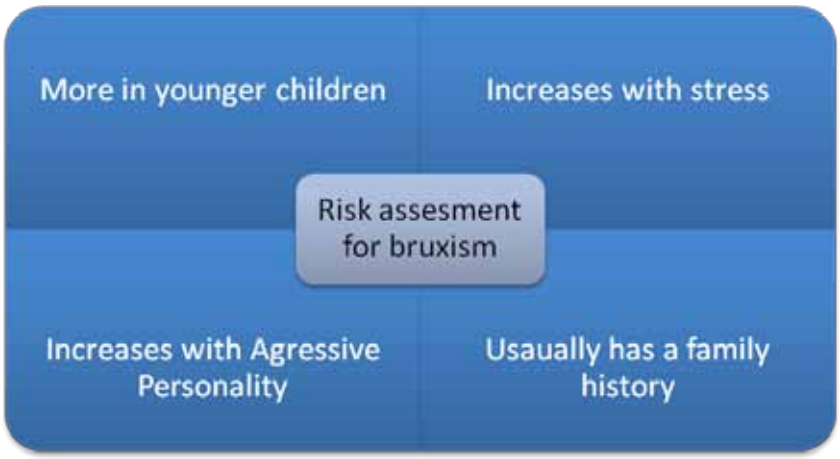

Figure 2: Risk factors for Bruxism

For a patient with bruxism clinical assessment and detection was the most important step in treatment. Because if it were left unattended it leads to depreciation of quality of life. As on long term basis bruxism leads to occlusal disharmony, TMJ disorder and damaged tooth[7]. The assessment method for bruxism were questionnaire form, scientific clinical evaluation, and electromyographic recording. In questionnaires assessments done were subjective and questions asked were related to signs and symptoms of soreness in gums or headache after waking up. It should be asked to parents, siblings or wife if they have heard patient grinding teeth. As for the dental clinic of North American the clinical evaluation[8,9] of bruxism can be done by taking a detaileddental history of the patient and evaluating the periodontal status, occlusal wear facets on teeth and abnormalities of TMJ[10].

Korioth et al. reported asymmetric occlusal wear out of stabilizing splint when used in sleep bruxism patients[11]. Forgione gave the Bruxcore Bruxism Monitoring Device (BBMD) to measure the nocturnal bruxism activity[12]. Takeuchi inventedan intra-splint force detector (ISFD) and it intraorally records the force being produced by tooth contact on the appliance during bruxism[13]. But the most tried and tested method of recording bruxism without any intraoral instruments were masticatory muscle electromyographic[14]. In a recent development a miniature self-contained EMG detector-analyser (grindcare, medotech Denmark) was developed to record biofeedback in sleep bruxorsby just attaching it to masticatory muscle. The EMG detector analyzer works by recording of EMG activity of the masticatory muscle, and then processing the EMG signals to detect tooth gnashing and clutching and give biofeedback stimulation for reducing sleep bruxism activities[15]. Sleep laboratory was another new advancement to detect sleep bruxism, in a controlled environment where brain waves heartbeats and breathing rate while sleeping were recorded. Simultaneous audio-video recordings were used to record any eye movements, limb movements and any deviation in the sleep pattern of the patient. Sleep disorders like sleep apnoea and insomnia were ruled out and sleep bruxism was diagnosed by this procedure. The major limitation of the sleep laboratory wasthat due to change in the environment of the patient the normal sleep pattern cannot be observed in some patients[16,17].

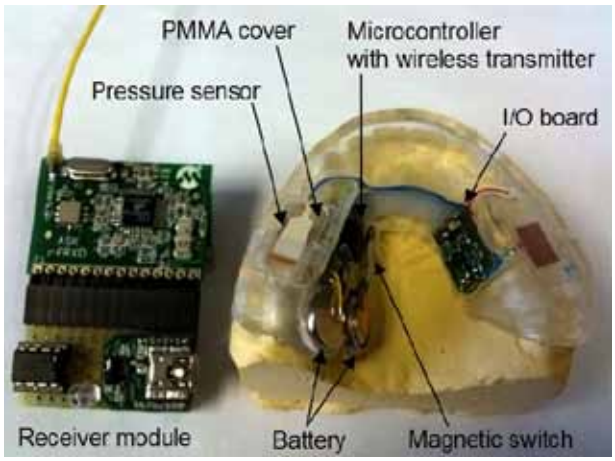

Figure 3. Contingent electrical stimulationapparataus

Table 1. Signs & Symptoms of bruxism

1	Iatrogenic sensitivity to heat and cold of the tooth
2	Muscle pain due to intense contraction in the morning.
3	The sound heard by parents and relative when the teeth were ground together
4	An uneven tooth wear with exposure of dentine
5	Micro-fractures on the tooth enamel
6	Fractured or broken teeth
7	Periodontally compromised teeth
8	Pain in the temporomandibular joint and restricted mouth opening
9	Earache

Effects of Bruxism on Fixed prosthesis: The effect of bruxism on prosthodontic restoration like single, multiple and full mouth rehabilitation was mechanical failure. The fracture of ceramic material and dislodgement of the crown was the most common failure in bruxors. Metal or metal-ceramic restorations seem to be the safest choice of prosthesis in cases of high load conditions[18]. But due to the risk of fracture of ceramic veneers in metal-ceramic restorations, many clinicians prefer metal crowns for heavy bruxors. The material of the present period zirconia, which has excellent strength,aesthetics,and claims mechanical property almost similar to metal crowns(International Journal of Applied Dental Sciences Zirconia) has been used in bruxers[19,20]. But on clinical use it has been found to have complications of fracture of veneered part[21]. So in bruxism patient's monolith zirconia crown should only be used.

Effect of bruxism on implant restorations: Bruxor who have implant prostheses were at a risk of loss of osseointegration. But systematic reviews have concluded that there was no relationship between occlusal forces and loss of osseointegration[22,23]. Studies by Elfelt A, De Boever AL have indicated that there was a higher rate of complication on superstructures of removable and fixed implant-supported prosthesis in bruxism patients[24.25].

Effect of bruxism on dentures: Inpatient wearing complete or removable partial denture the most common clinical problem was the soreness of denture bearing area. But there was no systemic review on the effect of bruxism in the partially edentulous patient and its effect on residual dentition and denture bearing tissue.

Current Treatments of Bruxism: To treat bruxism, we not only have to treat the effect of it but also eradicate the cause.

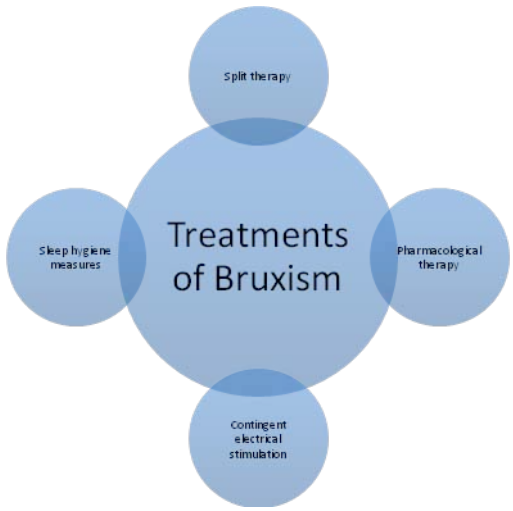

Figure 4: Treaments of Bruxism

1. **Sleep hygiene measure:** The term sleep hygiene means counseling the patient to ensure less physical and cognitive activity before retiring to bed. And to doze off within minutes of going to bed, the patient has to ensure a quiet and dark environment in the bedroom. In one randomized clinical trial it was found that there was no clinically significant difference between patients using sleep hygiene and control group[26]. But reducing the consumption of coffee, alcohol and tobacco had a positive effect on patients with sleep bruxism[27].
2. **Occlusal therapy:** The first line of treatment of bruxism was occlusal splints. These reduce the pain and prevent tooth wear inpatient with sleep bruxism. They were classified into hard splints and soft splints.

Okeson[28] had preferred hard splints over soft splints because soft splints were difficult to adjust than hard splints. It was found hard splints to be more effective in reducing the bruxism activity. But in a study by Madani et alfounda similar reduction in muscle activity associated with sleep bruxism after 2 months of therapy[29] in patients using occlusal splints and in patients taking medication gabapentin.

3. **Pharmacological therapy:** In a randomized clinical trial done by Mohamed et al. for evaluating amitriptyline in patients with sleep bruxism and temporomandibular disorder, found no changes in pain and masseteric muscle fatigue[30]. But in contrast to a study by Lobbezzo et al, it was found that levodopa used in bruxorsreduced pain and bruxism in 70% casein comparison to placebo[31]. In some patients with psychosomatic disorder, when clonazepam was given, it reported to reduce sleep bruxism along with increase REM sleep[32]. But to recommend clonazepam with clonidine (a α_2 adrenergic agonist used in hypertensive patient[33]) in routine clinical practice more randomized control trial on a bigger population has to be done.In recent studies Shim et al[34] used muscle relaxant botulinum toxin type A injection to treat masticatory muscle in sleep bruxism patients and found to reduce the amplitude of contraction in patients but there was no difference in number of contraction. Pathophysiology of botulinum toxin was inhibition of acetylcholine at the neuromuscular junction. So a more randomized control trial of botulinum toxin and placebo has to be done to recommend it in clinical practice.

4. **Contingent electrical stimulation:** In an attempt to treat bruxism contingent electrical stimulation(CES) has been tried by a lot of scientists. In this low-level electric stimulation was applied on the muscles when they became active i.e. during bruxism episode. Two studies were done on patients with myofascial pain and nocturnal bruxism, and it was found that EMG episode was reduced but no reduction in muscle pain[35,36]. So CES was found to reduce the sleep bruxism while in use but was not able to reduce it after discontinuation. So long term studies have to be done on CES and CES versus TENS and its effectiveness if done in combination.

Conclusion

The most common parafunctional habit was bruxism, which can occur during wakefulness and sleep. Usually the patient comes for treatment when there were in pain and discomfort. The side effect of bruxism was progressive dental wear, so to improve the quality of life, full comprehensive treatment has to be done. The etiology was multifactorial and there was no specific treatment option to reduce the effects of bruxism. Treatment has to be multidisciplinary with counseling and behavioral strategies, splint therapy, medication and contingent electrical stimulation. But all the treatments have shown mixed results in various patients. So clinical judgment was most important to treat symptoms and prevent tooth wear, reduce tooth grinding and improve muscle discomfort. So long term studies including a wide variety of bruxism patients and comparing the effect of different treatments on all of them has to do.To helpa clinician known when to treat the patient and when to leave it alone to resolve by itself.

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