



**BRUXISM AND PROSTHODONTIC REHABILITATION- A NOVEL REVIEW ON
VARIOUS CLINICAL CHALLENGING ASPECTS**

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Received 25th Aug. 2020; Revised 21st Sept. 2020; Accepted 13th Oct. 2020; Available online 1st July 2021

<https://doi.org/10.31032/IJBPAS/2021/10.7.5553>

ABSTRACT

Background: Bruxism is a Para-functional habit associated with oral manifestations like Clenching or grinding of teeth, hypersensitivity, attrition, occlusal wear, fractures, gingival recessions, fissures and cracks of fixed prosthesis and removable dentures especially made of dental ceramics. Special care has to be taken in bruxism patients to reduce the unnecessary effects of heavy occlusal loading caused by mechanical components of the prosthesis.

Aim: The present literature review was carried to apprehend and explore the various clinical challenging aspects associated with prosthetic rehabilitation in bruxism patients.

Materials and methods: A structured literature search for articles in the English language in PubMed, MEDLINE, Embase, Google Scholar and Web of Science databases from 1980 to till date was retrieved by using MeSH terms “Bruxism”, “Removable prosthesis”, “Management of Bruxism”, “Prosthetic Complications” “Occlusal Therapy” and “Bruxism and Prosthodontic treatment” .

Discussion: Oral manifestations are often associated with rhythmic activity of masticatory muscles resulting in abnormal mandibular movements. For an effective treatment of bruxism,

establishment of occlusal harmony along with management of environmental factors is critical. Fractures of removable dentures are rare compared to the fixed prosthesis however bruxism along with other factors like smoking, poor oral hygiene might influence on bone loss in implant supported fixed prosthesis.

Conclusion: Though no specific treatment is available at present for management of bruxism, the current modalities focus on the prevention of tooth wear, reduce Temporomandibular joint discomfort; and improve muscle activity. Hence appropriate strategies and special care treatment modalities have to be followed to ensure successful treatment.

Keywords: Bruxism, Non-Functional Grinding, Occlusal load, Occlusal Therapy, Prosthetic management, Tooth Wear

INTRODUCTION:

Bruxism is a Para-functional habit of stomatognathic system characterized by clenching and grinding of teeth during sleep (Sleep bruxism) and daytime (Awake Bruxism). Though not many serious pathological complications or effects have been reported, nevertheless it is an important abnormal activity that interrupts or breaks the successful restoration of the dental tissues [1]. Various literature studies have shown 20-25% of female population predominantly presented with daytime bruxism and 8-16% irrespective of gender had shown significant sleep bruxism with an average overall prevalence rate of 8-31%. Similarly the overall prevalence of bruxism in children varies between 14 to 20% [2]. The exact etiology of bruxism is not well known, but it is agreed that various reasons such as Patho-physiological factors like arousal response, psycho social influence caused by depression, anxiety, stress and peripheral factors like abnormal

centric relation and occlusal disharmony along with genetic aspects in combination might contribute to the multifactorial origin [3].

According to GPT 9, bruxism is 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. Various dental manifestations includes Clenching or grinding of the teeth while asleep, hypersensitivity of teeth to hot, cold, sweet, attrition, occlusal wear, fractures of teeth, gingival recessions, loss of teeth, fissures and cracks of fixed prosthesis and removable dentures especially made of dental ceramics, cheek and tongue biting [4]. These manifestations are often associated with rhythmic activity of masticatory muscles resulting in abnormal

mandibular movements. For an effective treatment of bruxism, establishment of occlusal harmony along with management of environmental factors is critical. In the field of prosthetic rehabilitation bruxism often imparts such critical establishment by causing loss of retention, fracture of material, chipping of ceramic veneers in metal-ceramic restorations, creating high occlusal load on implant supported prosthesis, soreness of the denture-bearing mucosa, fracture of removal prosthesis and several other complications [5, 6]. Thus proper diagnosis and management of bruxism in association with prosthetic special care treatment is critical for the successful outcome to improve the quality of life. Hence the present literature review was carried out to apprehend and explore the various clinical challenging aspects associated with prosthetic rehabilitation in bruxism patients.

MATERIALS AND METHODS:

A structured literature search for articles written in the English language in PubMed, MEDLINE, Embase, Google Scholar and Web of Science databases from 1980 to till date was retrieved by using MeSH terms “Bruxism”, “Removable prosthesis”, “Management of Bruxism”, “Temporo mandibular disorders” ”Prosthetic Complications” “Occlusal Therapy” and “Bruxism and Prosthodontic treatment” .

LITERATURE REVIEW:

Glaros in 1981 designed a study to evaluate the prevalence of both present and past clenching and grinding behaviors occurring during the day or during sleep under a variety of emotional conditions like Nervousness, anger, frustrations, depressions along with assessment of familial incidence to establish the role of genetic factors. His study showed that diurnal bruxism occurs more common and often in male population than nocturnal bruxism as seen in female population. These diurnal bruxism patients are more alert to stress and reported with significant clinical manifestations. However no familial incidence was observed suggesting predominance of environmental factors than those of genetic origin [7].

Johansson *et al* in 2011 performed a critical review based on the available literature research to draw conclusions about the existence of a possible relationship between bruxism and prosthetic rehabilitation and its clinical significance. He stated that bruxism could be a vital risk factors often related to increased perfunctory and/or procedural complications in prosthodontic enhancement although not directly impact on the survival of the implant prosthesis. He concluded that specific care has to be taken in bruxism patients to reduce the unnecessary effects of heavy occlusal

loading possibly caused by mechanical components that contribute to prosthetic structural reliability and integrity [3].

Komiyama *et al* in 2012 discussed the importance of the occlusal arrangement, various patterns used in implant restorations for implant durability and specific clinical approach and materials used for implant prostheses in order to prevent complications caused by bruxism. He suggested that the failure of implant supported prostheses is often due to occlusal overload caused by bruxism pattern. With the introduction of immediate loading and early placement, the clinical management of bruxism will turn out to be an important aspect for implant prostheses. The author concluded by stating that lack of well-designed clinical trials concerning the significance of bruxism on implant prostheses stances a serious immediate concerning problem [8].

Prasad *et al* in 2014 discussed on various current concepts in diagnosis and management of bruxism. He explained the various diagnostic tools such as questionnaires, clinical examination by evaluating tooth grinding, tapping, presence of tooth wear, abnormal jaw movements, eccentric position, masseter muscle hypertrophy, and discomfort during mastication, Temporo-mandibular joint pain, and clicking sound with help of intraoral appliances such as

electromyography, Bruxcore plate and polysomnography. Various management modalities have been suggested including habit awareness psychological behavioral therapy, habit reversal therapy, and use of prosthetic rehabilitation appliances, occlusal therapy, relaxation technique and biofeedback. He concluded that though definitive evidences are mandatory for establishment of proper management however in most clinical cases in the absence of such evidence occlusal therapy accompanied by life style modification, behavioral management and pharmacological intervention could prove as a dynamic treatment modality [1].

Wleckiewicz *et al* in 2014 presented the influence of environmental factors, genetic factors and role of human civilization evolution on the prevalence of bruxism. The authors comprehensively explained the most relevant aspects of psychological and anthropological factors fluctuating over time as well as their interfaces and also described a significant relationship between chronic stress, anxiety, depression and bruxism. He concluded that lifestyle, workplace environment, dietary habits, and occlusal disharmony influence the patient's psycho emotional situation that directly influences the occluso-muscle disorder [4].

Schmitter *et al* in 2014 systematically reviewed the effect of

bruxism on zirconia restorations and also assessed the prevalence of nocturnal masseter muscular activity. The study showed nocturnal muscle activity was higher in 63.8% of individuals and concluded that lack of evidences in establishing a potential relationship between bruxism (nocturnal/diurnal) and veneer of zirconia restorations [6].

Manfredidni *et al* in 2017 evaluated the relationship between prosthetic rehabilitation and TMDs and bruxism. He concluded that Based on the best existing evidence, prosthetic modifications in dental occlusion are not yet satisfactory strategies for treating TMD symptoms or assisting an individual to prevent bruxism habit. Clinicians should take utmost care when performing irreversible occlusal changes in healthy individuals and in patients with TMD and/or bruxism [9].

Chrcanovic *et al* in 2017 analyzed the complications of dental implant treatment done in a group of bruxism patients. The study showed the statistically significant higher implant failure rate among the bruxism patients in compared to the normal implant patients. The author believed that these results may be related to the decreased proprioception of implants in comparison with the normal teeth surrounded by periodontal ligament tissues where there is an active feedback

mechanism to the jaw closing and opening movements. He concluded that bruxism may significantly increase both the implant failure rate and the degree of mechanical /procedural complications encountered due to implant-supported restorations [10].

Kanathila *et al* in 2018 briefly discussed on the various concepts in the diagnosis and treatment of bruxism. The author concluded that appropriate Counselling and behavioral strategies, splint therapy, medications, and contingent electrical stimulation can be used as different ways reducing the effects of bruxism. The management of bruxism should focus to prevent progression of dental wear, reduce teeth grinding sounds, and improve muscle discomfort and mandibular dysfunction in the most severe cases [11].

KEY ASPECTS:

There is no specific management strategy currently available to prevent bruxism. The current modalities focuses on the prevention of tooth wear, reduce Temporomandibular joint discomfort; improve muscle activity along with counseling and pharmacological therapy to reduce the complications [12]. The use of interocclusal appliances is the most common and accepted way to prevent wear of teeth [13]. It is evident that resin based materials show higher wear than gold or ceramic based prosthesis. Over the year's

zirconia as a promising material of choice have shown improved mechanical properties. When prosthetic intervention is indicated in such patient with bruxism, efforts should be made to reduce the effects of heavy occlusal loading by use of alternative materials without compromising the prosthetic structural integrity. The occlusal design of extensive rehabilitations in patients with bruxism should be as simple as possible to reduce occlusal load [14].

Basic treatment strategies such as a symmetrical distribution of inter-arch relations, occlusal stability, occlusal harmony, periodontal health re-establishment and patients comfort are generally enough to enhance function and oral health of an individual. Keeping this in mind, some prosthetic modifications like canine guidance, occlusal guidance and inter-arch recording techniques by using individually mounted articulators and face-bows may help the clinicians to manage severe occlusal instability [15]. Systematic reviews on implant supported prosthesis have concluded that there is no relevant association between occlusal forces and loss of osseointegration and also stated that maximal bite force, bruxism, length of cantilevers were of lesser importance in compared to smoking, poor oral hygiene and systemic diseases in establishing a significant bone loss [16]. In a similar way,

patients with high degree of bruxism may have deleterious effects on the residual alveolar bone, existing dentition and soreness of denture-bearing tissues in patients with RPDs, although this has not been systematically studied [17]. Hence appropriate strategies and special care treatment modalities have to be followed to ensure successful diagnosis and treatment to improve the quality of life.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: Nil

REFERENCES:

- [1] Prasad KD, Swaminathan AA, Prasad AD. A review of current concepts in bruxism-diagnosis and management. Nitte University Journal of Health Science. 2014 Dec 1; 4(4): 129.
- [2] Manfredini D, Winocur E, Guarda Nardini L, Lobbezoo F. Epidemiology Of Bruxism In Adults: A Systematic Review Of Literature. Journal of Orofacial Pain. 2013; 27(2): 99-110.
- [3] Johansson A, Omar R, Carlsson GE. Bruxism and prosthetic treatment: a critical review. Journal of prosthodontic research. 2011; 55(3): 127-36.
- [4] Wieckiewicz M, Paradowska-Stolarz A, Wieckiewicz W. Psychosocial aspects of bruxism: the most paramount factor

- influencing teeth grinding. *BioMed Research International*. 2014 Jan 1; 2014.
- [5] Ekfeldt A, Fransson B, Soöderlund B, Oilo G. Wear resistance of some prosthodontic materials *in vivo*. *Acta Odontol Scand*. 1993; 51: 99-107.
- [6] Schmitter M, Boemicke W, Stober T. Bruxism in prospective studies of veneered zirconia restorations-a systematic review. *International Journal of Prosthodontics*. 2014 Mar 1; 27(2).
- [7] Glaros AG. Incidence of diurnal and nocturnal bruxism. *The Journal of prosthetic dentistry*. 1981 May 1; 45(5): 545-9.
- [8] Komiyama O, Lobbezoo F, De Laat A, Iida T, Kitagawa T, Murakami H, Kato T, Kawara M. Clinical management of implant prostheses in patients with bruxism. *International journal of biomaterials*. 2012 Jan 1; 2012.
- [9] Manfredini D, Poggio CE. Prosthodontic planning in patients with temporomandibular disorders and/or bruxism: A systematic review. *The Journal of prosthetic dentistry*. 2017 May 1; 117(5): 606-13.
- [10] Chrcanovic BR, Kisch J, Albrektsson T, Wennerberg A. Bruxism and dental implant treatment complications: a retrospective comparative study of 98 bruxer patients and a matched group. *Clinical oral implants research*. 2017 Jul; 28(7): e1-9.
- [11] Kanathila H, Pangi A, Poojary B, Doddamani M. Diagnosis and treatment of bruxism: Concepts from past to present. *Int. J. Appl. Dent. Sci*. 2018; 4(1): 290-5.
- [12] Shilpa Shetty, VarunPitti, SatishBabu CL, Surendra Kumar GP, Deepthi BC. Bruxism: A Literature Review. *J Indian Prosthodont Soc*. 2010; 10(3): 141-148.
- [13] Carlsson GE. Critical review of some dogmas in prosthodontics. *J Prosthodont Res* 2009; 53: 3–10.
- [14] Klineberg I, Kingston D, Murray G. The bases for using a particular occlusal design in tooth and implant-borne reconstructions and complete dentures. *Clin Oral Impl Res* 2007; 18: 151-67.
- [15] Utz KH, Müller F, Lückerrath W, Fuss E, Koeck B. Accuracy of checkbite registration and centric condylar position. *J Oral Rehabil* 2002; 29: 458-66.
- [16] Lindquist LW, Carlsson GE, Jemt T. A prospective 15-year follow-up study of mandibular fixed

prostheses supported by osseointegrated implants. Clinical results and marginal bone loss. *Clin Oral Implants Res.* 1996; 7: 329-36.

- [17] Baba K, Aridome K, Pallegama RW. Management of bruxism-induced complications in removable partial denture wearers using specially designed dentures: A clinical report. *Cranio.* 2008; 26: 71-6.