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RESEARCH ARTICLE

A SYSTEMATIC REVIEW ON VARIOUS TREATMENT OPTIONS FOR BRUXISM

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ABSTRACT

Aim: To write a systematic review on the various treatment options in the management of bruxism.
Material and method: A literature search was performed, to search on the related article on bruxism. Since the literature of bruxism is broad topic, this paper is focusing on treatment that available to treat bruxism patients. The article was searched via National Center for Biotechnology Information (NCBI) in order to get accessed for Pub Med articles, by using the following query: 'treatment option for bruxism' or 'management of bruxism' or 'therapy of bruxism' or 'way to control bruxism'. All of the articles abstracts in english was reviewed and screened.
Results: Based on the electronic search, there were about 16 publication in total, which suitable for analysis. Two articles involve combination of both occlusal splint and massage therapies, four study involve the usage of occlusal splint alone for treatment, one article involve in comparison of effectiveness of treatment in between the occlusal splint and cognitive behavior, occlusal splint with drugs as well as occlusal splint with biofeedback. There was also one article which used contingent electrical stimulant for the treatment and the rest through pharmalogical approaches.
Conclusion: Bruxism is a common parafunctional habit which can happen either during sleep or awake. There is no exception for age, gender or even race. There are various treatment available to treat bruxism, but it not specifically to stop bruxism. Rather than stop the habit, this treatment help to reduce the adverse effect and control the habit

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INTRODUCTION

Bruxism is a common movement disorder which involve clenching and grinding of teeth. It mainly occur among the majority of population. The term bruxism is derived from a Greek word 'brychein' which means to grind (Krishna Prasad, 2014). In other word it also known as clenching or grinding of teeth, which is unusual habit done by the bruxist. Based on the Glossary of Prosthodontic Terms (GPT-8) (AASM, 2005), bruxism is define as the parafunctional grinding of teeth or an oral habit consisting of involuntary rhythmic or spasmodic non-functional gnashing, grinding or clenching of teeth in other than chewing movements of mandible which may lead to occlusal trauma (Shilpa Shetty, 2010). In addition, bruxism is also a parafunctional activity, which is different from normal functional activity like chewing and speaking. It would cause a negative impact on the patient's masticatory muscles as well as the temperomandibular joint due to changes on the patient's occlusion (Reddy *et al*., 2014). This may happen neither during awake nor sleep. If it take place during sleep, it is called as sleep bruxism (SB) which is usually noticeable.

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Basically, sleep bruxism occur during sleep, which result from the clenching or repetition action of the masticatory muscles that lead to grinding of teeth (de la Hoz-Aizpurua, 2011) and followed by the production of sound that make it become more visible to others. Whereas, awake bruxism (AB) is also occur due to clenching and grinding of teeth. However, it occurs during day time, and it is loud enough to be heard by their partner (6). Both sleep and awake bruxism can become a threat to the bruxist and the causes may varies. When comparing both type of bruxism, awake bruxism (AB) has lower percentage of occurrence in society with percentage of 20% of AB and 8-16% of SB in adult (Krishna Prasad, 2014). Whereas in children, it is about 14% to 20% of occurrence (Krishna Prasad, 2014).On top of that, the prevalence of bruxism can be seen occur predominantly among woman compare to male, however this may varies (Krishna Prasad, 2014; The Influence of Gender and Bruxism on the Human Maximum Bite Force, 2006). On top of that, bruxists individuals tend to perform non-centric positions which result to a stronger bite force on the incisors compare to molar (Krishna Prasad, 2014; The Influence of Gender and Bruxism on the Human Maximum Bite Force, 2006). This will then lead to tooth wear and periodontal disease. Thus, dentists play a major role to help bruxists to control their parafunctional habit by providing a

Table 1. Eligibility Criteria

Inclusion Criteria	Exclusion Criteria
Involve adults more than 18 or older	Involve children less than 18
Any duration	Duration of active therapy not clear (or clarified by author)
Clinical diagnosis (EMG/PSG) of SB and clinical diagnosis of AB	Co-existing diagnosis of AB and SB
Patient volunteered to join the therapy	Not being forced
English language (article)	Other language (article)
Published or unpublished	-
Biofeedback for controlling or reducing bruxism	-
Randomized or quasirandomized clinical trials or randomized cross over study or case report	-
Outcome reported at the completion of active therapy	-

Citation	Study type	Group	Intervention	Duration	Results
Gomes CAF de P et al. [16]	Randomized Controlled Trial	19 17 23	Occlusal splint Massage Massage and occlusal splint	4 weeks 4 weeks (3 weekly sessions) 4 weeks	Occlusal splint help to improve quality of life as it improve teeth function, protect against aggression to the teeth and tooth wear as well as reduction in muscle pain. Massage of the muscle of mastication help to reduce the pain and manage the bruxism. Combination of both therapies only help in greater reduction of muscle pain.
Hasan OnderGumus et al. [17]	Randomized Controlled Trial	20	Occlusal splint therapy and computerized analysis	3 months	Area of posterior teeth in contact among bruxist greater than normal individual, but does not affect their occlusion.
Gomes CAF de P et al. [18]	Randomized Clinical Trial	15 15 15 15	Conventional occlusal splint Silicone occlusal splint Massage Massage and conventional occlusal splint	4 weeks 4 weeks 4 weeks (3 weekly sessions) 4 weeks (3 weekly sessions for massage)	Occlusal splint and massage therapy treatment alone on the patients does not show much effect on electromyographic on the masseter. However, combination of both therapies result to decreased in symptoms of sleep bruxism as well as temperomandibular disorder.
Harada T et al. [19]	Randomized controlled trial	16	Occlusal splint which covered occlusal area of maxillary arch (SS) Occlusal splint which does not cover occlusal area of maxillary arch (PS)	12 weeks Group A – SS 6 weeks, PS 6 weeks (after interval of 2 months) Group B – vice versa	Both types of splint shown reduction on electromyography activity of masseter and SB symptoms, immediately after the application of the appliances. However it does not show any significant changes after prolong usage during duration of 6 weeks. Thus, usage of splint is known as the symptomatic treatment
Matsumoto et al. [20]	Randomized controlled trial	20 *Group C (continuous) * Group I (used splint in every other week)	Occlusal splint (stabilization splint)	29 days	Both group of subjects show immediate reduction on both masseter electromyographic and SB activities. However, continuous usage of stabilization splint does not reduce SB for a longer time, but it is effective through intermittent used of the appliance.
Arima et al. [21]	Crossover Randomized clinical trial	11	Occlusal splint with mandibular advancement: Full arch of maxillary mandibular appliance (restrictions movement of mandible) Full arch of maxillary mandibular appliance (no restrictions) Full arch flat stabilization appliance	1 week	All appliances reduce the masseter electromyographic activity. Restriction on the movement mandible does not give any significant effect on jaw-muscle activity during sleep.

Continue…

Madani AS et al [22]	Randomized controlled trial	20	Stabilization occlusal splint (Group A) Gabapentin (Group B)	8 weeks	Both occlusal splint and gabapentin help to reduce SB. Gabapentin is better than occlusal splint, as it help to improve quality of sleep and increased in the amount of deep sleep.
Ommerborn M. A. et al. [23]	Randomized controlled trial	57	Occlusal splint (OS) - 29 Cognitive behavioral treatment (CBT) -28	12 weeks (1.5 H weekly sessions for CBT)	Both occlusal splint and cognitive behavioral treatment help to reduce SB. However, bruxist whom received CBT, tend to reverse back to have SB, after the therapy finished. This may related to the emotional and environment control.
Carra MC et al. [24]	Randomized controlled trial	16	Cloridine (paradoxical effect)	4 days	Under cloridine induction, there was increased in the arousal pressure followed by the reduction of SB.
Shim YJ et al. [25]	Randomized controlled trial	20 Group A- Injection on masseter muscle only Group B- Injection on both masseter and temporalis muscles	Injection of BONT-A (Botulinum toxin)	4 weeks	Reduction in intensity of contraction in injected muscles. Controlled the activity of SB.
Lobbezoo F et al. [26]	Crossover, Randomized clinical trial	10	Administration of low doses L-dopa along with benserazide	1 days (night)	L-dopa help to reduce the masseterelctromyographic activity which associate to SB.
Villafane JH et al. [27]	Case report	1	Injection of BONT-A in both massetermuscles	2 weeks (2 months follow up)	Reduction in bruxism and improvement in trismusshowing by patient, in which she able to open her mouth with a distance of 15 mm.
Milanlioglu [28]	Case reports	1	Administration of Buspirone	2 weeks	Paroxetine administered to patient help treating patient headaches and depression. However, in turn she develop severe SB. Buspirone was then administered and she showed disappearance of SB as well as jaw pain and stiffness. Buspirone successfully treated SB.
Santamato A et al. [29]	Case reports	1	Injection of BTX-A	3 days (3 months post treatment)	Botulinum toxin (BTX-A) reduce master and temporal muscles hyperactivity. Thus, treat the nocturnal bruxism.
Jadidi F et al. [30]	Polysomnographic study, Randomized controlled trial	14	Contingent electrical stimulation (CES)	3 days	CES non-painful intensity, inhibit the electromyographic activity on temporalis muscle during sleep. However, it does not cause significant arousal responses in any of the sleep paramteters.
Gu W et al. [31]	Randomized clinical trial	24	Biofeedback therapy– 12 Occlusal splint (Biofeedback splint) -12	12 weeks	Biofeedback therapy is better options for the mild bruxers, and it is more effective than the occlusal splint in controlling bruxism.

better diagnosis and consult a proper treatment for them. This is because bruxism would cause breakage of dental restorations, tooth damage, induction of temporal headache along with temperomandibular disorders (Lavigne, 2008). Therefore, it is important for dentists to know either their patient is having bruxism or not by having a proper diagnosis and help them to control and manage their habit. Therefore, the purpose of this article is to systematically review the dental literature regarding the various treatment options for bruxism.

MATERIALS AND METHODS

Study Selection Criteria

The articles were searched and chose based on listed inclusion criteria in Table 1. Based on these criteria, only selected articles were chose and reviewed.

Search strategy

A literature search was performed to search on the related article on bruxism. Since the literature of bruxism is a broad topic, this paper is focusing on treatments that available to treat bruxism patients. The article was searched via National Center for Biotechnology Information (NCBI) in order to get accessed for Pub Med articles. The articles were searched using the following query: 'treatment option for bruxism' or 'management of bruxism' or 'therapy of bruxism' or 'way to control bruxism'. All of the articles abstracts which is in English was reviewed and screened.

Data Collection

The collected articles which obligated the criteria in Table 1, were analyzed and recorded. The following information was

recorded: author, year of publication, duration of treatment, intervention as well as result obtained from the therapy.

RESULTS

Based on the electronic search, there were about 16 publication in total, which suitable for analysis. Two articles involve combination of both occlusal splint and massage therapies, four study involve the usage of occlusal splint alone for treatment, one article involve in comparison of effectiveness of treatment in between the occlusal splint and cognitive behavior, occlusal splint with drugs as well as occlusal splint with biofeedback. There was also one article which used contingent electrical stimulant for the treatment and the rest through pharmalogical approaches. The study in the clinical trial was generally accessed through electromyographic (EGC) activity of masticatory muscles or polymosnorgrahic study.

Treatment available of bruxism

Occlusal Splint

Bruxism or heavy load given on the occlusal area of tooth, can lead it to becoming wear. In order to reduce the possibility for the occlusal surface to become weary, occlusal splint is suggested by most of dentists for the bruxism patients (Anders Johansson, 2011; Krishna Prasad, 2014). Besides, it also believe to be a main therapy for preventing dental grinding noise as well as tooth wear in sleep bruxism (Guaita, 2016).

Massage and Stretching

The intra and extra oral massage on the masseter as well as cervical muscles will affect the blood circulation, improvement of metabolism and also reduction in the muscle tone (Amorism, 2014). The goal of this therapy is to decrease the pain and allowed mandible to rest in a proper positions by increasing the range of motion of the mandible (Quinn, 1995). It is done clinically, with the involvement of dentists in charge.

Pharmalogical Approaches

Bruxism generally can be manage through pharmalogical approaches. It can be done through administration of drugs like botulinum toxin, cloridine, buspirone and etc. These drugs having serotonergic and dopaminergic activities toward sleep bruxism (Tan, 2000). Thus, they help to treat bruxism.

Biofeedback

It is a technique that allowed the individuals to learn about their body functions (behavior), in order to promote behavioral changes in them and result to a better health and performance in life (Ilovar *et al*., 2014). It is important for the individuals to retain the changes even after the therapies is discontinued.

Contingent Electrical Stimulant (CES)

CES is useful for decreasing the activity of masticatory muscles that associates with sleep bruxism (Guaita, 2010). It is a miniature of self contained elctromyographic (EMG) detector, which able recording of the temporalis muscle EMG activity and sends signal for clenching and grinding of teeth (Krishna Prasad, 2014). It provides the biofeedback stimulation as well as useful for reduction of bruxism (Jadidi *et al*., 2007).

Conclusion

There are various treatment that are available to treat bruxism. Based on the research done on this study, it is prove that occlusal splint is the most common treatment used to treat bruxists. It also believe that the usage of drugs like BOTX-A, provide a better result in reduce the hyperactivity of the contraction of the masticatory muscles. Contingent electrical stimulant should be introduced to the society, as it is still new to the world of treatment of bruxism. Therefore, it is concluded that bruxism is a common parafunctional habit, which can happen either during sleep or awake. There is no exception for age, gender and even race. There are various treatment availableto treat bruxism, but it is not specifically to treat bruxism. Rather than stop this habit, this treatment help to reverse the adverse effects and control the habit.

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