

**An Innovative Strategy In Treatment of Bruxism: Botox Therapy.**

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**Introduction**

Masticatory system activities can be divided into two types: functional activities, which include chewing, speaking. They are very controlled muscles activities, which allow the masticatory system to perform necessary functions with minimum damage to the structures of this system. Therefore, functional activities are considered to be directly influenced by the occlusion. <sup>(1)</sup>

On the other hand, parafunctional activities, which include clenching or grinding of the teeth and it indicates the movement of the jaw outside the normal function even if the occlusion is in normal state, for example bruxism. Parafunctional activity is also known as muscle hyperactivity. <sup>(1)</sup>

Bruxism can best be defined as a parafunctional activity of the masticatory muscles. It is a repetitive non-functional oral movement disorder characterized by grinding and/or clenching of the teeth and splinting of the jaw muscles, which can result in several orofacial lesions such as tooth wear, periodontal lesions, temporomandibular joint disorders and muscles pain. It is an oral condition of great interest to both researchers and clinicians.

According to recent studies, the prevalence of bruxism was reported to be 8% to 31.4%, and this number includes both awake bruxism and during sleep bruxism. <sup>(1)</sup>

Bruxism during daytime is commonly a semivoluntary ‘clenching’ activity and is also known as ‘Awake Bruxism’ (AB) or Diurnal Bruxism (DB). Awake Bruxism can be associated with life stress caused by familial responsibility or work pressure. Bruxism during sleep is termed as ‘Sleep Bruxism’ (SB). Sleep bruxism is an oromandibular behavior that is defined as a stereotyped movement disorder occurring during sleep and characterized by tooth grinding and/or clenching. Sleep bruxism was recently classified as sleep related movement disorder according to recent classification of Sleep Disorders. <sup>(1)</sup>

Many patients are not aware that they grind their teeth during sleep, therefore in this context the dentist has an important role in the early diagnosis and management of sleep bruxism, in order to prevent severe damages to the dental structure. When sleep bruxism is diagnosed early, teeth wear stays limited to the enamel of anterior teeth only and the decision whether to restore worn facets is dependent on the patient’s aesthetic demands and financial availability. <sup>(2)</sup>

Patient with severe teeth wear exhibit loss of occlusal vertical dimension. Although bruxism is not a life-threatening condition, excessive shortening of anterior teeth by tooth wear can negatively impact patient's quality of life and be associated with functional limitations, physical pain, and social disability.<sup>(3)</sup>

Although bruxism has high prevalence, up till now the cause is not completely clear, it is considered to have multifactorial aetiology. In the past, morphological factors, like occlusal discrepancies and the anatomy of the bony structures of the orofacial region, have been considered the main causative factors for bruxism.<sup>(1)</sup>

Nowadays, these factors play only a minor role, if any.

Recent focus is more on the pathophysiological factors. For example, bruxism has been suggested to be part of a sleep arousal response. In addition, bruxism appears to be modulated by various neurotransmitters in the central nervous system. More specifically, disturbances in the central dopaminergic system have been linked to bruxism. Furthermore, factors like smoking, alcohol, drugs, diseases, and trauma may be involved in the bruxism aetiology. Psychological factors like stress and personality are frequently mentioned in relation to bruxism as well, but research shows controversial results. Taken all evidences together, bruxism appears to be mainly regulated centrally, not peripherally.<sup>(5)</sup>

In fact, one thing seems certain: There is no single factor that is responsible for bruxism. It is also rather evident that there is no single treatment that is permanently effective for eliminating or even reducing bruxism.<sup>(6)</sup>

The treatment of bruxism revolves around repairing the damage of teeth from dental restoration breakage or damage, temporal headache, mandibular disorder that has already occurred attempting to prevent further damage and manage symptom.<sup>(5)</sup>

Since bruxism is not life-threatening and there is little evidence of the efficacy of any treatment. It has been recommended that only conservative treatment which carries low risk of morbidity should be used. The first line of treatment available is mouth guards (night guards). Even though mouth guards are widely used as a treatment option, there is a lot of insufficient evidence in treating sleep bruxism, and probably ineffective for awake bruxism.

On the other hand, they provide a mechanical protection of the teeth from the grinding damage rather than reducing in bruxism activity itself.

Occlusal splints are no more effective than mouth guards in reducing the symptoms of bruxism. Using Botox (Botulinum toxin) is one of the new innovations and strategies of treating and preventing bruxism. Its mechanism of action is targeting and reducing excessive muscle activity, therefore, will reduce teeth grinding and the bruxism activity. Botulinum toxin is a neurotoxin produced by anaerobic bacteria *Clostridium botulinum*. It causes a prolonged inhibition of neurotransmitter release of peripheral cholinergic nerve at both neuromuscular junctions and autonomic sympathetic and parasympathetic nerve terminals. *They are eight types of Botulinum toxins named from A to G. Only Botulinum toxin type A can be used in dental conditions.* The first therapeutic use of botulinum toxin was conceived by Kerner and coined the name botulism (1786-1862), it is the first toxin to be accepted for therapeutic uses.

The injection of Botox could be in two methods one includes the injection of Botox bilaterally slowly into the masseter immediately superior to the angle of the mandible. Another one includes injecting botulinum toxin in both the masseter and temporalis muscles for severe bruxism patients. Most of the studies reported that masseter muscle injection alone could reduce nocturnal

bruxism effectively.

Like any medication, Botox has some side effects, which include allergic reactions, rash, itching, headache, edema, erythema, ecchymosis, transient hyposthesia and alteration in salivary consistency. Botox is contraindicated to any known hypersensitivity reactions to any of the botulinum preparations, presence of active infection at the site of injection, pregnancy and lactation, psychological unstable patients.<sup>(12)</sup>

Although it is considered as an effective treatment, Botox is a temporary. It may last four to six months, but in some cases Botox had shown resolution of bruxism after Botox injection.

Injection of botulinum toxin or Botox has shown promising results in managing the hyperactive orofacial musculature.<sup>(7)</sup>

This study was more interested in using Botox therapy among the other new techniques of treating bruxism as it is more convenient for the patients rather than other treatment modalities, and it doesn't require an obligation to the patient until the cessation of the injection after few months, and it offers minimally invasive, quick and painless approach with minimum complications.<sup>(12)</sup>

The researches to date, are considering Botox as an effective therapy just as other treatments.

### Materials and Method

An electronic literature search was accomplished to identify publications related to bruxism and Botox therapy using the databases of Saudi Digital Library (SDL), PubMed and Google Scholar for articles published in English within the past ten years. The following terms were used "Botox in dentistry" "bruxism and Botox" and "Botulinum toxin injection" as keywords. Fifteen articles were selected out of: 33 articles from PubMed, 275 articles from SDL and 2,898 articles from Google Scholar. Cross-sectional study was conducted to obtain information

regarding the knowledge about one of the promising treatment modalities of bruxism: using Botox as a treatment options for patients with bruxism among dental college faculty members of Princess Nourah bint Abdulrahman University (PNU), Riyadh, Kingdom of Saudi Arabia.

Questionnaires were distributed among the Target population "sample size", the dental faculty members at Princess Noura bint Abdulrahman University, Riyadh, Kingdom of Saudi Arabia. Including specialists, general practitioners and part timers. The sample was based on certain criteria: Their years of experience compared to dental students, their broad knowledge about bruxism and its squealy, their experiences with the patients attitude toward mouth guards and other different treatment modalities.

The questionnaire was disrupted as a hardcopy among the target population and it consisted of three pages. The first page consisted of the demographic data, the other pages of the questionnaire contained questions about bruxism and its treatments, including Botox as a treatment method. The questions were in a gradual sequence, started with the sequel of bruxism, the common etiological factors of bruxism and the incidence among each age and gender groups and the management of bruxism. Moreover, the rest of the questions were about the Botox usage in treating bruxism, if the participants heard of its uses in dentistry, and if the participants are considering using it in the future. For the questionnaire answers, a five-points scale was used (Likert- type scale): *Strongly agree, Agree, Neutral, Disagree, Strongly disagree* for each question about bruxism, and the Botox questions were *yes or no or maybe* questions.

For the validity test a total of 15 questionnaires were distributed. Five for each group of general practitioners, specialists and part-timers. Their knowledge was assessed

through questions about their opinions on causes and treatment of bruxism, focusing on the treatment of using Botox, and whether they will consider using it in their practice. Positive verbal feedbacks were given about the subject, which was a first time hearing about it for all of the fifteen participants. One of the feedbacks was a concern if it was evidence-based and about the safety of it. Another was about how and where to inject the Botox. All their questions about the treatment were answered after filling the questionnaire as it was for the evaluation of their knowledge. A few questions in some surveys have not been filled. Some of the participants answered yes to Question “have you heard about the uses of Botox in dentistry? If yes, please explain:” and they did not explain it. All questions were clear and understood by all practitioners.

The data entry for processing has started immediately after the questionnaire distribution and collection; all the data were placed into rows and columns for further analysis by using an Excel sheet for the statistical analysis.

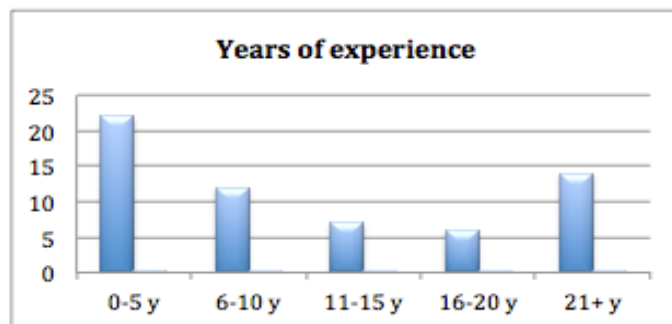
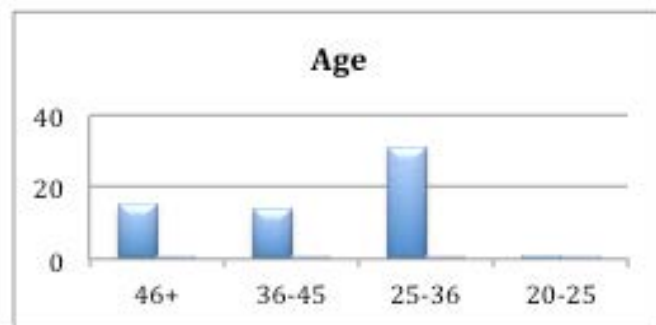
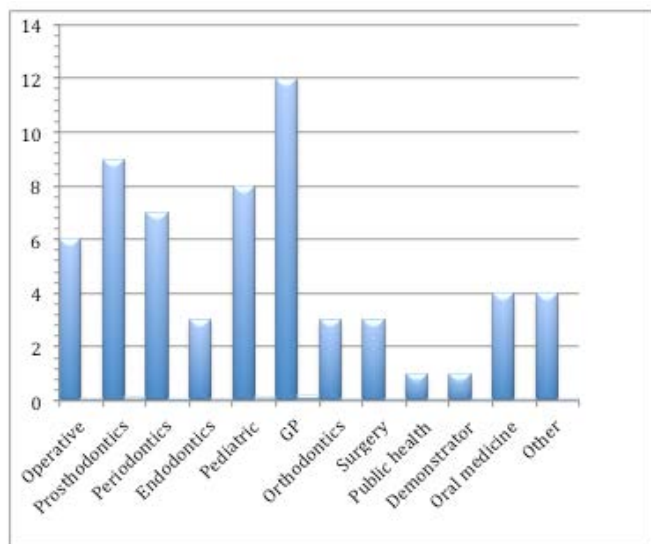


Figure : Number of participants from each speciality, total number is sixty-one participants.

### Result

This study was conducted on sixty-one (66%) participants out of ninety-three dental college faculty members of Princess Nourah bint Abdulrahman University (PNU), Riyadh, Kingdom of Saudi Arabia.

35% of faculty members were not including due to certain reasons including sick leaves, scholarships, and others.

According to the demographic data, there was a variation in the age and years of experience and most of them fall in the range of 25-36 years old and 0-5 years of experience, respectively.

Depending on the data analysis, as authors of different article have written about the different sequels of bruxism about 79% of the participants in this study were strongly agree that teeth wear is considered as a sequel of Bruxism, followed by Muscles pain (75%), Temporomandibular joint disorders (64%), Abfraction (33%), failure of restorations (31%) and finally periodontal lesions (23%). (56%) of the included faculty members have had examined less then 10 cases of patients with bruxism over

the past two years. The recent studies have shown many discussions upon the main etiology of bruxism whether it is a psychological, physiological or pathological cause.

In this study, more than half of the participant (59%) had chosen psychological disorders as the common etiological factor of Bruxism.

Almost half of the participants (52%) agreed that the incidence is more in females than in males, and (38%) of the participants believed that the incidence is not higher in children than in adults.

There are different treatments modalities of bruxism which include occlusal intervention, occlusal appliances, change in the lifestyle, psychological therapy and pharmacological intervention, (49%) to (51%) of the participants believed that bruxism can be best managed by the occlusal appliance and changes in the lifestyle.

As well as there is new innovation in the treatment of the bruxism which is "BOTOX", (75%) of the faculty included in this study heard about the uses of Botox in dentistry and they explained how it could be used in dentistry, (25%) of the included faculty haven't heard about it. Although (15%) of the sample size suggested that Botox cannot treat bruxism, (48%) are considering using it in the future. Only one faculty member out of 61 participants had used Botox to treat patient with bruxism.

### **Discussion**

Following the data collection, a total of sixty-one completed survey questionnaires were collected resulting in a response rate of 66%.

The study sample successfully contained members of each specialty, 10% operative 15% prosthodontics, 13% Pedodontics, 11% periodontics, 5% endodontics, 5% orthodontics, 5% oral surgery, 2% public health, 7% oral medicine and 20% general practitioners.

Most of this study questionnaire answers depended on Likert scale type, because; it uses fixed choice response

formats and are designed to measure attitudes or opinions (Bowling, 1997; Burns, & Grove, 1997). The Likert type scale does not rely on simple yes or no answers, it allows the participants to show their opinions on different levels, thus it is more accurate than other used scales.

The study has highlighted the importance of treating bruxism, avoiding it will harm the oral health and facial muscles.

Most of the faculty members are young adults with limited years of experience, which explains why 56% of them have examined less than ten patients with bruxism over the past two years.

Even though bruxism is considered to have multifactorial etiology, there was an increasing result in relating psychological problems as main etiology of bruxism. Psychological stress, anxiety and depressions are significantly related to clenching and grinding of the teeth.

In this study's data analysis, most of the faculty members has more knowledge about tooth wear as a sequel of bruxism than muscle pain, temporomandibular joint (TMJ) disorders, abfraction, failure of restoration, and periodontal lesions, which could be explained by the reason that teeth status is the first thing to be detected by the examiner in each dental visit, compared to periodontal lesions. To examine periodontal health efficiently many steps must be followed. That is why it was the last one to be chosen.

As it is well known that females tend to care, analyze and wonder more than males, they tend to be more stressed and they are significantly more likely than men to fall into overthinking which might explain why most of the faculty members had chosen females to have higher incidence of Bruxism than males. Another reason could be that most of the participants are females, females in our society tend to have an overload of responsibilities and



duties, which might correlate with psychological stress leading to increasing risk of developing bruxism.

The answer to the incidence of bruxism among the children and adult was neutral by most of the participants due to the lack of background about the prevalence in each age category. Also, it could be due to the difference in the participants' specialties, treating patients with different age group.

The majority of the participants strongly agreed that the bruxism can be best managed by the occlusal appliance; it has been used for many years and it is considered the first line of treatment for bruxism, as it prevents the squeal of bruxism. Correspondingly, more than half of the included faculty agreed that the best way to manage is to change the lifestyle; for example working out, mediating can be used to treat any underlying psychological problems such as stress and anxiety, which can result in bruxism.

The age of participants ranged from 25 years to over 46 years, and as it was mentioned in the results 75% of the participants answered yes they have heard about the uses of Botox in dentistry, 33% of them were in the age range of 26-35 years old, and 16% of them are General practitioners.

39% of the included faculty agreed that Botox can treat bruxism, on the other hand, the other faculty members are not convinced enough of using Botox in treating bruxism and are not considering using it in the future, and it could be because Botox is best known by its cosmetic uses, not in its therapeutic effects.

### Conclusion

To conclude Botox appears to justify its title as the poison that heals, it could be a promising treatment in the future. And it could be a chair side single visit treatment. But it was evident that less than half of the faculty members are not aware of this treatment modality. It's recommended to all the faculty members to attend more workshops

regarding uses of Botox in Dentistry.

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