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Review Article

Psychosocial Factors and Bruxism - A Review

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ABSTRACT

Bruxism is a repetitive jaw-muscle activity characterized by clenching or grinding of the teeth and by bracing or thrusting of the mandible. It is the third most common of the many parafunctional activities of the masticatory system. Bruxism has a multifactorial etiology, which includes morphological, pathophysiological and psychosocial factors. Psychosocial variables such as anxiety, hostility, and intrapunitive reactions to frustrating situations are significantly correlated with bruxing behavior. Due to its multifactorial nature, it is important to establish the diagnosis of bruxism based on the possible etiological factors of this condition and not only on the clinical symptoms. This way, the identification of behavioral problems and emotional stress may improve the understanding of the interaction of these factors in the development or worsening of bruxism. This narrative review encompasses the role of psychosocial factors such as anxiety, stress and characteristics of personality in the etiology and management of bruxism.

Key words: Anxiety, Bruxism, Clenching, Para functional habit, Personality trait, Stress.

INTRODUCTION

Oral habits or parafunctions have been reported to be common worldwide, with many children and adolescents performing them on a daily basis. [1] Oral habits are repetitive behaviour in the oral cavity that results in loss of tooth structure and their effect is dependent on the nature, onset and duration of habits. [2] These habits are learned patterns of muscle contraction and have a very complex nature. They are associated with anger, hunger, sleep, tooth eruption and fear. [3] The term parafunction was introduced by Drum to suggest distinction between occlusal stress exerted during mastication and swallowing and occlusal stress which are brought into action outside of the normal function. Parafunctional oral activities are non functional oromandibular or lingual activities that includes jaw clenching, bruxism, tooth grinding, tooth tapping, cheek biting, lip biting, object biting etc. that can occur alone or in combination and are different from functional activities like chewing, speaking and swallowing. [4]

The main parafunctional habit involved is bruxism, which is classified as parafunction because it does not have a functional objective, such as mastication, phonation, or deglutition [4] it is also called tooth grinding, or occlusal neurosis. [5] Miller suggested a differentiation between nocturnal grinding of the teeth (bruxism) habitual grinding of the teeth in the daytime (bruxomania). [5] Bruxism has been commonly reported in pediatric patients, with an incidence that varies between 7-15%. [6] The prevalence of bruxism is reported to be 20% among the adult population, predominantly among females. [4] Awareness of bruxism in the general

population is low (15% to 23%). [6] This narrative review outlines the psychosocial aspects of bruxism with etiology, clinical considerations, diagnosis and management of bruxism.

According to American Sleep Disorders Association, Bruxism is defined as **"**Tooth grinding or clenching during sleep plus one of the following: Tooth wear, sounds or jaw muscle discomfort in the absence of medical disorder.**"** [5] Further it has proposed the terms: **"sleep bruxism" (nocturnal) and "awake bruxism" (diurnal).** [7] Whereas **Bruxomania** is **"**The grinding of teeth occurring as a neurotic habit during the waking state.**"** [5]

CLASSIFICATION OF BRUXISM

Bruxism is classified based on:

1) **Time of occurrence**
   a. Awake bruxism
   b. Sleep bruxism (SB)
   c. Combined bruxism
2) **Aetiology**
   a. Primary, essential or idiopathic bruxism: For which no apparent cause is known.
   b. Secondary bruxism: Secondary to diseases (coma, icterus, cerebral palsy), medication (e.g., antipsychotic and cardioactive medication) and drugs (e.g., amphetamines, cocaine).
3) **Motor activity type**
   a. Tonic: Muscular contraction sustained for more than two seconds.
   b. Phasic: Brief, repeated contractions of the masticatory musculature with three or more consecutive bursts of electromyographic activity that last between 0.25 and two seconds apart.
   c. Combined: Alternating appearance of tonic and phasic episodes. Approximately 90% of the episodes of SB are phasic or combined, unlike in awake bruxism, where episodes are predominantly tonic.
4) **Status of bruxism**
   a. Past
   b. Current or present [8]

ETIOLOGY OF BRUXISM

The etiology of bruxism is uncertain, but the hypotheses fall into four major categories:

1. Local factors
2. Neurological factors
3. Medications
4. Psychosocial factors

Local factors

Bruxism has been interpreted as an automatic reaction of the body to occlusal interferences with the purpose of eliminating them by grinding. Even though there are some data suggesting that occlusion affects muscle activity leading to parafunctions, most of the studies seem to deny this correlation. [7]

Neurological factors

Some neurological pathologies may be associated with parafunctional oral activity such as -Dyskinesias, Parkinson's disease, and other extrapyramidal disorders. [7]

Medications

Several medications that have been shown to elicit bruxism: Amphetamines, L-dopa, fenfluramine, phenothiazine, neuroleptics, selective serotonin reuptake inhibitors (SSRls), Antipsychotic agents which frequently cause dyskinesias: fluphenazine, haloperidol loxapine, molindone, perphenazine, pimozide, thiothixene, trifluoperazine and Recreational drugs (heroin, cocaine, ecstasy, marijuana, ("crack", LSD, methadone). [7]

Psychosocial factors

This includes anxiety, stress and characteristics of personality. [6]

Anxiety is described as an unpleasant emotion characterized by worry, tension, and fear, which are felt occasionally and to varying degrees. [9] Anxiety is an emotional state triggered by the body, which includes both psychological and physiological components, becoming pathological when exaggerated or disproportional in relation to the trigger. This leads to disruption and failure to perform its role as a psychological alarm, with potential to develop into pathology when exceeding the individual's adaptive

capacity. The influence of anxiety has been widely emphasized, for both triggering and perpetuating bruxism, resulting in an increase in muscle tension caused by emotional stress during moments of anxiety, manifesting itself somatically, i.e., a form of body language that cannot be understood by the subject. [10]

Stress related disturbances, including depression and anxiety, are a real problem in a highly developed society. Clinical studies suggest that stress is the main reason for patients to seek medical advice (50-75%). [11] Stress can be defined as a real or interpreted threat to the physiological or psychological integrity of an individual that results in physiological and/or behavioural responses. [12] Stress is known to be an initiating, predisposing and perpetuating factor for physical impairment, psychological symptoms and sleep disorders. [13] Stress can be acute and chronic: Acute stress resulting from specific events or situations that involve unpredictability and poor sense of control. [14] Chronic stress belongs to the most destructive factors threatening a human organism. [11]

Pathophysiology of stress

All impressions concerning external environment are processed in the brain. The central nervous system is responsible for their assessment. Signals reach the limbic system and hypothalamus, where they trigger proper emotions and stimulate the sympathetic nervous system releasing adrenaline, which leads to faster breathing and heartbeat, a higher muscle tension, and an increased sugar level and blood pressure. Any external information which triggers such a response may be recognized as a stressor. Stressors, regardless of their type, stimulate in an organism stereotypical, nonspecific, and complex adaptation reactions. This adaptation is controlled by hormonal and neurohormonal processes. [11]

The effects of suppressing emotions and motor activities burden the function of an organism resulting in several neuromuscular disorders. Various pathological emotional experiences more and more often result in the development of a muscular parafunction/ bruxism. [11]

The main role in the tension coordination belongs to gamma neurons, which are controlled by higher centres and participate in the development of an abnormal muscle activity. Chronic stress and warning reactions triggered by it manifest themselves as functional deficiencies of the nervous-muscle system and are the main etiologic factors of psycho-dependent bruxism. [11]

Servan-Schreiber et al report a so-called **"emotional brain,"** which has a completely separate structure from the neocortex and it functions independently. This **"brain"** is located in the limbic system, so in the central part of the encephalon, and it consists of three main anatomical elements: the hippocampal gyrus, cingulate gyrus, and amygdala. These elements have a far less complicated structure than the neocortex; that is, they are not arranged in regular bundles of neurons, but the nerve cells are rather mixed here. Pathological chronic stress and emotional disorders result from functional disturbances of the **"emotional brain,"** which most often are a consequence of traumas and/or family and professional life. [11]

Characteristics of Personality: Personality traits are related to individual ways of dealing with different situations. Personality traits in childhood may also be observed in adulthood. Depending on personality traits present during childhood, the individual may have difficulty dealing with pressure and conflict and subsequently suffer from stress. Personality traits can also be associated with physical health such as nutritional disorders and sleep disturbance. [15]

Individuals with stress and/or specific personality traits tend to release the tension accumulated during the day through sleep bruxism. Traits of neuroticism may result in reactions of anxiety and anger, whereas, responsibility/conscientiousness is expressed through self-discipline and a

sense of duty. Individuals who score highly for neuroticism tend to be emotionally hypersensitive, sensitive to ridicule, incapable of dealing with pressure, and panic easily in emergency situations. [15]

CLINICAL CONSIDERATIONS OF BRUXISM

Although lateral pterygoids are intended to depress the mandible, a voluntary unilateral activity causes excursive movement to the contralateral side. [5] However, bruxism cannot be described as "hyperactivity of the lateral pterygoid." Even though, there is hyperactivity of the Lateral pterygoids, the clenching component of parafunctional elevation is considered the definitive component of bruxism. [5] Various aspects of functional and parafunctional activities is shown in Table 1.

Table1: Differences between normal functional and parafunctional activity [5]

Activities	Normal Functional	Parafunctional
Direction of applied force	During chewing and swallowing, the mandible moves in a vertical direction. As it closes and tooth contacts occur, the predominant forces applied to the teeth are also in a vertical direction which is accepted well by the supportive structures of the teeth.	During bruxism, when the mandible shifts from side to side, heavy horizontal forces are applied on the teeth, which are not well-accepted. These increase the chances of damage to the teeth and/or supportive structures.
Mandibular position	Most of the functional activity of mandible occurs at or near the centric occlusion position. The forces related to the functional activity are distributed to many teeth that minimize potential damage to a single tooth.	Bruxism occurs in eccentric positions. Few tooth contacts occur during the activity and in this activity, the mandibular position is far from its stable position. This position of mandible causes more strain on the masticatory system, making it more susceptible to breakdown. This causes the application of heavy forces to a few teeth.
Muscle activity	Most functional activity occurring in jaws consists of well-controlled, rhythmic contraction and relaxation of the muscles. This rhythmic activity permits adequate blood flow, which supplies oxygen to the tissues and eliminates by-products accumulated at the cellular level.	Bruxism results in sustained muscle contraction for long periods. This type of activity reduces oxygenation within the muscle tissues as there is reduced blood flow. As a result, the levels of carbon dioxide and cellular waste by-products increase within the muscle tissue creating the symptoms of fatigue, pain, and spasms.
Neuromuscular reflexes	Neuromuscular reflexes are present during functional activities, protecting the dental structures from damage.	During bruxism, however, the neuromuscular protecting mechanisms appear to be absent, or at least the reflex thresholds are raised, resulting in less influence over muscle activity. Therefore, the same tooth contacts that inhibit muscle activity during function do not inhibit Parafunctional activity. This increases the levels of parafunctional activity that can cause a breakdown of the structures involved.

Signs and symptoms

Signs

1. Abnormal tooth wear and occlusal trauma
2. Tongue on cheek indentation
3. Linea alba along the biting pane
4. Gum recession
5. Presence of torus maxillaries and /or mandibularis
6. Increase in muscle activity (this is recorded by the polysomnography)
7. Presence of masseter muscle hypertrophy on voluntary contraction [8]

Symptoms

1. Grinding of the teeth accompanied by a characteristics sound that may even awaken the bruxers bed partner
2. Headache (especially in the temporal zone when the patient wakes up in the morning)
3. Pain, Clicking or locking of temporomandibular joint
4. Pain in the masticatory and cervical muscles
5. Tooth or teeth hypersensitive to cold air or liquid
6. Excessive tooth mobility
7. Poor sleep quality ,tiredness [8]

DIAGNOSIS OF BRUXISM

Diagnosis of bruxism is based particularly on case history, clinical evaluation followed by investigations. [4]

Case history

Self reports to assess presence and absence of bruxism is convenient for both clinicians and researchers. But it has been found that about 80% of bruxism episodes

are not accompanied by noise. So a large percentage of adults and children are unaware of their bruxism activity and thus fails to identify themselves as the bruxers. [4] Hence it is essential to rule out the presence or absence of bruxism through case histories.

Clinical evaluation

Tooth Wear

Tooth wear is considered to be analogous to bruxism. Tooth wear is a cumulative record of both functional and parafunctional activities and various factors such as age, gender, diet and bruxism are associated with tooth wear. Several studies have demonstrated a positive relationship between tooth wear and bruxism. Major disadvantage with tooth wear is that it neither proves ongoing bruxism nor static tooth clenching. Tooth-Wear Index is used to the rank persons with regard to incisal and occlusal wear. [4]

Wear Facets of Intra-oral Appliance

Repetitive wear pattern on the occlusal splint has been reported with wear facets on full-arch acrylic resin splints, which reappeared in the same location with a similar pattern and direction, even after adjustment of the splints. [4] Hence intra oral appliances may be used to detect bruxism.

Assessment of bruxism activity

The Bruxcore Bruxism-Monitoring Device (BBMD) is an intra-oral appliance that was introduced as a device for measuring sleep bruxism activity objectively and the Bruxcore plate evaluates bruxism activity by counting the number of abraded microdots on its surface and by scoring the volumetric magnitude of abrasion. The major disadvantage with this method is that it is difficult to count the number of missing dots with good precision. [4]

Measurement of bite force

Takeuchi et al. developed a recording device for sleep bruxism, an intra-splint force detector (ISFD), which uses an intra-oral appliance to measure the force being produced by tooth contact onto the appliance. The force is detected using a thin, deformation-sensitive piezoelectric film, which is embedded 1-2 mm below the occlusal surface of the appliance. [4]

Investigations

Polysomnography (sleep laboratory)

This offers a highly controlled recording environment wherein sleep disorders (e.g. sleep apnoea and insomnia) can be ruled out and sleep bruxism can be discriminated from other orofacial activities (e.g. myoclonus, swallowing and coughing) that occur during sleep. Physiological changes related to sleep bruxism (e.g. micro arousal, tachycardia and sleep-stage shift) can also be monitored. [4] These recordings for sleep bruxism generally include electroencephalogram, Electromyography, electrocardiogram and thermally sensitive resistor (monitoring air flow) signals along with simultaneous audio-video recordings. One major limitation is that a change in the environment for sleep may influence the actual behaviour of bruxism. Another is the expense as multiple night recording is to be taken for the occurrence of sleep bruxism varies over a number of nights. [4]

Masticatory Muscle Electromyographic Recording

Sleep bruxism activity is assessed based on EMG (Electromyography) activity in the masticatory muscles (masseter and/ or temporalis). Since 1970s, sleep bruxism episodes were measured over an extended period in patient's homes with the use of battery-operated EMG recording devices which can measure masticatory muscle activity more minutely, i.e. the number, duration and magnitude of bruxism events. A miniature self-contained EMG detector-analyser (Bite-Strip) was developed as a screening test for moderate to high level bruxers wherein the number of bruxism events can be objectively estimated by simply attaching it to the skin over the masseter muscle. [4]

MANAGEMENT OF BRUXISM

The dentist's main role is to reduce associated psychosocial factors, orofacial sensory complaints (e.g. pain, tooth sounds) and prevent further damage of the orofacial

structures (e.g. tooth wear, fracture of dental restorations). [16] Approaches for management of bruxism shown in Fig 1.

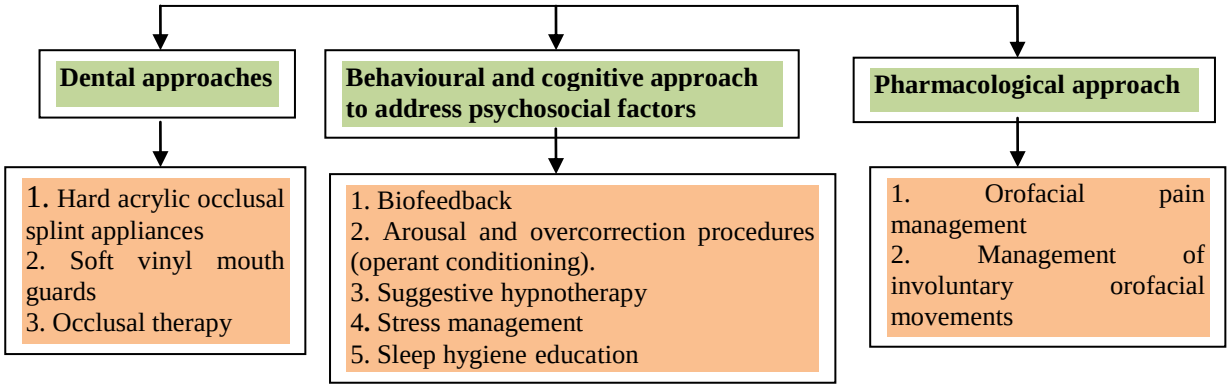

Fig 1: Approaches for the management of Bruxism

Dental approaches

1. Hard acrylic occlusal splint appliances
2. soft vinyl mouth guards
3. occlusal therapy

Hard acrylic occlusal splint appliances

Hard acrylic occlusal splint appliances may be indicated in patients who require protection of their teeth from the further damage, to reduce tooth grinding sounds during sleep, or to manage concomitant orofacial pains (example masticatory muscle myalgia). Although removal of occlusal interferences, change in muscle activity, and modification of patients habits have been proposed for oral splint efficacy in sleep bruxism, they remain to be proved. [16]

Soft vinyl mouth guards

Soft mouth guards are generally not durable and are contraindicated for long term use. More than 50% of patients with soft mouth guards show increased masseter EMG activity during sleep. [16]

Occlusal therapy

The effect of irreversible occlusal therapy to treat temporomandibular joint disorders and bruxism is controversial .Because the contribution of occlusal factors to sleep bruxism genesis has not been clearly demonstrated, this treatment is not considered a first line approach in Sleep bruxism management. This treatment is considered more appropriate if there are functional, post- orthodontic, post-surgical, or post -restorative occlusal issues. [16]

Behavioural and cognitive approaches to address psychosocial factors:

1. Biofeedback
2. Arousal and overcorrection procedures (operant conditioning).
3. Suggestive hypnotherapy
4. Stress management
5. Sleep hygiene education [16]

Biofeedback

Biofeedback is a technique that provides individuals with information about their bodily functions with the intention of promoting changes in behaviour that result in improved health or performance. It aims to generate a learned response that persists even after the technique is discontinued. Electronically detected physiological measurements are coupled with a feedback signal that is initiated when pre-specified criteria are met and terminated only when the desired change in behaviour occurs. [17] Bio feedback has been reported to reduce Sleep bruxism but the effect does not persist after withdrawal of the treatment. [16]

Arousal and overcorrection procedures (operant conditioning)

Patients are awakened when they have Sleep bruxism episodes (arousal procedure), and they are required to perform positive behaviours (e.g., hand washing, brushing teeth) as an overcorrection. The combination of arousal and overcorrection

procedures has been suggested to be more effective than arousal procedures alone. [16]

Suggestive hypnotherapy

Suggestive hypnotherapy is a cognitive approach reported to reduce masseter EMG activity during sleep in which patients are instructed to relax jaw muscles. Patients are instructed to clench their teeth repeatedly until they feel discomfort and then relax. In this way patients recognise that cessation of their habit release jaw muscle fatigue and discomfort. [16]

Stress management

Stress management or changing a life style has been suggested if patients are experiencing stress or anxiety. Thus, either a dentist or an appropriate health professional can educate patients to understand the possible links between sleep bruxism and life stress and instruct them in managing oromotor reactions to life events by relaxation strategies such as respiratory exercise (e.g., abdominal breathing). [16]

Sleep hygiene education

Sleep hygiene education may be useful cognitive approach for sleep bruxism patients. This education may include relaxation techniques, avoiding intense mental or physical activity in the evening, refraining from the use of alcohol, caffeine, and tobacco close to bed time, and creating a comfortable sleeping environment (e.g., adequate ventilation, comfortable bed). The efficacy of such Sleep bruxism management remains to be proved. [16]

Pharmacologic approaches:

1. Orofacial pain management
2. Management of involuntary orofacial movements

Orofacial pain management

Some of the medications commonly used for orofacial pain management are benzodiazepines, central muscle relaxants, tricyclic antidepressants. Risks of drowsiness or sleepiness should be considered when using almost all of these medications. [16] Some types of physical medicine (Transcutaneous electrical nerve stimulation, acupuncture.) and alternative/ naturopathic medicine are also suggested. [16]

Benzodiazepines (e.g., diazepam) and central muscle relaxant (e.g., methocarbamol) taken at bed time have been reported to reduce oromotor activity during sleep. Clonazepam has been shown to have a long term efficacy and few adverse effects in the advent of injurious sleep parasomnias with motor behaviours (e.g., RBD, sleep walking, sleep terrors, insomnia) but its efficacy has never been accessed in Sleep bruxism patients. Small doses of tricyclic antidepressants (amitriptyline) were reported to have no effect on sleep bruxism after 1 week and 4 week treatment. The amino acid tryptophan, a serotonin precursor, was also found to have no effect on sleep bruxism activity in a placebo-controlled study. [16]

Management of involuntary orofacial movements

Injections of botulinum toxin A is an effective treatment for involuntary orofacial movements such as cranial dystonia. This treatment has also been reported to reduce masseter hypertrophy possibly associated with day time clenching and in the treatment of patients with secondary bruxism related to oromandibular movement disorders. [16]

CONCLUSION

Bruxism is a common parafunctional habit with multifactorial etiology. It occurs during both sleep and wakefulness, but, nocturnal bruxism and diurnal bruxism should be differentiated. The role of psychosocial factors in the etiology of bruxism is probably one of the most debated issues concerning this disorder. Increased stress level in modern societies causes these habits to become more prevalent. Bruxism, in some patients has pathological consequences such as tooth wear, occlusal trauma and hypertrophy of the masticatory muscles.

Early diagnosis is very much necessary to treat bruxism. Since bruxism adversely affects dentoalveolar system, more attention to control and prevent them

is required. So the duty of dentists is not only tooth repair and modification of dentoalveolar changes, but also, has to have enough knowledge about psychosocial aspects of bruxism and apply multiple approaches in the management of bruxism.

REFERENCES

1. Emodi-Perlman A, Eli I, Friedman-Rubin P, Goldsmith C, Reiter S, Winocur E. Bruxism, oral parafunctions, anamnestic and clinical findings of temporomandibular disorders in children. J Oral Rehabil. 2012; 39(2):126-35.
2. Garde JB, Suryavanshi RK, Jawale BA, Deshmukh V, Dadhe DP, Suryavanshi MK. An epidemiological study to know the prev alence of deleterious oral habits among 6 to 12 year old children. J Int Oral Health. 2014; 6(1):39-43.
3. Carvalho AL, Cury AA, Garcia RC. Prevalence of bruxism and emotional str ess and the association between them in Brazilian police officers. Braz Oral Res. 2008; 22(1):31-5.
4. Shilpa Shetty, Varun Pitti, C. L. Satish Babu, G. P. Surendra Kumar, B. C. Deepthi. Bruxism: a literature review. J Indian Prosthodont Soc. 2010; 10(3): 141-148.
5. Reddy SV, Kumar MP, Sravanthi D, Mohsin AH, Anuhya V. Bruxism: a literature review. J Int Oral Health. 2014; 6(6):105-9.
6. Ferreira-Bacci Ado V, Cardoso CL, Díaz-Serrano KV. Behavioral problems and emotional stress in children with bruxism. Braz Dent J. 2012; 23(3):246-51.
7. Melis M, Abou-Atme YS. Prevalence of bruxism awareness in a Sardinian population.Cranio.2003; 21(2):144-51.
8. de la Hoz-Aizpurua JL, Díaz-Alonso E, LaTouche-Arbizu R, Mesa-Jiménez J.Sleep bruxism. Conceptual review and update. Med 2011; 16(2):e231-8.
9. Oliveira MT, Bittencourt ST, Marcon K, Destro S, Pereira JR Sleep bruxism and anxiety level in children. Braz Oral Res. 2015; 29(1):1-5.
10. Alves AC, Alchieri JC, Barbosa GA. Bruxism. Masticatory implications and anxiety. Acta Odontol Latinoam.2013; 26(1):15-22.
11. Wieckiewicz M, Paradowska-Stolarz A, Wieckiewicz W. Psychosocial aspects of bruxism: the most paramount factor influencing teeth grinding. Biomed Res Int.2014; 2014:469187:1-7.
12. Manfredini D, Lobbezoo F. Role of psychosocial factors in the etiology of bruxism. J Orofac Pain.2009; 23(2): 153-66.
13. Ahlberg J, Savolainen A, Rantala M, Lindholm H, Ko¨no¨nen M. Reported bruxism and biopsychosocial symptoms: a longitudinal study. Community Dent Oral Epidemiol 2004; 32: 307-11.
14. Rasheed N.Prolonged stress leads to serious health problems: preventive approaches. Int J Health Sci (Qassim). 2016; 10(1): V-VI.
15. Serra-Negra JM, Paiva SM, Abreu MH, Flores-Mendoza CE, Pordeus IA. Relationship between tasks performed, personality traits, and sleep bruxism in Brazilian school children-a population-based cross-sectional study. PLoS One. 2013 Nov 14; 8(11):1-6.
16. Kato T, Thie NM, Montplaisir JY, Lavigne GJ. Bruxism and orofacial movements during sleep. Dent Clin North Am. 2001; 45(4): 657-84.
17. Ilovar S, Zolger D, Castrillon E, Car J, Huckvale K. Biofeedback for treatment of awake and sleep bruxism in adults: systematic review protocol. Syst Rev. 2014; 2 (3):42.

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