Bruxism as a Consequence of Stress and Movement Disorders: Brief Review

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Abstract

Bruxism is considered to be an unusual repetitive movement syndrome, which is described as involuntary gnashing of teeth. The condition is classified as sleep bruxism (SB) and awake bruxism (AB). The objective of the study was to review the current literature on bruxism and its potential relation to stress and movement disorders. Factors causing bruxism are numerous. It has been found that people suffering from stress are more prone to the condition than healthy subjects. Awake bruxism is frequently observed in subjects with hyperkinetic movement disorders and it can be associated with anxiety, which involves the limbic part of the basal ganglia. However, further studies should be conducted to interpret the link more thoroughly.

Keywords

- teeth grinding
- parasomnia
- parafunction
- repetitive jaw movement
- mastication muscle activity

Review

Stress is identified by people as a "condition of being in long-term tension due to requirements that exceed their potential," as presented by some researchers.[1] Extreme long-lasting stress may have perpetual effect on the reaction to stress, surpassing the natural ability of the human body to adjust.[2] Stress-related physiological and phycological disorders are defined by the type of stress stimulus[3] and its ability to generate various functional changes, which include consequences observed in the maxillofacial region.[4]

Bruxism can be defined as a condition in which an abnormal recurrent jaw action of clenching and mandible thrusting are observed.[5,6] Currently, the condition is classified as sleep bruxism (SB) and awake bruxism (AB). However, phenomenologically, there are significant differences observed between the two types. Semivoluntary AB, i.e., non-functional activity of gnashing that occurs during wakefulness is defined as caused by stress and anxiety-conditioned recurrent or continued teeth grinding or jaw thrusting.[5,7] SB, which is a sleep-related stereotypic movement disorder

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associated with both rhythmical and non-rhythmical mastication muscle activity, which is actually considered to be a form of parasomnia.[5,7,8] SB has previously been considered as a dysfunctional movement or pathological condition, whereas it is now accepted as a centrally controlled condition with various systemic risk factors. It has been postulated that sleep bruxism may have a protective role during sleep, for example, in relation to airway maintenance or in stimulating saliva flow.[9] Clinical manifestation of both awake and sleep bruxism depends on diverse individual behavioral patterns.[5]

Regular rotation pattern of jaw-opener and jaw-closer muscle activity is deteriorated in bruxism, resulting in activation of both muscles.[10] Bruxism acts as a permanent motion mechanism. The severity of the symptoms is directly related to the malfunctioning of the body. Thus, negative emotions, depression, and stressful conditions can bring an increase in muscle tone performance and teeth gnashing.[11] Stress and mental conditions are commonly recognized to cause the progression in parafunctional habits, as well as TMDs. Bruxism is known as a parafunctional habit, which has psychosocial, emotional, and psychological bases.[12] It is crucial for both treatment and prevention to diagnose the bruxism in its early stages.[13]

Bruxism is multifactorial in its etiological nature.[14,15] The possible factors which contribute to the development of the condition include smoking,[16] high alcohol consumption[17] and coffee intake,[18] gastroesophageal reflux disease,[19] sleep apnea,[20] depression,[21] and anxiety.[22–25] These also include genetic predisposition and behavioral patterns.[13] The condition can be also associated with anatomical and morphological abnormalities, such as dental malocclusion.[26]

There are a few studies that have revealed the possible relation of bruxism to movement disorders and emotional alterations,[27] most of them being clinical reports. ►**Table 1** shows the number of bruxism cases in patients with various movement impairments.

AB is not commonly reported in patients with Parkinson's syndrome. This might be due to the fact that AB is not a specific symptom of the syndrome and is considered rather minor issue compared with other major motor as well as cognitive disorders. Obviously, the medications directed to dopaminergic pathways stimulate AB.[28] Moreover, continuous stimulation with apomorphine induce non-functional masticatory activity. On the contrary, although people with Parkinson's syndrome suffer from sleep disorders, SB is infrequent. It is mostly observed during NREM sleep and in the stage before alteration to REM sleep.[29]

Table 1 Cases of bruxism reported in patients with movement impairment[29]

Movement impairments	Reported cases of bruxism
Parkinsonian syndromes	$n = 175$
Chorea	$n = 7$
Primary dystonia	$n = 300$
Psychomotor disorders	$n = 57$
Restless legs syndrome	$n = 380$
Secondary bruxism	$n = 355$

Bruxism is commonly reported among subjects with hyperkinetic syndromes including dystonia, levodopa-induced dyskinesia, and chorea. Pathologies in which AB is mostly observed and is found to be rather severe are stereotypic and cognitive impairments as Rett's and Down syndromes as well as autistic spectrum disorders.[30] Significant characteristic feature of AB is the relation of bruxism to anxiety. Personality traits have their impact on the symptoms observed in the general population,[31] suggesting limbic system mechanisms, particularly basal ganglia being involved in the pathophysiology.

Amygdala, the hypothalamus, as well as other subcortical regions of the brain, such as red nucleus, the anterior pretectal nucleus, the cerebellum, the periaqueductal gray, the raphe nuclei and various parts of basal ganglia take their part in mastication. Inputs that are transmitted from the basal ganglia are received by the areas of the brain located in the frontal cerebral cortex via thalamocortical projection.[31,32]

Regardless of the etiological factors, bruxism can be modulated by stress and various types of movement impairments.

For the management of the bruxism occlusal therapy can be performed, which will provide an opportunity to achieve harmonious relationship between occluding surfaces. Occlusal appliances such as hard splints are preferred over soft splints because they prevent inadvertent tooth movements.[33] Moreover, hard splints are more effective in reducing bruxism activity than the soft ones. Biofeedback can be applied for bruxism during wakefulness as well as for sleep bruxism. While awake, patients can be trained to control their jaw muscle activities through auditory. For SB, auditory, electrical, vibratory, and even taste stimuli can be used for feedback. Drugs that have paralytic effect on the muscles through an inhibition of acetylcholine release at the neuromuscular junction (botulinum toxin) decreases bruxism activity, especially in severe cases with comorbidities.[15]

Conclusion

Considering all above-mentioned data, it can be concluded that bruxism is related to stress. However, further studies should be performed to establish the definite association. Bruxism is more common in patients with movement disorders and the condition is subject to treatment by neurologist. Moreover, the management of patients with the condition requires clinical evaluation by various specialists. Bruxism management strategies include occlusal therapy with hard splints, biofeedback, and pharmacological therapy.

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Conflict of Interest
None declared.

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