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## The influence of stress on the occurrence of bruxism

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## **ABSTRACT**

**Introduction:** Bruxism is defined as a stereotypical hyperactivity of the masseter characterized by clenching and grinding of the teeth. Etiopathology of bruxism still remains unclear, is one of the least known dysfunctions of the stomatognathic system. However, a lot of research have shown the correlation between stress and bruxism.

**The aim of the study:** Paying attention to the correlation between the occurrence of stress and the presence of bruxism in the population.

**Material and method:** The research was done by the usage of the PubMed and Google Scholar articles about the topic of: bruxism; stress; epidemiology; characteristic; psychotherapy;

**Description of the state of knowledge:** Psychosocial factors such as state anxiety and trait anxiety, alexithymia, and perceived stress are as important as somatic causes in the occurrence and maintenance of bruxism. Impact of stress is especially noticeable during research conducted on students. Management of bruxism should embrace dental, pharmacological and psychobehavioural procedures. It requires a wider analysis in the aspect of concomitant disorders. The involvement of different specialists is required.

**Summary:** We can undoubtedly say that stress is an inherent condition that accompanies us in everyday life. However, it is important to pay attention to its coexistence with bruxism and its harmful effect not only on organs such as the heart or stomach, but also the stomatognathic system - which is confirmed by many studies. However, the multidimensionality and complexity of the etiology of bruxism require further considerations and research.

**Key words:** bruxism; stress; psychotherapy;

## **INTRODUCTION:**

Bruxism is one of the least understood stomatognathic system disorders. Over the years, a number of controversies have arisen about the causes of bruxism and tooth clenching. Previously, the scientific world was convinced of the relationship between occlusion disorders and bruxism [1, 2, 3, 4]. Later studies [5, 6, 7], however, did not confirm the hypothesis that occlusion disorders cause episodes of bruxism. Although the improvement of the occlusal contacts affects the function of the stomatognathic system, their distribution probably does not contribute to bruxism. One factor that appears to influence bruxism-related activity is emotional stress. Early studies on the intensity of nocturnal activity associated with bruxism showed an increased intensity of the masseter stimuli associated with stressful situations [7, 8, 9, 10].

Various psychosocial factors associated with bruxism have also received much attention in the literature. A number of studies have shown a relationship with bruxism of certain personality traits (e.g., aggression or emotional suppression) [11, 12 – 15], psychosocial factors (e.g., perceived time pressure or competition) [16, 17], and psychological stress (cf. stressful lifestyle) [23, 16 – 20]. Anxiety and neuroticism personality traits have especially been reported in individuals with bruxism [11, 19 – 22]. By inference, bruxism is supposed to be inducted centrally, with the somatic effects found in the stomatognathic system (i.e., muscle tenderness, limitation of jaw movements, oral and facial pain, headache, and tooth wear or fracture) [24].

Regardless of the definition, bruxism, being a somatic symptom disorder, is related in time with stressful events or problems. Nonetheless, the literature does not provide a definite conclusion whether bruxism is associated with psychological dispositions or transient states of a psychosocial character.

### **BRUXISM PHYSIOLOGY:**

The most common occlusal parafunction, which is harmful to the masticatory system, is bruxism. The definition of bruxism according to the International Classification of Sleep Disorders published online in 2013 refers to bruxism as "repetitive mandibular activity characterized by the clenching or grinding of the teeth and / or the stiffening or protrusion of the lower jaw" both subconsciously and consciously [25 – 27]. Patients are often unaware of the existence of bruxism, cause it occurs mainly during sleep [28].

The clinical symptoms of bruxism include changes in the chewing surfaces and incisal edges of the teeth in the form of abnormal, excessive wear, leading to lowering the height of the crowns and the formation of visible unevenness. As a result of bruxism, teeth break, as well as damage to prosthetic restorations.

The phenomenon of bruxism (grinding or clenching of teeth during sleep or awake) affects millions of people throughout the world. It has been thought that bruxism may be genetic in origin, influenced by psychosocial factors, link to several concomitant physiological and pathophysiological events during sleep, as well as caused or perpetuated by occlusal discrepancies.

At present, however, bruxism is generally considered to be centrally regulated, with peripheral factors playing only a minor role in its etiology [29].

Often, as much as 86% of patients, the consequences of bruxism are pain located in the face, masseter muscles, as well as in the neck, back, throat, and arms. Tension headaches, pain in the area of the temporomandibular joint and tinnitus are reported by 65% of patients. Decreased libido was reported in 50% of patients and sexual dysfunction in 38%. Bruxism is accompanied by nocturnal awakening responsible for the occurrence of excessive daytime sleepiness, slowing down and attention deficits in 80% of patients. As a result, approximately 55% of patients with bruxism experience daily discomfort [30].

Bruxism and bad habits cause changes in tooth enamel. There are abrasions on the surface of crowns, fractures, excessive mobility, mesial tooth displacement or their apparent eruption occur. Occlusion disorder is a destructive factor in the course of periodontal disease and accelerates bone tissue damage [31].

### **EPIDEMIOLOGY OF BRUXISM:**

For many years, bruxism has been one of the least understood and most widespread, destructive and harmful disorders affecting the masticatory system [32 – 34].

Over the years, various theories regarding the etiology of bruxism have emerged and have been challenged. Some have been refuted, others are still waiting for constructive criticism.

Later, the dominant theories (but now considered excluded and obsolete) were those that bruxism was closely related to malocclusion and anatomic problems.

In the following years, new theories emerged linking bruxism with increased CNS impulses and psychogenic factors (i.e., stress) - these theories have become the most common and recognized today.

In addition, studies have shown that patients with bruxism have higher levels of urinary catecholamines compared to those without bruxism. These findings also confirm the link between emotional stress and bruxism.

Is it merely behavior, a risk factor that dangerously increases the likelihood of the disorder, or is it the same disorder with only a destructive habit? Perhaps because of its multifactorial aetiology, or because of a controversial understanding of its mechanism, many authors are still unsure how to assess bruxism [35].

A possible explanation could be related to the pathophysiological factors [36] modulating the bruxism: mainly regulated centrally [38] a multidimensional phenomenon, [37] and associated to perceived stress [39]. On these bases, we hypothesize a possible cascade – It could start from the psychosocial factors, tied to stress, and then could act via central factors, tied to neurotransmission from the brain to the chewing muscles. These could transfer the burden of stress on the teeth through peripheral factors, and these could finally cause the occlusion interferences.

#### **THE PRESENCE OF STRESS AND THE OCCURRENCE OF BRUXISM:**

The occlusal syndrome is an expression of the patient's fight with himself and with the surrounding circle.

Bruxism is an expression of experienced stress. Every day people are exposed to conflict situations, stress situation. Stress-induced responses are considered to be the body's physiological responses [40]. The differences are between individual patients. Everyone reacts to stressful situations in their own way. Pain symptoms are the most common reason for a patient's consultation and appear in the absence adaptation of structures of the temporo-mandibular joint and muscles to situation.

It seems that patients with the stomatognathic system disorders, especially with their chronic forms, experience intensified anxiety, frustration and anger. The presence of these features seems to increase the intensity of stress, which may lead to the induction of dysfunction [42, 43]. Depression and anxiety related to important aspects of life may change the patient's perception and tolerance of disorders, prompting him to seek therapeutic help [41, 44 – 46].

Occlusal disorders are more common in women than in men. A typical patient with cranio-mandibular dysfunction is a woman aged 40 to 45 [47]. In men, stress puts pressure on other organs, such as the heart - promoting a heart attack, and the stomach- causing ulceration. Changes taking place in society are conducive to stress and cause in women neurovegetative disorders typical of men so far.

In researches among women with bruxism, the most significant difference compared to the control group was excessive stress sensitivity. It is emphasized that the anxiety personality and the attitude towards achieving success play an important role in the formation of bruxism. Chronic stresses alter the sensitivity of the receptors in the muscles, which over-stimulate causes increased and uncontrolled contraction of the masseter muscles. Contemporary woman, apart from problems of a personal and family nature, bears the burden of responsibility associated with her professional activity. No wonder that it affects her health - also in aspect of teeth.

Also, many studies have shown the correlation between bruxism and stress that affects the quality of life of university students.

Theories about the origin of bruxism [48] have hypothesized different types of factors: peripheral, connected to teeth occlusion interferences, central, connected to neurotransmission from brain to chewing muscles and psychosocial, associated to stress. According to current literature, stress plays an important role in the pathogenesis of bruxism.

The number of studies on the relationship between bruxism and stress in university students has increased in recent years: the university setting, with its transitional nature, commitment and challenges [50 – 52], can be a time in which students can either learn to cope with it or remain unaware of its presence and become prone to its negative effects. Thus, the prevalence of bruxism, and its correlation with perceived stress in a group of Italian University students was investigated.

In terms of studies in the specific college/university setting, an association between bruxism and stress has been shown [49, 55 – 58], and literature reports an increase in the incidence of self-reported nocturnal bruxism in college students over the last decades [49].

Notwithstanding the limitations, it is possible to affirm that university students show a higher awake bruxism and stress levels in relation to the general population, that a correlation exists between awake bruxism and stress, and that there is a gender difference for the presence of stress. It is also possible to state that the correlation between stress and awake bruxism, is gender-related, being present only in male university students.

The correlation between stress and bruxism is reported in current literature: for example, this finding was reported in a previous study on occupational stress [54], and, more specifically, in university students stress can induce neuromuscular alterations in the mouth and jaw, increasing the general prevalence of temporo-mandibular disorders.

In addition, the finding of a higher bruxism prevalence for students in respect of the general population data appeared to be consistent with current literature; moreover, recent literature has shown levels of bruxism up to 83% in dentistry students [53].

## **TREATMENT:**

If it is suspected that stress of significant intensity is the factor causing the disorder in a patient, it should be treated to reduce it. It should include simple, non-invasive methods. If initial stress relief treatment is not working as expected, the physician should contact staff specialized in behavior modification and psychotherapy. Patients for whom therapy does not bring tangible results may suffer from disorders that are most effectively treated by other specialists.

One of the most effective methods of reducing stress is establishing a positive relationship between the doctor and the patient. The basis of this process is the physician's awareness that the patient came to his office seeking help in relation to his pain and dysfunction. Pain, especially of a chronic nature, generates stress, which additionally aggravates the entire problem. The patient's uncertainty related to doubts about the scale of the problem as well as the lack of trust in the therapeutic methods proposed by the doctor may also contribute to the intensification of stress and emotional tensions. The physician should communicate with the patient in a warm, courteous manner which should increase confidence. The patient should also be presented with a thorough discussion of the problem, emphasizing (if true) that the condition is not as serious as previously thought. The clinician should make every effort to minimize the patient's fears, frustration, hostility, anger, or even fear [59].

There are many hypotheses regarding the psychotherapy of bruxism in the literature. Those that can also be considered to lower the level of stress and have a positive effect on the reduction of the symptoms of the disease are, for example, psychoanalysis, autosuggestion, hypnosis, progressive relaxation, meditation, self-monitoring, sleep hygiene, habit reversal / habit retraining and massed practice.

Relaxation, along with meditation, are supposed to affect not only calming down, but also greater awareness of the body. At the beginning of the 21st century, Restrepo et al. examined the use of 6 months of therapy on 33 children with symptoms of bruxism. During the study, the children were to learn relaxation techniques to control stress and thus tension, which negatively affected the symptoms of bruxism. The use of these psychological methods made their anxiety levels lower, and thus easier to cope with bruxism [60].

In primary awake bruxism, increased levels of anxiety and stress as well as somatic symptoms were noted. It is for this reason that it has been suggested that this form of bruxism could be treated not only with habit changes, but above all with relaxation therapy. However, there are no randomized clinical trials supporting the effectiveness of this therapy.

However, taking into account sleep bruxism and the use of relaxation therapy, only one randomized clinical trial was conducted in which the effectiveness of relaxation therapy in combination with sleep hygiene was tested, which included, for example, no drinking alcohol or coffee just before going to bed. However, no statistically significant correlations were found between the use of such combined therapy for 4 weeks and the reduction of bruxism symptoms [61].

Just as the whole topic of work is about the effect of stress on the onset of nocturnal bruxism, coping with stress should reduce symptoms of this disease. Giraki et al. examined both the impact of stress on bruxism and the ability to deal with stress to reduce symptoms of bruxism. In their work, they confirmed their main theses that bruxism is all the more serious when someone is more stressed in everyday life or at work (the stress level was tested using Kurzer Fragebogen zur Erfassung von

Belastungen, KFB). People with higher symptoms of bruxism (checked with the Bruxcore-Bruxism-Monitoring-Device (BBMD, Bruxcore, Boston, USA) also scored worse in the survey checking how they cope with stress (Stressverarbeitungsfragebogen-78, SVF-78) [62].

If it is suspected that a significant etiological factor contributing to the occurrence of bruxism in a particular patient is high intensity stress, then anxiolytic drugs (i.e. anxiolytics) may be effective in this case [64, 65]. The physician should remember that they do not reduce stress, but only reduce the patient's sensitivity and response to stress. The use of anxiolytic drugs is therefore a supportive treatment. A frequently used group of drugs are those belonging to the group of benzodiazepines, among which diazepam (Valium) deserves attention. A single dose (2.5–5 mg) of diazepam at bedtime is recommended to relax the muscles and possibly reduce nocturnal parafunctional activity [63, 66].

## **SUMMARY:**

Contrary to personality traits, various emotional states can exert a fundamental influence on human behavior patterns. The analysis of the emotional states of patients with temporomandibular dysfunctions provided several authoritative results. Most of the patients showed an increased level of anxiety - however, it was not possible to state unequivocally whether this observation was the cause or a consequence of the symptoms of abnormal function [69, 71, 73 – 80]. Probably both phenomena can be confirmed in reality, pointing to the complementary effect-causal relationship in this case.

Other frequently detected emotional states are anxiety, frustration, hostility, anger and fear [70,71, 72, 74, 81, 82]. The resultant of all these features is a benchmark for the intensity of stress experienced by the patient.

On the basis of other research processes [67, 68, 73, 83, 84] it has been shown that the intensified level of emotional tensions may lead to the intensification of parafunctional activity in the stomatognathic system. It can manifest itself not only in tooth grinding but also a general increase in muscle tonicity [69]. Therefore, a correlation can be found between the intensification of the feeling of fear, anxiety, frustration and anger, and increased muscle tension. It is therefore imperative that the clinician also pay attention to these problems when conducting a medical history of the patient. However, there are no psychological tests that would allow to recognize whether certain emotional states may contribute to increased muscle activity [85, 86].

It is believed that individuals with bruxism develop this habit because of the influence of emotional factors, such as having to deal with an accumulation of tasks, loss, expectations, conflict, self-image, self-esteem, and anxiety [87, 88, 89 - 91]. The capacity to deal with stress is unique to each individual and may be directly related to the formation of individual personality [88].

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