CHAPTER
30

Presence of bruxism and temporomandibular joint dysfunction during the COVID-19 pandemic: Literature review

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ABSTRACT
The COVID-19 pandemic caused a series of deleterious changes to the health and well-being of the population, the literature points to an increase in cases of bruxism and temporomandibular disorders due to the tension, stress and anxiety experienced during the coronavirus outbreak in the world. Therefore, the objective of this study was to carry out a literature review on the increase in symptoms of temporomandibular disorders (TMD) and bruxism in the population during the pandemic period. Electronic searches were carried out in PubMed, LILACS and the Virtual Health Library (BVS) for articles published between 2019 and December 2022. The pandemic caused an increase in symptoms of stress and anxiety, important factors for a higher prevalence of TMD and bruxism among adolescents and adults. Although these conditions are routinely present in the population, they can lead individuals to pain and disability, so health promotion measures can be used to prepare the population for pandemic episodes.

Keywords: Coronavirus, facial pain, temporomandibular joint dysfunction syndrome, bruxism.

1 INTODUCTION

The Covid-19 pandemic caused a series of deleterious changes to the health and well-being of the population since it modified the pattern of licit and illicit drug consumption, as well as changes in sleep and reduced physical activity practices.1, 2

About the area of Dentistry, the literature points to an increase in cases of bruxism and temporomandibular disorders due to the tension, stress and anxiety experienced during the coronavirus outbreak in the world.3,4

Temporomandibular disorders are a set of symptoms and signs that affect the masticatory muscles, the temporomandibular joint and associated structures, causing damage to the functions of the stomatognathic system, impacting the quality of life of individuals.5

Its etiology is multifactorial and may be related to anatomical, systemic, pathophysiological, psychosocial and trauma factors.6

Bruxism, on the other hand, is a parafunction characterized by unconscious activities of the masticatory muscles rhythmically and constantly that manifests itself through the activities of squeezing and grinding the teeth.7

According to Almeida-Leite (2020)8, the pandemic had a major impact on the field of Dentistry, since it is evident that psychological factors increase the risk of developing and maintaining bruxism and TMD, so the dental surgeon must be aware of the factors that lead to its emergence, and then the definition of the correct management of alterations that afflict the temporomandibular joint and bruxism.

Therefore, this theme leads to the following question: What were the factors that led to the increase in TMD and bruxism during the COVID-19 pandemic? Based on what has been mentioned, this study is justified by the increase in cases of TMD and bruxism that were evidenced during the pandemic and also by the relevance of adequate knowledge of these cases for their correct dental management.

Therefore, the general objective of this study is to carry out a literature review on the increase in symptoms of temporomandibular disorders and bruxism in the population during the pandemic period. And to understand the theme, the following specific objectives were outlined: Knowing the general aspects of TMD and bruxism; understanding the importance of psychological aspects in the development of these conditions and describing the appropriate management of bruxism and TMD.

And to achieve these objectives, searches were carried out for articles on the following research platforms: Biblioteca Brasileira de Odontologia – BVS, Scielo, and Pubmed through articles published in the years 2019 and 2022 in Portuguese and English.

2 THEORETICAL REFERENCE

2.1 GENERAL ASPECTS OF TMD AND BRUXISM

The temporomandibular joint (TMJ) is a hinge-arthrodial anatomical structure, which encompasses the cranio-cervical-mandibular complex associated with the functions of phonation, mastication, swallowing, breathing and jaw posture.

Its close relationship with cervical structures associated with its complex neurophysiology makes it the focus of study in several health areas such as speech therapy, otorhinolaryngology, neurophysiology, psychiatry, psychology, and dentistry, among others.5

The term TMD is used to define a group of musculoskeletal conditions that involve pain and/or dysfunction in the TMJ, masticatory muscles and related structures. TMD is considered one of the main causes of orofacial pain of non-odontogenic origin.6

Its etiology is multifactorial, encompassing several factors: psychosocial components (depression, anxiety, stress, etc.), genetic and environmental factors (smoking), direct or indirect trauma, microtrauma due to parafunctional habits, and local factors.5,9

There are a consistent association with other pain conditions (such as chronic headaches), fibromyalgia, autoimmune disorders (such as Sjogren's syndrome, rheumatoid arthritis, and lupus erythematosus), psychiatric illnesses, and sleep apnoea.10

Its symptomatology includes orofacial and TMJ pain, headache, dizziness, tooth wear, clicking sounds, tinnitus, crepitus, pain in the neck, pre-auricular and auricular region, the sensation of aural fullness, hearing loss and restriction of amplitude in the opening of the ear. mouth.9

TMD can affect between 5 and 12% of the population, with at least 5% of patients seeking medical and/or dental treatment. As for gender and age, the female population under 30 years of age is more affected than men.10

Therefore, TMD is considered a chronic disease.5 For DC, given the combination of clinical, psychosocial and systemic manifestations, its diagnosis is a challenge. Therefore, TMD must be evaluated and treated by a multidisciplinary team composed of a CD, a speech therapist, a psychologist, a physiotherapist and a physician.11

The term bruxism refers to a repetitive, periodic, involuntary and excessive activity of the masticatory muscles through clenching/grinding of the teeth.7

Bruxism shows the same incidence in both sexes; however, it is more frequent in children and young adults, becoming less common in old age, its etiology is multifactorial.12,13

It is divided into two types: nocturnal and daytime. Awake bruxism (also known as daytime bruxism), occurs during the day or when the individual is awake, and in sleep bruxism. The latter is subclassified into primary or secondary and phasic or tonic.7

People who practice wakefulness bruxism may clench, grind their teeth, or have other parafunctional habits, such as biting the inside of their cheeks, tongue, or fingernails.

The movement of daytime bruxism is usually more like grinding than grinding and is usually not audible, and when accompanied by symptoms, they get worse as the day progresses. Daytime bruxism is more common in women.12

Sleep bruxism is a motor alteration characterized by the intense activity of the masseter and temporal muscles, causing non-functional contact of the teeth spontaneously.12 When primary, it has an unknown etiology. It is a chronic, continuous disorder, controlled by the central nervous system,

usually appearing in childhood or during adolescence.13 Secondary disorders are associated with neurological and psychiatric disorders, sleep disorders and medication administration.14

Bruxism can cause tooth wear, non-carious cervical lesions, tooth fractures, tooth hypersensitivity, fractures of restorations, crowns and partial and fixed prostheses.14,15

Incisal/occlusal wear is the loss of tissues in the tooth (dentin, cement and enamel) due to mechanical friction between the dental arches, causing changes in the morphology of the teeth.16

Generally, bruxism causes pain in the jaw muscles, headache and severe damage to the oral cavity such as loss of periodontal support, hypertrophy of the masticatory muscles, tendency and stiffness in the jaw muscles, pain in the temporomandibular and pre-auricular region.14

2.2 IMPORTANCE OF PSYCHOLOGICAL ASPECTS IN THE INCREASE OF TMD AND BRUXISM DURING THE COVID-19 PANDEMIC

During the proliferation of the virus, everyone's lifestyle changed drastically, profoundly affecting not only health systems, the economy but also social relationships.1

Although social isolation measures were important for controlling the spread of the virus, such measures generated psychological suffering for the population, such as anxiety, depression and sleep disorders.17

In addition to the increase in cases of bruxism and temporomandibular disorders. 3,4,8,18,19 According to Okeson (2019)9 the emotional centers of the brain influence muscle function.

The hypothalamus, the reticular system, and particularly the limbic system is primarily responsible for the individual's emotional state.

These centers influence muscle activity in many ways, one of which is through the gamma-efferent pathways. Stress affects the body by activating the hypothalamic-pituitary-adrenal (HPA) axis, which in turn prepares the body to respond to the autonomic nervous system.

The HPA axis, through complex neural pathways, increases the activity of gamma motor neurons, which causes intrafusal muscle fibers to contract.

The overall effect is an increase in muscle tone. therefore, emotional stress needs to be understood, as it often plays an important role in TMD.6,9

This relationship can be explained by the fact that the jaw and face muscles are responsible for expressions related to fear, anger, aggression and happiness.19

Parafunctional habits such as clenching/gnashing the teeth, biting the cheek, lips, tongue and objects, chewing and sleeping on one side, and biting nails have well-defined emotional aspects as a scenario, and serve as a means of releasing tension and, consequently, there is a strong association with TMD.20,21

Individuals with higher levels of stress are more prone to bruxism and TMJ disorders and, in general, excessive stress has several implications for quality of life, as it raises levels of the hormone cortisol, which in turn is responsible for adapting the human organism to stimuli from the external environment.22

In this scenario, through stressful situations similar to what was experienced during the pandemic, in addition to cortisol, the human body also triggers the release of adrenocorticotropic hormone, which, associated with cortisol, increases the degree of pain perception, especially in psychologically vulnerable individuals.18

According to Puppin et al. (2021)4 bruxism is a parafunction directly associated with psychological aspects, since most bruxism individuals are anxious and depressed, that is, emotional tensions are manifested in their own body as self-harm.

According to Generoso et al. (2022)19 during the pandemic, bruxism symptoms were more frequent and intense, profoundly affecting the well-being of individuals, as there was a sudden reduction in physical activities and interpersonal relationships.

Vladutu et al. (2022)23 assessed the relationship between bruxism and anxiety in students at the Faculty of Dental Medicine in Craiova, Romania, using questionnaires in the year 2021.

Stress was assessed by the presence of signs such as nervousness, tachycardia, tension, and symptoms related to sleep, such as difficulty falling asleep and disturbed sleep, as well as sleep deprivation and feeling tired during the day.

Anxiety was analyzed according to the following signs: panic, feeling that something bad was going to happen and feeling fearful for no reason. Bruxism was self-reported through the frequency of episodes that occurred. 328 students, aged 21 to 41, participated in the survey.

The presence of signs of bruxism was reported by 39.33% of the participants, mostly women, being related to older age.

Significant associations were found between the increase in stress levels after the onset of the COVID-19 pandemic with the frequency of self-rated bruxism, the main symptoms being pain in the muscles during chewing and in the neck muscles.

2.3 DENTAL MANAGEMENT OF BRUXISM AND TMD

During the confinement imposed by the Covid-19 pandemic, only essential services were allowed to operate under a strict hygiene scheme and with the use of personal protective equipment against the spread of the virus, this same dynamic happened in dental offices and clinics. In most countries, dentists have been instructed to limit their practices to emergency dental care.4

The diagnosis of TMD is generally performed by dental surgeons (CD) through consultation and oral clinical examination, and some imaging tests (radiography and magnetic resonance imaging) may be requested to corroborate the final diagnosis.

However, the DS must take into account that psychological factors such as depression, anxiety, and diseases such as Parkinson's and schizophrenia can trigger TMD, that is, the DS must verify the origin of this dysfunction.

In some cases, the treatment must be multidisciplinary, with a referral to a professional psychologist.4

Treatments are varied, due to the multifactorial aspects of TMD and should be performed in a multidisciplinary environment, however, these therapeutic modalities should be conservative, non-invasive and reversible whenever possible, and adapted to the patient's psychosocial condition.6,24

One of the first conservative management is self-care aiming at patient autonomy in controlling their symptoms in recurrent episodes of TMD.4

TMD treatments include pharmacological therapy, psychological interventions, physiotherapy, acupuncture, botulinum toxin application, surgical intervention, laser therapy, orthodontic treatment, thermotherapy, transcutaneous neuromuscular electrical stimulation, myofunctional exercises, dry needling and manual therapies.6,24,25

The treatment of bruxism, as well as TMD, demands a multidisciplinary approach, from dentistry to physiotherapy, being relevant to consider the oral, medical and psychological aspects of the patient.

And the earlier the better, as it is possible to minimize and/or prevent complications caused by bruxism.13

The treatment plan must meet the following objectives: reduction of physical and psychological stress, treatment of signs and symptoms, reduction of occlusal interferences and alteration of the patient's usual neuromuscular pattern.13

Some authors recommend sleep hygiene and relaxation techniques because they are easy to perform daily, and include maintaining a routine or habits that make sleeping as pleasant as possible.

By controlling the light, avoiding the ingestion of caffeine-based beverages and keeping the environment silent.13,26

The occlusal splint is also a recommended treatment for bruxism, its installation aims to improve painful symptoms, as it helps to reduce hyperactivity of the temporal muscle during rest and of the electromyographic activity during contraction for the masseter.14

In cases where the patient with bruxism has worn or fractured teeth, the DS must remove the cause and carry out the restorative treatment, taking into account the functional and aesthetic aspects, paying attention to the most appropriate choice of a resistant material similar to dentin.27

In the field of physiotherapy, the following methods are employed: ultrasound, therapeutic massage, infrared light, cryotherapy, kinesiotherapy and low-intensity laser therapy, microcurrent and transcutaneous electrical neuromuscular stimulation and microcurrent.28

Finally, the literature also points to the use of biofeedback psychotherapy for the treatment of bruxism and is based on the idea that bruxists can "unlearn" this parafunction.

This therapy is performed with the aid of an electromyographic monitor (EMG), and can also be applied through auditory, vibratory or gustatory stimuli.14

3 DISCUSSIONS

With the gradual return of dental activities, it was possible to observe an exponential increase in problems related to oral health arising from the pandemic.25

Emodi-Perlman and Eli (2021)3 published one of the first prospective studies on cases of TMD, orofacial pain and bruxism during the first year of the Covid-19 pandemic.

The study data revealed that people with chronic TMD had a greater deterioration of the psychological state and an increase in orofacial pain when compared to individuals with bruxism, despite this parafunction being strongly associated with psychological aspects such as anxiety and stress.

Data that agree with the study by Vladutu et al. (2022)23 in which the pandemic was a predictor for a higher prevalence of muscle pain, associated with greater anxiety and stress in adults.

Generoso et al. (2022)19 conducted a cross-sectional study that evaluated the repercussions of the covid-19 pandemic on psychological factors and their link with bruxism from a sample of 1476 individuals from five Brazilian macro-regions (north, northeast, south, southeast and central- west).

The results showed that all respondents stated that during social distancing they felt more stressed and nervous, 77% of them reported that muscle pain, headache, facial pain and muscle pain (neck and shoulder) worsened during this period. 87% of respondents reported teeth clenching symptoms during the day, 57% declared teeth grinding and 71% reported both teeth grinding and clenching during the Covid-19 pandemic.

Corroborating with the aforementioned authors, Dadnam et al. (2021)29 state that there has been an increase in patients with TMD characteristics and bruxism who have dental wear, orofacial pain and dental fractures attributed to grinding and jaw clenching, especially in individuals who have a worsened psycho-emotional status.

Wu et al. (2020)30 believe that patients with TMD have a high degree of sympathetic activity with greater release of adrenocortical hormones, leading to vasoconstriction and increased peripheral vascular resistance, triggered by the emergency and threat caused by the pandemic.

The studies, included in this review, evaluated the possible relationship of COVID-19 in the appearance and worsening of temporomandibular symptoms, despite the complexity that involves the etiological factors, clinical signs and symptoms of dysfunctions in the temporomandibular joint, the authors share the opinion that patients with TMD present psychological alterations such as sadness, anxiety and anguish.29,30,31

This fact can be explained by the rapid changes in people's lives that the pandemic brought, the fear of infection and death from the virus and mandatory quarantines.

Social distancing ended up triggering feelings of anxiety, and stress that in turn had repercussions on the human body, with bruxism being one of the alterations of the stomatognathic system most cited in studies that portray oral health during the pandemic.3,4,8,31,32

A survey conducted in China by Wu et al. (2020)30 compared patients with TMD with the general population and a population of orthodontic patients regarding the feeling of psychological distress (sadness, insecurity, mood swings, guilt, malaise, among other feelings). Individuals with TMD, when compared to two other population samples, had higher levels of psychological distress, especially young females.

Winocur-Arias et al. (2022)31 carried out a prospective study in Israel to assess the effects of the coronavirus pandemic on the prevalence of bruxism, oral parafunction and painful temporomandibular disorders and assess the influence of the pandemic on both sexes.

The study included 288 patients, where 108 patients were evaluated before the pandemic era and 180 during the pandemic. Data revealed that parafunctional activities were more prevalent in men (78%) than in women patients (62%) during the pandemic, however, bruxism (sleep and wakefulness) was more common in women.

Gaş et al. (2021)1 examined the association between sleep quality, depression, anxiety and stress levels, and the frequency of temporomandibular disorders in 699 dental students at a university in Turkey during the COVID-19 pandemic.

The results show that 77.5% of the students had TMD symptoms, the prevalence was higher among female students. In addition, it was observed that these students had high levels of anxiety, stress and depression that directly affected sleep quality.

Peixoto et al. (2021)32 evaluated the psychosocial status, sleep quality, TMD symptoms and bruxism in Brazilian dentists (DC) during the COVID-19 pandemic.

The sample consisted of 641 DS divided into three groups (CD in quarantine; DC in outpatient setting and frontline professionals), who answered an electronic form containing 5 questionnaires referring to screening for orofacial pain and TMD, sleep quality, scale of anxiety, depression and stress and waking bruxism.

TMD was found in 24.3% of respondents, while sleep bruxism was diagnosed in 58% and wakefulness bruxism in 53.8%, respectively.

Depression was more significant in CDs who were in quarantine than in those who were working on an outpatient basis and the frontlines in the fight against the coronavirus.

The results of Peixoto et al. (2021)32 suggested that social isolation had a more negative impact on the lives of CDs than the act of actively working.

4 FINAL CONSIDERATIONS

Due to what was mentioned in the literature review, the Covid-19 pandemic triggered not only changes in various sectors of society but also in people's lives, especially concerning psychological aspects due to social isolation measures.

It was observed during the preparation of the study that symptoms of stress and anxiety were important factors that influenced the increase in cases of temporomandibular disorders and bruxism.

Therefore, the knowledge gained from this study contributes to a greater understanding of the role of stress and anxiety as factors that promoted the increase in cases of TMD and bruxism in several individuals around the world during the covid-19 pandemic.

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