

## COVID-19 and Painful Temporomandibular Disorders: what does the dentist need to know?

## COVID-19 e Disfunções Temporomandibulares Dolorosas: o que o dentista precisa saber?

Jean Soares **MIRANDA**<sup>1</sup>  <https://orcid.org/0000-0001-5379-0155>

Letícia Ladeira **BONATO**<sup>2</sup>  <https://orcid.org/0000-0002-2171-1181>

Ricardo de Souza **TESCH**<sup>3</sup>  <https://orcid.org/0000-0002-2060-0981>

### ABSTRACT

COVID-19 outbreak may lead to major impacts in applied oral sciences. Remarkably, it could be expected that factors associated to pandemic may lead to a greater risk of developing, worsening and perpetuating TMD and its associated risk factors. This non systematic literature review aims to discuss how the COVID-19 pandemic can influence the emergence, maintenance or worsening of TMD worldwide. During epidemics: the number of people whose mental health is affected tends to be greater than the number affected by the infection, and fear increases anxiety and stress levels in healthy individuals; chronic pain patients probably not receipt important treatments; overuse of medications becomes frequent; there are manifestation of unconscious oral parafunctional habits and poor sleep quality. All these facts represent risk factors common to TMD. Dentists should be aware of these issues and adapt their practices to properly diagnose and treat these patients within a multifactorial approach, increasing the quality of life of these individuals.

**Indexing terms:** Coronavirus. Pandemias. Temporomandibular joint dysfunction syndrome.

### RESUMO

*O surto de COVID-19 pode causar grandes impactos nas ciências relacionadas a odontologia. Notavelmente, pode-se esperar que os fatores associados à pandemia possam levar a um maior risco de desenvolver, agravar e perpetuar a DTM e seus fatores associados. Esta revisão não sistemática da literatura tem como objetivo discutir como a pandemia de COVID-19 pode influenciar no surgimento, manutenção ou agravamento da DTM em todo o mundo. Durante as epidemias: o número de pessoas cuja saúde mental é afetada tende a ser maior do que o número afetado pela infecção, e o medo aumenta os níveis de ansiedade e estresse em indivíduos saudáveis; pacientes com dor crônica provavelmente não recebem tratamentos importantes; o uso excessivo de medicamentos torna-se frequente; há manifestação de hábitos parafuncionais orais inconscientes e má qualidade do sono. Todos esses fatos representam fatores de risco comuns à DTM. O dentista deve estar atento a essas questões e adaptar sua prática para diagnosticar e tratar adequadamente esses pacientes dentro de uma abordagem multifatorial, aumentando a qualidade de vida desses indivíduos.*

**Termos de indexação:** *Coronavírus. Pandemics. Síndrome da disfunção da articulação temporomandibular.*

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<sup>1</sup> Universidade Federal de Juiz de Fora - Campus Governador Valadares, Departamento de Odontologia. Rua São Paulo, 745, Centro, 35010-180, Governador Valadares, MG, Brasil. Correspondence to: JS MIRANDA. E-mail: <jean.miranda@ufjf.br>.

<sup>2</sup> Universidade Federal Fluminense. Rio de Janeiro, RJ, Brasil.

<sup>3</sup> Faculdade de Medicina de Petrópolis. Petrópolis, RJ, Brasil.

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## **INTRODUCTION**

Temporomandibular disorders (TMDs) is a generic term that consists of a set of conditions that affect different musculoskeletal structures involving and/or associated to the temporomandibular joints (TMJs) and masticatory muscles [1], with direct and indirect costs of up to US\$ 4 billion for American society in the last decade [2]. This TMDs can be asymptomatic or manifest as an episodic or chronic pain with dysfunctional episodes to the stomatognathic system. However, it is also common to find patients with TMD seeking treatment to others associated or comorbid symptoms, such as headaches and otological manifestations [3].

The contemporary multifactorial and biopsychosocial approach to the diagnosis and management of TMD focuses on the integration of biological, psychological and social factors that moderate the occurrence, maintenance and remission of TMD [1, 4]. As the manifestation of these conditions is often influenced by the interaction of different genetic [5] and environmental aspects [2], several risk factors are usually involved in their development, whether they are psychological (anxiety, somatization, depression, and pain catastrophizing) and/or biological (gender, oral parafunctions, internal or external injuries) [4].

The long lasting epidemic outbreak that started in the Chinese city of Wuhan last December, caused by the new coronavirus (COVID-19) and its related severe acute respiratory syndrome (SARS-CoV-2), created a dangerous and deadly health problem causing concerns to the international community with cases confirmed in mostly all countries of the world. This new health problem is scaring the entire globe with severe clinical, psychological, emotional personal consequences and health system collapse and economic slowdown [6].

Thus, during this challenging period, it is extremely common for individuals to be exposed to risk factors commonly related to TMD, such as high levels of anxiety and stress [7], low quality of sleep due to the imposition of quarantine and self-medication [8].

In addition, postponing non-emergency dental and medical care has a potential impact on the experience, cognition, treatment and rehabilitation of patients with oral diseases, such as TMD [9]. It is believed that these factors can perpetuate pre-existing TMD and increase the incidence of the condition in the general population. Thus, this nonsystematic literature review aims to discuss how

the COVID-19 pandemic can influence the emergence, maintenance or worsening of TMD worldwide.

## **METHODS**

A non-systematic search was performed to identify articles relating the areas of TMD and orofacial pain and COVID-19 to each other. For this purpose, searches were performed in the PubMed and SciELO databases, using the following MeSH terms: "temporomandibular disorders", "temporomandibular joint", "temporomandibular joint disorders", "orofacial pain", and "COVID-19". Literature reviews, systematic reviews, meta-analysis, observational studies and clinical trials published between 2001 and 2020 were included.

### **The emotional impact of COVID-19**

The World Health Organization (WHO) declared COVID-19 a pandemic illness presents over 110 countries and territories around the world. Infectious disease outbreaks such as COVID-19, as well as other public health disturbing events, can cause emotional distress and anxiety, even in people without high risk of morbidity, as they face the fear of a virus that laypeople may not be familiar with [10]. Thus, the uncertainty and low predictability of the consequences of COVID-19 infection not only threaten people's physical health, but also affect people's mental health, especially in terms of emotions and cognition [11].

The COVID-19 pandemic carries an overload of stressful events, such as the loss of employment, financial insecurity, social quarantine, and deaths of family members or friends [12]. Just in Brazil up to 14,5 million cases were diagnosed and more than one hundred thousand of them had been fatal [13].

During epidemics, the number of people whose mental health is affected tends to be greater than the number affected by the infection [14,15]. In a pandemic, fear increases anxiety and stress levels in healthy individuals [15]. Many clinically stable COVID-19 patients suffer from significant post-traumatic stress symptoms [16], defined as a psychological reaction to a negative event [17], with significant detrimental impact. In such cases, appropriate psychological interventions and long-term follow-up assessments should be promptly implemented [16].

Moreover, there is a significant relationship between painful TMD, depression and anxiety [18]. Psychological responses to threatening situations, such as those faced during the COVID-19 pandemic, can trigger a chain of events that culminate in higher levels of sympathetic activity in response to stress and a consequent hyper-excitability of primary afferent sensitive neurons responsible for the recognition and conduction of painful stimulus to the central nervous system [19]. This cycle can initiate or amplify the pain, especially in psychologically vulnerable individuals. Therefore, post-pandemic signs and symptoms of chronic orofacial pain, including TMD, are expected to occur in a pattern similar to the described post-traumatic stress syndrome [19].

### Chronic pain and self medication

Chronic pain causes significant suffering, limitation of daily activities and reduced quality of life. During the COVID-19 pandemic, chronic pain patients are probably not receiving important treatments due to the reallocation of resources and reduction health care offer, both intending to limit the spread of the infection and to save lives of the infected ones. So, the current COVID-19 pandemic is associated to a significant disruption in the treatment of chronic or subacute pain conditions [20].

The impact of treatment interruption may have consequences in pain intensity and related disability and functional impairment, that may include decreased mobility and reduction in overall health status. Consequently, overuse of medications becomes frequent, including opioid abuse with its associated risks [20]. Even worse, people are adopting not only the self-medication but also self-dosing [8]. The Brazilian Health Surveillance Agency (ANVISA) released a video on the danger of self-medication but, unfortunately, the material only refers to the use of a specific drug, hydroxychloroquine [8].

To minimize the impact of the pandemic on patients with chronic pain, important issues need to be addressed, including ensuring continuity of care and pain medications, especially anti-inflammatory drugs, steroids and opioids; the use of telemedicine; maintenance of biopsychosocial management; and the allowance and priority to the necessary clinical sessions [21].

### Parafuncional habits

Regarding TMD manifestations, one important link between them and the individual impact of emotional

and psychological traumatic events is the evidenced manifestation of unconscious oral parafunctional habits, such as teeth clenching, as part of the so called awake and/or sleep bruxism [17]. These parafunctional activities are considered together one of the most important risk factors for TMD development and maintenance [22].

Bruxism, whatever its circadian manifestation, can be classified according to its main origin or cause, as primary or secondary [23]. The primary forms are mainly centrally driven [24], while the secondary bruxism is associated with the use of drugs or other active substances, or to neurological disorders [23]. Thus, the association between the covid-19 pandemic and bruxism can be established through both different paths.

Psychosocial factors such as anxiety and stress are recognized to be associated mainly with the awake form of bruxism [25], which is characterized by the parafunctional activity of clenching the teeth while the patient are awake and without necessarily being conscious of performing it [26, 27]. Patients diagnosed with elevated stress levels are up to 6 times more likely to develop this condition [19, 28]. Recently some authors suggested that muscle contraction in awake bruxism may be part of the body's defense behavior mechanism associated with anxiety and stress, increasing significantly in this period of the pandemic [28]. Obstructive sleep apnea and hypopnea syndrome (OSAS) is one of the recognized risk factors for protective sleep bruxism. According to Simmons [29], sleep bruxism can be a compensatory mechanism to help overcome upper airway obstruction by activating muscles responsible for a forward movement of the mandible and tongue. Although there are few studies associating obstructive sleep apnea and hypopnea with COVID-19 [30], it is known that apnea and hypopnea may be a risk factor for mortality or deterioration of the clinical scenario in patients diagnosed with COVID-19. On the other hand, patients who suffered from COVID-19, especially severe cases, may be under risk for apnea and hypopnea due to pulmonary fibrosis [30].

### Poor sleep quality

Aware of the modulatory effects of sleep on the immune system, proper treatment of OSAS patients may be protective/beneficial in COVID-19 patients. The increased sympathetic activity previously described can also trigger a state of hyperarousal, creating or perpetuating

sleep disturbances [19], which is commonly reported at the beginning of the quarantine period. Sleep disturbances can aggravate patient's pain experience [31], including chronic orofacial pain conditions such as TMD or trigeminal neuralgia [32]. Literature points out to a high comorbidity between chronic pain and sleep restriction [31-33].

Although the association between sleep and pain is widely established, the mechanisms of this relationship has not been completely elucidated [31, 32]. Some theories indicates that sleep restriction may affect somatosensory perception in the orofacial area [33], although others point to the mediation of emotional distress or catastrophizing, commonly influenced by COVID-19 pandemic, as possible mediators [31]. Lastly, negative emotions can increase arousal and hypervigilance, causing sensitization to pain, avoidance, and functional disability [34].

### **TMD and other comorbid local pain conditions**

Migraine, tension type headache and even fibromyalgia are often reported as comorbid to TMD [28]. Similar to TMD, these conditions have psychosocial and somatic influences in the beginning and maintenance of a painful states and related disability [35]. We have previously demonstrated [36] that TMD patients had a higher prevalence of other painful conditions compared to asymptomatic individuals.

Some forms of headache during the pandemic period affect specially the front-line healthcare professionals, who must use additional personal protective equipment (PPE), such as N95 face mask and face shields [37]. Most of these professionals, which used PPE for almost 6 hours a day, reported perceiving headache characterized by tension-type pain (87.5%). A minor portion (23.4%) of them still reported symptoms such as nausea, vomiting, photophobia and/or phonophobia, neck pain and sensitivity to some movements. Another interesting fact was that professionals who already had previous headache diagnoses noticed a worsening in pain level [37]. Once headaches are recognized as important risk factors for TMD incidence [38], by means of well-known trigeminal central sensitization mechanisms [32], the facts exposed above is another non explored possible relationship between the pandemic moment we are living and the development painful TMD, especially in healthcare professionals.

## **DISCUSSION**

COVID-19 not only threaten physical but also the mental health of individuals of all ages [11]. The secondary consequences of the pandemic/lockdown, including economic disruption and in the lifestyle and the feeling hopeless, are strongly associated with emotional distress [39]. The social disconnection puts adults at greater risk of depression and anxiety [40], while children experience fears, uncertainties, and physical and social isolation. Understanding their reactions and emotions is essential to properly address their needs [41].

Realizing the severity of the outcomes associated with the disease and its high rate of transmission, regulatory agencies, such as the American Dental Association, have instructed dentists to stop providing treatment to patients, except for complaints classified as emergency including, among other acute urgent dental care, chronic orofacial pain conditions like TMD [42]. This is important because the lack of early diagnosis and intervention may cause the pain associated with TMD to become chronic, what is supposed to happen in up to 10% of the cases, once this unfavorable prognosis is usually associated with pain chronicity and may result in pain spreading to surrounding areas [43].

The stress caused due to the difficulties experienced in the current moment can also influence sleep quality and increase the risk of development of bruxism [17, 19, 28] and, as a possible consequence of TMD [44]. Sleep disturbances are associated with anxiety, depression, and suicidal behavior. Sleep abnormalities are a stand-alone risk factor for suicidal ideation, suicide attempts, and suicide death. Appropriate treatment of sleep disturbances is always vital and reduces symptoms of psychiatric disorders and suicidal ideation. However, recognizing and treating insomnia are especially important during stressful periods, such as the COVID-19 pandemic, because it may significantly reduce suicide rates [45].

Patients with painful TMD usually have history of continuous use of drugs and underwent many treatments approaches [46]. So, in such cases, dentists should give particular attention to drugs prescription. When advising patients to use medications as part of their treatment, it is important to specify the clinical conditions where analgesics, anti-inflammatory, antidepressants and muscle relaxants drug are really necessary and their appropriate dosages [42]. Patients should also be advised against

self-medication. Improper or abusive drug consumption can have important undesirable clinical implications for the ones who suffer from TMD. It is recommended that drug treatment for TMD be done strictly when necessary [46].

So, conservative and individualized approaches, including relaxation and self-massage techniques, jaw movements education and sleep hygiene are indicated. Guidance for the use of a variety of online tools and devices (apps and/or telemedicine) is also useful during this pandemic period [3, 28]. However, in cases of higher levels of pain intensity and/or severity, face-to-face appointments with a professional are essential and should be indicated. In this cases, the diagnostic approach of the TMDs is important because each disorder may have its own etiology, usually composed of more than one risk factor, that is, the psychological factor probably is accompanied by other(s) social and / or biological risk factors, which must be understood in order to establish an individualized treatment protocol [4].

## CONCLUSION

The COVID-19 pandemic will represent a challenge for the ones dealing with the management of chronic pain, including TMD and other orofacial pain conditions, for the next years and maybe decades. In this context, the social and psychological factors associated to the pandemic may lead to an increase in the risk of developing, worsening and perpetuating TMD cases. Dentists who works in the area should be aware of these issues and adapt their practices to properly diagnose and treat these patients within a multifactorial approach.

## Collaborators

JS MIRANDA and LL BONATO, conception, design of the study, acquisition of data, drafting the article and final approval. RS TESCH, conception, design of the study, critic revision for important intellectual content and final approval.

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