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## Orofacial Pain Neuroscience

# The impact of the COVID-19 pandemic on orofacial pain practice

## Perceptions from a convenience sample of orofacial pain practitioners

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Supplemental material is available online.

### ABSTRACT

**Background.** COVID-19 has had a substantial impact on people's lives. Increasing evidence indicates that patients with chronic pain particularly are being affected; however, few articles have examined how the pandemic has affected the care or clinical presentation of patients with orofacial pain. The aim of this study was to describe COVID-19–related changes in referral patterns and numbers, in patient demographics, in patients' seeking treatment for problems, and in administrative procedures in 3 orofacial pain clinical settings.

**Methods.** Practitioners participating in the American Academy of Orofacial Pain webinar titled "Practicing Orofacial Pain, Headache, and Sleep Care During the COVID-19 Pandemic" completed a voluntary anonymous online survey. Survey respondents completed general questions related to their orofacial pain practices and about perceptions of their patients' symptoms. For statistical analysis, the authors calculated frequencies and used analysis of variance for continuous variables or Likert scale variables and the  $\chi^2$  test for dichotomous or categorical variables. Statistical significance was set at *P* value of .05 or below.

**Results.** Practitioners noted an increase in new patients with orofacial pain. Of the participants, 33% indicated the onset of their patients' pain was often or extremely often related to COVID-19. The 5 most common symptoms that providers felt were aggravated in their patients were masticatory muscle myalgia, anxiety, tension-type headache, bruxism, and insomnia or fragmented sleep.

**Conclusion.** The COVID-19 pandemic has resulted in a marked increase in the number of patients seeking consultation for orofacial pain and associated symptoms.

**Practical Implications.** Because of the COVID-19 pandemic, orofacial pain practitioners have noticed an increase in orofacial pain symptoms across practice settings.

**Key Words.** COVID-19; SARS-CoV-2; coronavirus pandemic; orofacial pain; temporomandibular disorders.

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**W**ith increased stress, disrupted sleep, economic uncertainty, changes in social functioning, increased fear of contagion, and loss of loved ones, the impact of the COVID-19 pandemic on people's lives has been ubiquitous and unforgiving. Emerging evidence suggests that patients with chronic orofacial pain particularly are being affected negatively.<sup>1</sup> Increased stress and anxiety, health-related events, depression, and disrupted sleep are known to be potent predictors of pain intensity in those with some chronic orofacial pain conditions.<sup>2-4</sup> In addition, population-based surveys have found an increase in bruxism and other parafunctional habits as a result of the pandemic and related stress.<sup>1,5</sup> Furthermore, contagion with COVID-19 is associated with increased myalgia symptoms and fatigue,<sup>4</sup> and in some cases, these symptoms persist long after the active infection phase has passed,<sup>4,6</sup> providing another potential mechanism by which COVID-19 can exacerbate symptoms of chronic orofacial pain.

The COVID-19 pandemic not only is contributing directly to increased symptoms in patients with orofacial pain but also may be influencing how well they are able to access care. Although COVID-19–

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related changes have been well documented in certain medical services and chronic pain settings,<sup>7</sup> few articles specifically have examined how the pandemic has affected the care or clinical presentation of patients with chronic orofacial pain. Learning about how the pandemic has altered chronic orofacial pain treatment is important because it can highlight potential areas for improvement in access and continuity of care. The overall goal of our article is to describe COVID-19–related changes in chronic orofacial pain practice in 3 distinct settings, using data from 111 orofacial pain practitioners in general dental practices with orofacial pain–trained dentists, in private specialty orofacial practices, and in academic institutions with orofacial pain clinics. In this descriptive, exploratory article, we specifically aim to describe COVID-19–related changes in referral patterns and numbers, changes in patient demographics, changes in patients’ seeking treatment for problems, and changes in administrative procedures in each of these clinical settings. Because the analyses were descriptive and exploratory in nature, we did not test any formal a priori hypothesis.

## METHODS

### Study procedures and recruitment

On January 16, 2021, the American Academy of Orofacial Pain (AAOP) hosted a webinar titled “Practicing Orofacial Pain, Headache, and Sleep Care During the COVID-19 Pandemic.”<sup>8</sup> The webinar consisted of a panel discussion with orofacial pain practitioners from around the world discussing how COVID-19 has shifted their day-to-day orofacial pain practice. The webinar was available free of charge to all interested participants, although participants were required to register to receive the link to access the webinar. AAOP members were invited to complete the voluntary survey that was used for our study. Participants agreed to having their deidentified data used for research when they completed the survey. The institutional review board at the University of Kentucky determined that a review of the questionnaire was not required because the survey was designed to learn about orofacial pain practices and not about particular people.

### Participants

The survey was sent to 617 AAOP members. The survey was delivered to 596 members, because 21 emails were undeliverable; 252 members opened the survey, and 111 completed the survey.

### Materials

Participants completed the survey online. Questions related to general inquiries regarding participants’ orofacial pain practices and about providers’ perceptions of their patients’ symptoms. A list of the questions and response options assessed is provided in the Appendix, available online at the end of this article.

### Data analysis

Before beginning the primary analysis, we visually checked all variables for missing or impossible data. For all dichotomous questions, we coded the data so that “no” was 0 and “yes” was 1. We analyzed questions with distinct response categories by means of counting the frequencies in each of the categories. For all questions, we omitted responses of “not applicable” or “not sure” from analyses.

Once data were coded, we first described the frequency of responses for each question in each of the 3 practice settings. We omitted all data from the 16 people in more than 1 practice setting to avoid contamination between practice settings. Next, we compared across the practice settings by means of using analysis of variance for continuous or Likert scale variables and  $\chi^2$  test for dichotomous or categorical variables. We considered *P* values of .05 or smaller to be statistically significant. We ran the data using SPSS (Version 25; IBM).

## RESULTS

Among the survey respondents, 47 were practitioners in an orofacial pain specialty practice, 26 were general dentists with orofacial pain training, and 22 were from an orofacial pain setting in an academic institution. In addition, 16 reported practicing in more than 1 of the 3 settings. After excluding the latter, we included data from 95 people for analysis. The table reveals that across all practice settings, 32.6% of providers reported noticing an increase in self-referrals, and 46.3% of providers reported noticing an increase in referrals from other health care providers. The increases in self-referrals and

**Table.** Impact of COVID-19 on orofacial pain practice by practice setting.

NOTICED INCREASE	ALL PRACTICE SETTINGS						OROFACIAL PAIN SPECIALTY PRACTICE						GENERAL DENTIST WITH OROFACIAL PAIN						ACADEMIC INSTITUTION						P VALUE*
	No.		Yes Response				No.		Yes Response				No.		Yes Response				No.		Yes Response				
			No.	%	95% CI				No.	%	95% CI				No.	%	95% CI				No.	%	95% CI		
<b>Of New Patients Self-Referral</b>	68 <sup>†</sup>	31	45.6	33.5	to 58.1		32	16	50.0	31.9	to 68.1		23	10	43.5	23.2	to 65.5		13	5	38.5	13.9	to 68.4		.76
<b>Of New Patients Referred by Other Providers</b>	79 <sup>†</sup>	44	55.7	44.1	to 66.9		40	25	62.5	45.8	to 77.3		23	12	52.2	30.6	to 73.2		16	7	43.8	19.8	to 70.1		.41
<b>In Masticatory Muscle Myalgia</b>	95	72	75.8	65.9	to 84.0		47	36	76.6	62.0	to 87.7		26	23	88.5	69.9	to 97.6		22	13	59.1	36.4	to 79.3		.06
<b>In Temporomandibular Joint Arthralgia</b>	95	32	33.7	24.3	to 44.1		47	14	29.8	17.3	to 44.9		26	14	53.9	33.4	to 73.4		22	18	81.8	59.7	to 94.8		.025 <sup>‡</sup>
<b>In Cervicalgia</b>	95	30	31.6	22.4	to 41.9		47	19	40.4	26.4	to 55.7		26	7	26.9	11.6	to 47.8		22	4	18.2	5.2	to 40.3		.15
<b>In Muscle Spasm or Contraction</b>	95	30	31.6	22.4	to 41.9		47	13	27.7	15.6	to 42.6		26	13	50.0	29.9	to 70.1		22	4	18.2	5.2	to 40.3		.044 <sup>‡</sup>
<b>In Neuropathic Pain</b>	95	6	6.3	2.4	to 13.2		47	5	10.6	3.6	to 23.1		26	0	0	0.0	to 13.2		22	1	4.6	0.1	to 22.8		.19
<b>In Migraine Headache</b>	95	27	28.4	19.6	to 38.6		47	14	29.8	17.3	to 44.9		26	9	34.6	17.2	to 55.7		22	4	18.2	5.2	to 40.3		.43
<b>In Tension-Type Headache</b>	95	59	62.1	51.6	to 71.9		47	29	61.7	46.4	to 75.5		26	19	73.1	52.2	to 88.4		22	11	50.0	28.2	to 71.8		.26
<b>In New Daily Persistent Headache</b>	95	13	13.7	7.5	to 22.3		47	4	8.5	2.4	to 20.4		26	7	26.9	11.6	to 47.8		22	2	9.1	1.1	to 29.2		.07 <sup>‡</sup>
<b>In Insomnia or Falling Asleep</b>	95	48	50.5	40.1	to 61.0		47	23	48.9	34.1	to 63.9		26	15	57.7	36.9	to 76.7		22	10	45.5	24.4	to 67.8		.69
<b>In Insomnia or Fragmented Sleep</b>	95	50	52.6	42.1	to 63.0		47	26	55.3	40.1	to 69.8		26	15	57.7	36.9	to 76.7		22	9	40.9	20.7	to 63.7		.45
<b>In Bruxism</b>	95	58	61.1	50.5	to 70.9		47	25	53.2	38.1	to 67.9		26	20	76.9	56.4	to 91.0		22	13	59.1	36.4	to 79.3		.14
<b>In Anxiety</b>	95	66	69.5	59.2	to 78.5		47	33	70.2	55.1	to 82.7		26	22	84.6	65.1	to 95.6		22	11	50.0	28.2	to 71.8		.034 <sup>‡</sup>
<b>In Depression</b>	95	42	44.2	34.0	to 54.8		47	19	40.4	26.4	to 55.7		26	14	53.9	33.4	to 73.4		22	9	40.9	20.7	to 63.7		.51
<b>In Sleep Disturbance</b>	95	43	45.3	35.0	to 55.8		47	23	48.9	34.1	to 63.9		26	11	42.3	23.4	to 63.1		22	9	40.9	20.7	to 63.7		.77

\* P value obtained from a  $\chi^2$  test of homogeneity ( $df = 2$ ). † The remaining respondents chose the option of "not sure" in the survey. ‡ Indicates statistical significance at the level of P value less than or equal to .05.

other-provider referrals were similar across all 3 practice settings. A total of 47.7% ( $n = 42$ ) of providers reported that their patient volume was still lower than prepandemic levels, 23.5% ( $n = 19$ ) reported that their patient volume was similar to prepandemic levels, 28.8% ( $n = 24$ ) reported that their patient volume was now higher than prepandemic levels, and 10 providers replied that they were unsure about the impact of the pandemic on the volume of patients. These differences were not significantly different between the 3 practice settings ( $\chi^2_6 = 3.62$ ;  $P = .73$ ). Furthermore, approximately 28.4% ( $n = 27$ ) of respondents denied using telemedicine, 44.2% ( $n = 42$ ) reported using telemedicine a little, 25.3% ( $n = 24$ ) reported using telemedicine moderately or exclusively, and 2.1% ( $n = 2$ ) left the question unanswered. Of those reporting using telemedicine, most (58.1%) reported using it synchronously (in real time) or a combination of synchronously and asynchronously (29.0%). Providers in academic setting were less likely to use telemedicine, whereas those in specialty orofacial pain practices were the most likely to use telehealth moderately or exclusively ( $\chi^2_6 = 17.85$ ;  $P = .007$ ). Most providers (72.5%,  $n = 58$ ) reported never closing because of the pandemic, 11.3% ( $n = 9$ ) reported closing 1 through 14 days, and 16.2% ( $n = 13$ ) reported closing more than 14 days; this was similar across the 3 practice settings ( $\chi^2_4 = 3.62$ ;  $P = .19$ ).

With regard to providers' perceptions of patients' symptoms, 39.6% ( $n = 36$ ) of the providers reported that the onset of their patients' symptom was sometimes COVID-19-related, and 33.0% ( $n = 30$ ) reported that the onset was often or extremely often COVID-19-related. As revealed in the table, the 5 most common symptoms that providers felt were aggravated in their patients owing to COVID-19 were masticatory muscle myalgia, anxiety, tension-type headache, bruxism, and insomnia or fragmented sleep. Largely, perceptions of symptoms were consistent across settings, with 3 notable exceptions (Table). First, fewer providers in specialty practice settings reported noticing an increase in temporomandibular joint arthralgia relative to providers in the other 2 settings. Second, more providers in specialty practice and academic settings reported not noticing increases in muscle spasm relative to those in private dental settings. Third, a greater percentage of providers in general dental settings reported noticing anxiety than in the other 2 settings (Figure).

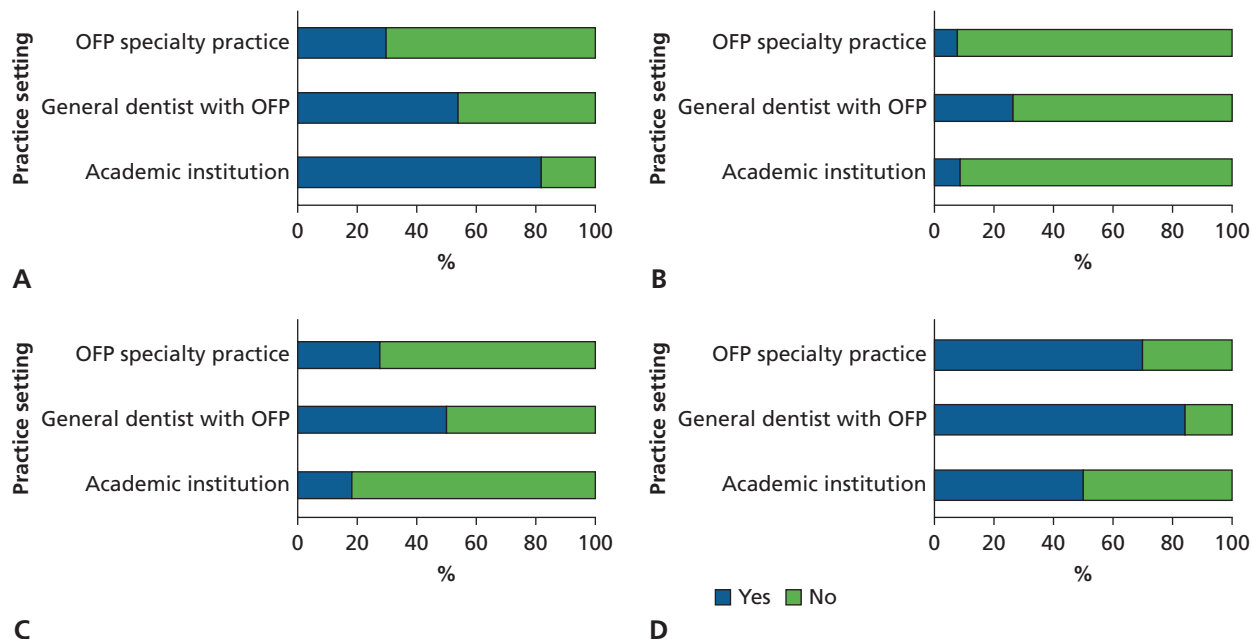
## DISCUSSION

Our study examined the effects of the COVID-19 pandemic on orofacial pain practices across different settings. Our results suggest that practitioners perceived an increase in new self-referred and other provider-referred patients, with approximately 30% of practitioners indicating the onset of their patients' symptoms was often or extremely often related to the COVID-19 pandemic. A previous survey of dental patients in Italy indicated that 40.7% had symptoms of pain in the face, jaw, or temples in the past month, with one-half of them worsening during the past month and 94.7% indicating that the aggravation of their pain was due to a major life event specifically related to the COVID-19 lockdown.<sup>9</sup> Similarly, Emodi-Perlman and colleagues<sup>1</sup> performed 2 surveys to evaluate the effect of the pandemic on prevalence and worsening of temporomandibular disorder (TMD) symptoms in Israel and Poland. Approximately one-half of the Polish and nearly a quarter of the Israeli respondents indicated experiencing pain at least once per week in the temple, face, or jaw since the beginning of the lockdown, and 34% and 28% of each population reported aggravation of their TMD symptoms, respectively.<sup>1</sup> Taken together, these results suggest that the pandemic may have caused an increase in orofacial pain symptoms and that orofacial pain practitioners are noticing an increase in these symptoms across practice settings.

Our results also suggest that specific symptoms are increasing more than others. Approximately 75.8% of the providers noticed an increase in masticatory myalgia, considerably higher than the 33.7% who noticed an increase in temporomandibular joint arthralgia. Previous studies have indicated that myogenous pain is more common than arthrogenous TMD pain when anxiety and depression are present.<sup>10-12</sup> According to the results of the survey, patients with orofacial pain reported an increase in anxiety symptoms, particularly in general dental settings. This is in line with other studies in the literature that suggest that anxiety, depression, and worrying about the pandemic increased the chances of developing TMDs.<sup>1</sup> One survey compared the psychological status of patients with TMD, orthodontic patients, and control patients during the pandemic. The findings indicated an overall worsening of mental health across all groups, with patients with TMD having the greatest increase in distress.<sup>13</sup> Anxiety, depression, or personal concerns increase the odds of experiencing TMD, with specific odds ratios of 1.32 due to concerns of being contaminated by the virus and 1.46 due to financial concerns because of the pandemic.<sup>1</sup> Thus, appropriate care for patients with muscle pain also should include resources for appropriate mental health treatment, including management of depression, anxiety, and stress. Many mental health providers have begun accepting telehealth patients in the United States, and as such, there is now a greater potential availability of mental health resources, as patients may be able to access mental health providers from anywhere in their states. This may be particularly important for patients from rural communities where there is still significant stigma for accessing psychological care or where that care usually has not been available.

Yet it is not only pain and mental health symptoms that have increased; intensification of bruxism also was reported in our study. Similarly, Emodi-Perlman and colleagues<sup>1</sup> found that during the COVID-19 pandemic, the odds of occurrence of awake bruxism and sleep bruxism increased from 2.51 to 6.41 and from 1.40 to 3.99, respectively, which could be explained by the association of psychosocial factors to bruxism.

Furthermore, in our study, over one-half of the providers noted an increase in sleep disturbances in general, and nearly one-half reported an increase in insomnia symptoms. Other studies already have reported an increase in poor sleep owing to the pandemic (measured via Pittsburgh Sleep



**Figure.** Graphs comparing percentage of participants who noticed increases in selected symptoms, by practice setting. **A.** Noticed increase in temporomandibular joint arthralgia. **B.** Noticed increase in new daily persistent headache. **C.** Noticed increase in muscle spasm or contraction. **D.** Noticed increase in anxiety. OFP: Orofacial pain.

Quality Index), with a prevalence of 40.5% before lockdown and 52.4% during.<sup>14</sup> The bidirectionality of chronic pain and poor sleep has been investigated widely; the presence of pain may disrupt normal sleep patterns, and disrupted sleep may lead to pain.<sup>15</sup> It has been estimated that 44% of patients with chronic pain have a sleep disorder.<sup>16</sup> Among those with orofacial pain, Meira and colleagues<sup>17</sup> evaluated the prevalence of insomnia in 952 patients consulting an orofacial pain unit, and 37% of them responded positively to the screening questionnaire for insomnia or hypersomnia. Thus, the orofacial pain practitioner plays an important role in the screening of sleep disorders; referral to the appropriate health care provider when a sleep disorder is suspected; and, when indicated, attempt to treat for sleep problems in patients with orofacial pain. Fortunately, a number of psychological interventions, such as cognitive behavioral therapy and brief behavioral therapy for insomnia, have been used successfully in this population, and the importance of these interventions is particularly great given the COVID-19–related disruptions in sleep.<sup>2</sup>

Telehealth may be particularly effective for interventions that do not require a clinical examination or hands-on procedure. In our study, only 29% of practitioners denied using telehealth. With the ongoing risk of contagion and the continuously evolving global situation, telemedicine has grown as a potent player for health care. Use of telemedicine service ensures continuity of care, decreasing the risk of experiencing COVID-19 exposure. It provides an opportunity for frequent encounters with the provider, improves access to care, and reduces travel costs and times.<sup>18</sup> Serrano-Ibáñez and colleagues<sup>3</sup> reported that patients with chronic pain were affected significantly because of the difficulty in receiving medical care, and Saccomanno and colleagues<sup>9</sup> indicated that some patients related their worsening in symptoms to loss of access to care. Hence, wider implementation of teledentistry as an alternative way to follow up with patients with chronic orofacial pain presents an important future direction for orofacial pain. Telehealth also has been implemented successfully in some settings for delivering brief psychological pain interventions to patients with chronic orofacial pain.<sup>19</sup> Even when normal operations resume after the pandemic, telehealth may be a key component to improving access to quality, multidisciplinary orofacial pain care.

Some limitations of our study include that the survey was conducted in a nonrandomized population of orofacial pain practitioners. Among the ones who opened the survey, 44% completed the survey, introducing an additional selection bias. The survey format also introduced a recall bias among the participants. In addition, on the basis of the questions of the survey, no information was obtained regarding the onset of the patients' pain symptoms. Therefore, we cannot distinguish

between the incidence of a new onset of pain symptom or the worsening of a preexisting chronic pain condition during the time surveyed.

## CONCLUSION

The COVID-19 pandemic has resulted in an increase in the number of patients seeking consultation for orofacial pain symptoms, especially owing to masticatory myogenous pain. Among the symptoms reported by patients, orofacial pain practitioners have reported an increase in psychological burden along with aggravation of associated parafunctional activities and disruption in sleep.

## SUPPLEMENTAL DATA

Supplemental data related to this article can be found at: <https://doi.org/10.1016/j.adaj.2022.03.012>. ■

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1. Emodi-Perlman A, Eli I, Smardz J, Uziel N, et al. Temporomandibular disorders and bruxism outbreak as a possible factor of orofacial pain worsening during the COVID-19 pandemic: concomitant research in two countries. *J Clin Med*. 2020;9(10):3250.
2. Cellini N, Canale N, Mioni G, Costa S. Changes in sleep pattern, sense of time and digital media use during COVID-19 lockdown in Italy. *J Sleep Res*. 2020;29(4):e13074.
3. Serrano-Ibáñez ER, Esteve R, Ramírez-Maestre C, Ruiz-Párraga GT, López-Martínez AE. Chronic pain in the time of COVID-19: stress aftermath and central sensitization. *Br J Health Psychol*. 2021;26(2):544-552.
4. Clauw DJ, Hauser W, Cohen SP, Fitzcharles MA. Considering the potential for an increase in chronic pain after the COVID-19 pandemic. *Pain*. 2020;161(8):1694-1697.
5. Almeida-Leite CM, Stuginski-Barbosa J, Conti PCR. How psychosocial and economic impacts of COVID-19 pandemic can interfere on bruxism and temporomandibular disorders? *J Appl Oral Sci*. 2020;28:e20200263.
6. Wostyn P. COVID-19 and chronic fatigue syndrome: is the worst yet to come? *Med Hypotheses*. 2021;146:110469.
7. Puntillo F, Giglio M, Brienza N, et al. Impact of COVID-19 pandemic on chronic pain management: looking for the best way to deliver care. *Best Pract Res Clin Anaesthesiol*. 2020;34(3):529-537.
8. Crandall S, Manfredini D, Cohen JR, Armin S, Boggero IA. Practicing orofacial pain, headaches and sleep care during COVID-19. American Academy of Orofacial Pain webinar. January 16, 2021. Accessed March 1, 2021. <https://aaop.org/practicing-orofacial-pain-headache-sleep-care-during-covid-19-a-free-panel-discussion-webinar>
9. Saccomanno S, Bernabei M, Scoppa F, Pirino A, Mastrapasqua R, Visco MA. Coronavirus lockdown as a major life stressor: does it affect TMD symptoms? *Int J Environ Res Public Health*. 2020;17(23):8907.
10. Klasser GD, Bassiur J, de Leeuw R. Differences in reported medical conditions between myogenous and arthrogenous TMD patients and its relevance to the general practitioner. *Quintessence Int*. 2014;45(2):157-167.
11. Mongini F, Ciccone G, Ceccarelli M, Baldi I, Ferrero L. Muscle tenderness in different types of facial pain and its relation to anxiety and depression: a cross-sectional study on 649 patients. *Pain*. 2007;131(1-2):106-111.
12. Kim YK, Kim SG, Im JH, Yun PY. Clinical survey of the patients with temporomandibular joint disorders, using Research Diagnostic Criteria (Axis II) for TMD: preliminary study. *J Craniomaxillofac Surg*. 2012;40(4):366-372.
13. Wu Y, Xiong X, Fang X, et al. Differences of psychological status of TMD patients, orthodontic patients and the general population during the COVID-19 epidemic: a cross-sectional study. Research Square. March 25, 2020. Preprint, Version 1. Withdrawal status: active. <https://doi.org/10.21203/rs.3.rs-18915/v1>
14. Gualano MR, Lo Moro G, Voglino G, Bert F, Siliquini R. Effects of Covid-19 lockdown on mental health and sleep disturbances in Italy. *Int J Environ Res Public Health*. 2020;17(13):4779.
15. Klasser GD, Almoznino G, Fortuna G. Sleep and orofacial pain. *Dent Clin North Am*. 2018;62(4):629-656.
16. Mathias JL, Cant ML, Burke ALJ. Sleep disturbances and sleep disorders in adults living with chronic pain: a meta-analysis. *Sleep Med*. 2018;52:198-210.
17. Meira ECM, Lukic N, Wojczynska A, Steiger B, Guimaraes AS, Ertlin DA. Insomnia in patients seeking care at an orofacial pain unit. *Front Neurol*. 2019;10:542.
18. Temesgen ZM, DeSimone DC, Mahmood M, Libertin CR, Varatharaj Palraj BR, Berbari EF. Health care after the COVID-19 pandemic and the influence of telemedicine. *Mayo Clin Proc*. 2020;95(suppl 9):S66-S68.
19. Sangalli L, Fernandez-Vial D, Moreno-Hay I, Boggero I. Telehealth increases access to brief behavioral interventions in orofacial pain clinic during COVID-19 pandemic: a retrospective study. *Pain Med*. 2022;23(4):799-806.