



## Orofacial & Oral manifestations of COVID-19

Dr Prathi Patel

Corresponding Author: Dr Khushali Shah

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**ABSTRACT:** Coronavirus disease (COVID-19) pandemic is at its peak level and affecting the most of the world population. Superior public health concerns are created because of it, and also making it necessary to gain more diagnostic knowledge for early precautions. The transmission risk of COVID-19 infection is higher amongst the healthcare workers including dentists, dental hygienists and dental assistants. Dental professionals are at highest risk due to face to face communication and getting exposed to saliva, blood and other body fluids which can be potential carrier of COVID-19. Though the dental professionals are at high risk, their role is vital for the screening and also in controlling the spread of infection through their clinical set up as oral cavity or orofacial structures can be considered as they show early and significant COVID-19 symptoms. For that dental professionals need to have a basic understanding of the corona virus and COVID-19 manifestations of orofacial structures and oral cavity. The importance of saliva in both the transmission and in diagnostic perspective need to be elaborated amongst the dental professionals since COVID-19 comes in contact with saliva in the most earliest stage. Also the dental professionals may be involved in studying the disease specific oral manifestations of this newly emerged disease. This article is designed in order to provide information regarding COVID-19, and possible methods of diagnosing COVID-19 through oral and orofacial manifestations.

**KEYWORDS:** COVID-19, Orofacial pain, Oral manifestations, Dysguesia, Anosmia

### I. INTRODUCTION

Since the first reported case in Wuhan, China, in December 2019, Coronavirus disease (COVID-19) has widely spread to several countries. In March 2020, The World Health Organization (WHO) declared COVID-19, as a pandemic.<sup>1</sup> As saliva is a main tool of spread of the virus, dental professionals are at increased risk of contracting the infection and becoming potential carriers of the disease.<sup>2</sup> According to Occupational Safety and Health Administration (OSHA), dental

health care personnel (DHCP) are placed in very high exposure risk category as they work in close proximity to the patient's oral cavity.<sup>3</sup> Also, dental procedures involve the use of aerosol generating instruments like handpiece and scaler, hence certain dental procedures pose greater risk of transmission of the virus to the operating dentists and the auxiliaries. The purpose of this manuscript is to provide a basic understanding of the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) and COVID-19 from dental professionals' perspective and the measures to overcome the challenges.

### II. OROFACIAL AND ORAL MANIFESTATIONS OF COVID-19

Amongst the various symptoms of COVID-19, there are several symptoms present which are related orofacial pain. These symptoms can serve as early diagnostic markers to dentists. The symptoms include the involvement of salivary gland involvement, facial muscle pain, masticatory muscle pain, altered tongue sensation & mainly olfactory nerve dysfunction.

#### OLFACTORY DYSFUNCTION - ANOSMIA

- Relevance to dentistry & Orofacial pain: Trigeminal nerve predominantly innervates the oral, perioral & nasal structures.<sup>3</sup> Although there is sufficient evidence present that trigeminal nerve works concurrently with olfactory nerve to bring out the sensation of smell.<sup>4</sup> There have been several variations noted in trigeminal nerve sensitivity during olfactory disorders.<sup>5</sup> Olfaction plays major role in perception of flavours.<sup>6</sup> Volatile molecules from food travel to nasal cavity through posterior part of oral cavity, during mastication.<sup>7</sup> Patients who have altered taste sensation (dysguesia), often have olfactory dysfunction.<sup>8,9</sup>
- Relevance to COVID-19: One of the studies conducted in 2020 showed olfactory dysfunctions in COVID-19 patients.<sup>10</sup> Earliest reports came in February, 2020 which described Anosmia as one of the symptoms of COVID-19.<sup>11,12</sup> "Loss of taste & smell" has been added to the symptom list (symptoms



appear within 2-14 days) by Center of Disease Control & Prevention.<sup>13</sup> 50% of COVID-19 patients reported anosmia as one of the symptoms.<sup>14</sup> British Association of Otorhinolaryngology considered anosmia as one of the COVID-19 marker.<sup>15</sup> In addition, it is suggested that if person is having anosmia, even if there are no other COVID-19 symptoms, that person should get quarantined to prevent further community spread.<sup>16</sup> It has been reported that COVID-19 can enter the central nervous system through two possible routes which are: 1) circulatory 2) through cribriform plate of ethmoid bone where olfactory nerve enters.<sup>17</sup> Significant co relation is found between COVID-19 and nasal congestion. This implies that obstructed nasal passages might serve as a significant component of the olfactory impairment. It is possible that damage to the olfactory neuroepithelium might have contributed to anosmia.<sup>18</sup> Reports are present that medicines used in management of orofacial pain ( ibuprofen & renin angiotensin system blockers) worsens the effect of COVID-19 symptoms.<sup>19</sup>

#### **SALIVARY GLAND DYSFUNCTION - XEROSTOMIA**

Saliva formation is mainly stimulated by taste. More than 50% of COVID-19 patient reported to have dysgeusia(altered taste sensation), which leads to xerostomia eventually. Secondarily xerostomia in COVID-19 patients is present due to mouth breathing caused by nasal congestion and rhinorrhea.<sup>20</sup> However there is no significant co relation found between dysgeusia and nasal congestion or xerostomia with nasal congestion.<sup>21</sup> Most common manifestation of xerostomia is considered to be Burning mouth syndrome.<sup>22</sup> Taste disturbances are seen in approximately 70% patients of BMS.<sup>23</sup> Also olfactory threshold is noted higher in BMS than control patients.<sup>24,25</sup>

#### **TASTE ABNORMALITIES- DYSGUESIA:**

Lost taste has been recognized as one of the symptoms of COVID-19. An Italian team reported that 20 out of 59 COVID-19 patients who were interviewed (33.9%) had at least one taste or olfactory disorder and 11 (18.6%) had both.<sup>23</sup> Most of the patients with these symptoms (91%) reported the occurrence of taste alterations before being hospitalized. Taste and smell disorder in this case could be explained by the fact that SARS-CoV-2 has been known for its interaction with angiotensin converting enzyme 2 (ACE2) receptor, to facilitate

its penetration into the cell, and this receptor is widely expressed on the epithelial cells of oral mucosa and the brain. In fact, expression of ACE2 was found to be higher in tongue, where the taste buds are most abundant, than gingiva or buccal mucosa.<sup>24</sup> In summary, dentists should be aware of this symptom since they may encounter patients with taste abnormalities in the form of dysgeusia or burning mouth syndrome.<sup>25</sup> Change in tongue sensation strongly correlated with swollen palate and plaque-like changes in the tongue are noticed.

#### **FACIAL PAIN**

There are findings with a number of studies showing that facial pain is more common in women than men , suffering from COVID-19.<sup>26,27</sup> Facial pain has found to be associated with nasal congestion, because nasal congestion occurs during URTI as a result of dilatation of veins in the nasal epithelium, adding to the accumulation of secretions in the sinuses.<sup>28</sup> This leads to pressure changes, eventually stimulating adherent trigeminal nerve endings, causing a pain sensation.<sup>29</sup>

#### **ORAL MUCOSAL LESIONS:**

The study conducted by Carreras-Presas et al showed that , there were three COVID-19 positive or suspected positive patients developed vesiculobullous lesion on oral mucosa. Since oral mucosa can be the first area to get infected with SARS-CoV-2, it can be concluded that oral mucosa lesions could be the first COVID-19 signs to arise. If studies in future confirm this conclusion, then it can be said that the dental practitioners would be the first ones to identify the COVID-19 positive cases.<sup>30</sup>

#### **MASTICATORY MUSCLE PAIN**

One of the study shows that around 11% of COVID-19 patients are having masticatory muscle pain.<sup>31</sup>

### **III. ADDITIONAL ORAL MANIFESTATION NEURALGIA- TRIGEMINAL**

Studies show that the virus can lead beyond cough, fever, pneumonia, involvement of the central and peripheral nervous system such as impaired taste and smell and neuralgia<sup>17</sup>. Among the most common pictures related to the central nervous system, there is Trigeminal Neuralgia which can present itself as a “shocking” pain, of intense intensity, which lasts a few seconds, and can occur several times a day; it can also affect only one or more branches of the trigeminal nerve, unilaterally; and be associated with autonomic



phenomena, in addition to pain (watery eyes, runny nose or congestion, eyelid edema, restlessness and conjunctival hyperemia). The treatment of choice will be medication with the use of anticonvulsants such as Carbamazepine, preferably<sup>17</sup>. In the case of Post-Herpetic Neuralgia, which is usually preceded by skin changes in the region of the face, like vesicles<sup>16</sup>; the following characteristics are identified: it occurs due to a reactivation of infection by the varicella-zoster virus; the pain may present soon after the event or up to 6 months afterwards, generally presenting as “burning” or “needles” of strong intensity; when it affects the ophthalmic branch of the trigeminal, eye protection is extremely necessary; treatment: medicated with several drugs (antidepressants, anticonvulsants, central muscle relaxants); invasive treatment in certain cases may be indicated, but this is rarely indicated (radiofrequency, botulinum toxin, balloon decompression); may show only partial response to treatment<sup>17</sup>. When diagnosed with Atypical Neuralgia of the Face, Pain presents itself as a “shock”, of intense intensity, which lasts a few seconds, and can occur several times a day, being extremely rare non-unilateral cases; it is often similar to trigeminal neuralgia, but it has variable duration, as well as it can present with other descriptions, such as “burning”, “needles”; often associated with autonomic phenomena in addition to pain; treatment: medication (usually with anticonvulsants and analgesics), invasive procedures (radiofrequency, balloon compression guided by radioscopy), and its treatment is often difficult or only partial<sup>16,17</sup>; it may be associated with trigeminal neuralgia corresponding to treatments, trauma and surgery.

#### IV. MANAGEMENT OF OROFACIAL PAIN DURING COVID-19

The management of Orofacial pain in the age of COVID 19 should be done by Pharmacological therapy primarily. Teledentistry treatment includes advice, antibiotics and analgesics.<sup>32,33</sup> Most commonly prescribed drugs for the control of oral and dental pain, are NSAIDs. Most prescribed NSAIDs are ibuprofen, diclofenac, Aspirin, piroxicam, naproxen ect .There is lack of evidence that these drugs should be contraindicated in COVID 19 pandemic but caution may be taken for prescribing it. It has been reported that NSAIDs are associated with increased risk of adverse effects when used in patients with Acute respiratory infection including COVID-19<sup>34</sup> and on 8th March 2020 WHO made statement saying ,Avoid taking

ibuprofen for COVID 19 symptoms while NHS recommended particularly Paracetamol for COVID 19 symptoms. Then WHO issued Scientific brief on 19h April mentioning lack of evidence that shows adverse effects with the use of NSAIDs.<sup>35</sup>

#### V. CONCLUSION

Dentistry is a profession where the dentist works in close proximity to the patient’s mouth and many procedures produce aerosol which is a mixture of water (from a dental instrument like high speed hand piece) and patient’s saliva or blood. These aerosols could result in the spread of infection and diseases including COVID-19. The dental practitioners refrain from some elective dental procedures like restoration and extraction of asymptomatic teeth, aesthetic dental procedures, orthodontic adjustments and routine radiographs. By avoiding the aerosol generating procedures, the dental professionals avoid the spread or transmission of the infection. They attend to only the emergency dental procedures to alleviate the pain of their patients. Further studies need to be designed to explore the disease specific oral manifestations in COVID 19 patients.

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