



## Covid-19 and Periodontal Health: A Review

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### **ABSTRACT**

*The COVID-19 outbreak has affected human existence in many ways, with uncertainty faced globally. The similarity seen on inflammatory response pathway shows there is a potential relationship between COVID-19 and Periodontitis are related. Considering the relationship, significant importance should be given to maintain periodontal health, maintaining careful and good oral hygiene in the COVID-19 situation. The purpose of this review of literature is to highlight the link between periodontal health and risk of COVID-19.*

**Keywords:** Covid-19, Periodontal disease, Oral health

## Introduction

Covid-19 is a worldwide infection that challenged the functionality of every aspect of our lives, from healthcare to the economy to journalism to education. The velocity of the spread illustrated a challenge both for health care providers, policymakers and also higher education medical schools. (1)

The corona virus disease 2019 (COVID-19) infection was first identified and reported in the year 2019 in a cluster of cases, caused by a newly identified Beta corona virus. Reported at Wuhan, the capital of China's Hubei province the virus was initially named as 2019 novel corona virus (2019-nCoV) by the World Health Organization (WHO) on January 12, 2020.(2) The incubation period for individual infected with Covid-19 infection is between 2 to 14 days. (3)

Corona virus disease-2019 was declared a pandemic on March 11, 2020, and a public health emergency by the World Health Organization (WHO).(4) Since then, South Asian countries have witnessed at least two waves of the disease with variable intensity. India has lived through and survived two of the most disastrous COVID waves. While the first wave introduced us to the challenges posed by the SARs-COV-2 virus, the second wave added to the woes by attacking our healthcare system, damaging our medical infrastructure and claiming more lives than ever. (5)

The Omicron variant has now been detected in many countries around the world. WHO reports that Omicron is probably in most countries, even if it hasn't been detected yet? Omicron is spreading more quickly than other variants. Based on the information available, WHO believes it is likely that Omicron will outpace the Delta variant where there is COVID-19 transmission in the community. On 26 November 2021, WHO designated the variant B.1.1.529 a variant of concern, named Omicron, on the advice of WHO's Technical Advisory Group on Virus Evolution (TAG-VE). (6,7)

A 44% jump in daily Covid cases on December 29 signals the overall increase in Covid cases that experts, scientific projections forecast following the outbreak of Omicron, the latest variant of SARS-CoV-2. (7)

Due to this pandemic every individual facing severe problems both economically and emotionally. (8) Periodontitis is one of the most common oral health diseases, which is caused due to different etiological factors. (9) Pathogens containing bacteria plays a major role in developing periodontitis. Based on study by Slots in the year 2010, there are viruses also been found in periodontal pockets. Hence, periodontal pockets also acts as pool for different pathogens. (10) It is also characterised by release of several chemical mediators as a result of the interaction between periodontal pathogens and the individual host response that becomes dysregulated. Periodontal disease is also related to other systemic disorders such as cardiovascular disease, endocrine disorders, respiratory diseases etc. through the release of periodontal pathogens and chemical mediators via the bloodstream that reach distant sites in the body. Therefore, periodontitis patients may present as a high risk group for SARS-Cov-2 infection. (11) The

purpose of this review of literature is to highlight the link between periodontal health and risk of COVID-19.

### **Oral Manifestations of Covid-19**

Dysgeusia is the first recognized oral symptom. Gustatory disorders, sialadenitis, aphthous-like ulcerations, erosive macules, vesicle, pustule, bulla, papule, plaque, pigmentation, halitosis, xerostomia, whitish areas, fissured or depapillated tongue, hemorrhagic crust, necrosis, swelling, erythema, and spontaneous bleeding of the oral mucosa are often seen. The most common sites of involvement in descending order are tongue, labial mucosa, and palate. Oral lesions can be self-limiting and may resolve in 10 days. (12,13)

### **Periodontal Health and Covid-19**

Oral cavity is important pool for all respiratory pathogens, that includes Chlamydia pneumoniae; and individuals who have periodontal disease have high chance of developing hospital-acquired pneumonia. (14) Different mechanisms have explained the capability of pathogens present in oral cavity, aggravate infection in lungs. Which includes aspiration of pathogens present in oral cavity towards the lower respiratory tract, more commonly among the high risk persons; Alteration of surface along the mucosa of respiratory tract through salivary enzymes, that leads to the pathogen colonization, and release of pro-inflammatory cytokines throughout periodontitis condition, that further encourages attachment to the epithelium of lung and respiratory pathogens colonization. (15) It has been observed that better hygiene on oral cavity and good care of oral health leads to declination on development of respiratory illness, which is more significantly in the older individuals and the patients admitted in ICU, as these individuals are more susceptible for getting serious complexities that are associated to COVID-19. (16)

Nevertheless, substandard oral health status inclines the possibility of expanding the medical conditions like COVID 19. Consequently, enhancing the oral health status of individuals of any age group, by declining their possibility of getting any non-oral systemic conditions, would lower the rate of spread of COVID-19. Despite the relationship among oral health and seriousness of COVID-19 manifestation looks logical, and still further research is necessary to reveal the relationship vastly. It is been found that Periodontal illness influence to a critical condition if the individual has other comorbidities. (17,18)

**Table no.1: Common Risk Factor For Periodontal Disease and Covid-19**

**Aging:** Individuals more than 65 years of age are categorized as high risk patients due to the comorbidities and reduced immunity present at this age. Thus elderly individuals are a high risk category group for both periodontal disease as well as COVID-19.<sup>11</sup>

**Stress related factor:** The global pandemic of COVID-19 has caused tremendous rise in the stress levels of individuals financially as well as psychologically. Stress is recognized as a risk factor for development of periodontal disease. Elevated levels of stress may lead to release of neuropeptides such as substance P from sensory nerves which have an effect on the activity of immune system a release of cytokines. This leads to depressed immunity making the individual susceptible to develop periodontal disease. Thus, stress is the interlinking factor between COVID-19 and periodontal disease.<sup>11</sup>

**Pregnancy:** Immunosuppression in pregnant patients, hormonal changes such as high progesterone and estrogen levels and the physiological adaptive changes predispose the pregnant female patient to develop periodontal disease as well as respiratory illness. COVID infection could complicate the perinatal events in the form of preeclampsia, premature rupture of membrane and low birth weight.<sup>19</sup>

**Diabetes:** Diabetes increases the possibility of having periodontal disease and presence of periodontal disease worsens the glycaemic control of diabetic individuals. Diabetes is also related to severe COVID-19 infections due to already compromised immune system in diabetics and a suitable environment of high blood glucose for the survival of the corona virus.<sup>11</sup>

**Smoking:** Smoking is a major risk factor to develop PD, and it affects the progression, severity and response to treatments of this condition. On the other hand, smoking is a risk factor of COVID-19 progression, being 1.4 times more probable to have severe COVID-19 symptoms.<sup>11</sup>

**Respiratory disease:** Studies have established that periodontal disease is a possible risk factor for respiratory diseases. It was suggested that patients with COVID-19 have an increased risk of aggravation when they present COPD and patients with pre-existing COPD have a 4-fold increased risk to develop severe COVID-19 illness. It was proposed that the increased risk could partly be because COPD patients present increased expression of ACE-2 in airways. Thus, the association of periodontal disease with COPD could be helpful to identify risk groups to develop severe COVID-19, since COPD increased importantly the risk of this affection.<sup>20</sup>

## **Management of Periodontal Diseases in Covid Era**

In the current COVID 19 pandemic, Dentists, Dental assistant as well as patients undergoing dental procedures are at high risk of cross-infection. Most dental procedures require close contact with the patient's oral cavity, saliva, blood, and respiratory tract secretions. Many patients who are asymptomatic may be shedding the virus. Hence all patients visiting a dental clinic must be considered as potential source of infection and dental professionals must follow appropriate infection prevention control guidelines.

### **Risk assessment**

#### **Low risk patient:**

- Vaccinated patients
- No active COVID-19 symptoms, RT-PCR negative
- COVID-19 affected person in whom 14 days have elapsed after resolution of the covid symptoms and/or RT-PCR negative.

#### **High risk patient:**

- Patients with COVID-19 symptoms
- Patients with RAT or RT-PCR positive.

All dental procedures can be undertaken with appropriate precautions in low risk patient. Only emergency procedures should be undertaken with standard COVID protocol in high risk patient.

According to Ministry of Health and Family Welfare guidelines, the precautions were categorized as:<sup>21</sup>

- Modifications for dental operatories
- Modifications at patient level screening and examination

### **Modification of Dental Operatories**

It includes the management of dental chair, the reception area, triage area, and the patient consultation room. The entrance of the clinic should be equipped with electronic sanitization facilities and triple-layered mouth masks for patients and health workers entering into the clinic. The temperature and the other associated symptoms should be well checked before letting any personnel from entering the clinic. Arrangements should be made in such a way that there should be a plastic or glass shield between the patient and the receptionist. The triage should have patient education aids to create awareness regarding the COVID- 19 pandemic. All transactions, if possible, must be made through digital means rather than through cash payments. It should also be made sure that the patients maintain at least 6-feet distance in the patient waiting area.

The patient should be asked to rinse his mouth with 10 mL of 0.5% povidone iodine (diluted in 1:20 concentration with water) for 30 seconds before spitting it out. After appropriate treatment, the dental chair along with other accessory instruments and equipment should be sprayed with 1% sodium hypochlorite solution by maintaining at least 3-feet distance from the chair. Fumigation should be done on a daily basis before clinic closure so as to prevent spread of infection. (22)

All instruments pertaining to dental procedures are to be disinfected, cleaned, and sterilized as per the standard infection-control protocol (CDC, 2003). All instruments should be mandatorily sterilized in color-changing sterilization autoclave pouches and proper storage to be done in the UV chamber. (23)

Improper disposal of biomedical waste in open space and water bodies leads to the spread of diseases. All biomedical waste pertaining to patient care should be carefully disposed as per the Bio-Medical Waste (Management and Handling) Rules, 1998, amended from time to time through an authorized biomedical disposal agency by the State Pollution Control Board. (24)

### **Modifications at Patient Level Screening and Examination**

Patients are to be encouraged to take appointments telephonically or register online before the contact appointment. In cases that sound like it may require a visual examination, initial view of the photograph sent by the patient or a video consultation can be done. (11)

Primary telephone screening to recognize suspected patients or probable COVID-19 infection can be done before scheduling appointments. Questions related to any travel history to COVID-19 infected regions, the existence of febrile respiratory illness (FRI) symptoms such as cough and fever, or presence of other concomitant diseases should be asked during telephone screening. A positive answer to any of these two questions would increase the initial concern and postpone the elective dental care for at least two weeks.(25)

If a patient requires in-person visit, temperature needs to be checked at the point of entry itself, preferably with a non-contact thermometer, followed by a questionnaire and rapid test if available. To avoid transmission, magazines and other unnecessary items must be removed from the clinic and appointments should be staggered. In pediatric dental setup, only one parent should accompany the child. Alcohol-based hand rub (ABHR) should be available at appropriate locations in the waiting area to help improve hand hygiene by children, parents, and staff. If treatment needs to be performed, informed consent must be obtained and the operatory must be prepared for the same. (26)

The treatment should thus be carved according to the needs of the patient and the category under which the patient falls (unknown for COVID and known for COVID). All the treatment must be performed with minimum release of aerosols and hand instruments to be used where ever possible. (26)

### **Treatment of Periodontal Diseases**

There is an urge to define more distinct guidelines in order to reduce the risk of dental emergencies and at the same time offer urgent care to those patients in need. For periodontal treatments, priority should be given to manual scaling and polishing instead of ultrasonic techniques. In case of aerosol generating procedures (such as using ultrasonic scalers, hand tools, air / water syringes), PPE such as aprons, masks, face shields and gloves should be used to protect the skin and mucous membranes from aerosol, and attention should be paid to hand hygiene. In such procedures, instead of surgical masks, N95 and N95 equivalent masks with more protective properties than surgical masks should be used.(27)

**Table no. 2: Treatment of Periodontal Diseases Based On Severity of Disease**

<b>Emergency</b>	<b>Urgent</b>	<b>Elective</b>
Gingivitis with conditions of stage III	Gingivitis with conditions of stage II gingival index according to Loe and Sillness	Gingivitis with conditions of stage I gingival index according to Loe and Sillness
Gingival index according to Loe and Sillness	Mucogingival tissues-related complaints other than esthetic issues.	Routine follow-up visits
Periodontitis—All stages according to Tonetti’s classification	Peri-implant mucositis	Depigmentation
Replacement of missing teeth (immediate implant)	Necrotizing gingivitis	Frenectomy
Necrotizing periodontitis and stomatitis	Prosthesis-related issues	Vestibular deepening
Abscesses	Replacement of missing teeth (delayed implant)	Hopeless teeth extraction
Pericoronitis		Esthetic-related issues
Endo-perio lesion		

**Conclusion**

COVID-19 is now recognized as a pandemic throughout the world, leading to a scramble in order to gather knowledge as well as evidence regarding the ‘novel’ corona virus which causes this disease. periodontal health have an indirect effect on COVID 19. Good oral health of an individual helps to reduce the possibility of getting systemic diseases, which have a chance of COVID 19 morbidity. Maintaining proper oral hygiene reduces possibility of getting periodontal disease which helps to maintain proper oral hygiene which have the positive impact on general health.

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