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Review Article

# COVID -19 and provisions for dental treatment: an overview

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ABSTRACT

The corona virus disease 2019 (COVID-19) was declared as a pandemic on 11 March 2020. For a dental care professional there is high risk of cross infection due to specific characteristic of dental clinic setting as well as treatment modalities. There is urgent need of infection control protocols in dental clinics and hospitals during the COVID-19 pandemic. This requires the proper guidelines so that nosocomial COVID-19 spread should be prevented and the urgent dental care can be provided to the needful patients. This article provides the guidelines for dental practitioners based on relevant guideline and experience. The aim of this article is to present an overview of the COVID-19 as well as overall guideline for dental treatment modality during and after the pandemic.



## 1. Introduction

The corona virus disease was emerged from Wuhan, China. Now it has become a major health challenge for many countries around the world.[1] The Chinese centre for Disease Control and Prevention was officially announced the novel coronavirus as the causative pathogen of coronavirus disease 2019 (COVID-19). This new virus seems to be very contagious and has quickly spread globally. The outbreak was declared as a Public Health Emergency of International Concern (PHEIC) by world health organization (WHO). On February 11, 2020, the WHO Director-General, Dr. Tedros Adhanom Ghebreyesus, announced that the disease caused by this new virus was "COVID-19," which is the acronym of "coronavirus disease 2019". These include severe acute respiratory syndrome coronavirus (SARS-CoV), first identified in 2002, and the Middle East respiratory syndrome coronavirus (MERS-CoV), first identified in 2012.[2] As of May 29, 2020, globally total 5701337 laboratory confirmed cases of COVID-19 has been recognized with total 357688 deaths,[3] In india till now there are 89987 active cases present including 4706 deaths (ncov2019@gov.in) . More than 80% of cases are mild and recover from the disease with symptomatic treatment. However, around 15% of cases are categorized as severely ill and the remaining 5% are categorized as critically ill. In about 80% of patients have only mild symptoms found that flu like symptoms and allergies (seasonal), that leads increased numbers of undiagnosed cases. The asymptomatic patients act as "carriers" and also becomes as reservoir for infection that ultimately leads to re-emergence of infection. The scientific name SARS-CoV-2 was given by the coronavirus study Group of the international Committee on taxonomy of viruses, but it is commonly known as the COVID-19 virus.[4] The asymptomatic incubation period of the virus is estimated between 2 and 12 days. It is noteworthy that the incubation period can range from 0 to 24 days (C.C. Lai et al., 2020), therefore transmission can occur before any symptoms are apparent. In general, older age and the existence of underlying systemic diseases (e.g., diabetes, hypertension, and cardiovascular disease) were associated with poorer prognosis.

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### 1.1. Sign & Symptoms

Patients with COVID-19 usually presents clinical symptoms such as fever, dry cough, tiredness and myalgia. Less obvious symptoms such as headache, nasal congestion, runny nose, sore throat, nausea, diarrhoea, reduced sense of smell (hyposmia), and abnormal taste sensation (dysguesia) have also been reported.[5] In addition patients suffering from COVID-19 shows abnormal chest X-ray and computed tomographic findings such as ground-glass opacities are typically found in the chest.[6] Other features published in British Journal of dermatology is COVID toe that is found in 19% of the patients. Other dermatological findings are small blisters on the limbs and trunks (9%), maculopapules (47%), livedo (6%) of cases. Irregular oral ulcer could be an inaugural symptom.[7] Cases with mild symptoms do not require any specific care, and usually symptomatic treatment and home isolation are enough. Oxygen therapy is the major intervention for patients with severe cases. Critical cases management is case dependant and will usually need intensive care.

### 1.2. Aetiology

The disease having the viral aetiology. The novel coronavirus is known for the largest genomic capacity and multiple hosts. It belongs from the family of RNA virus that is known as coronaviridae. The transmission of this virus can occur from animal to human (zoonotic),[2] and the most probable origin of this virus is from the Chinese horseshoe bats(Rhinolophussinicus). SARS-CoV-2 belongs to the beta CoVs category. The shape of the virus is round or elliptic and pleomorphic form, with a diameter ranges from 60–140 nm. The lipid solvents such as ether (75%), ethanol, chlorine-containing disinfectant, peroxyacetic acid and chloroform can inactivate these viruses effectively.

### 1.3. Mode of Transmission

The main source of transmission is patients with symptomatic COVID-19, but according to recent studies it has been seen that the patients in their incubation period and also the asymptomatic patients can be carriers of SARS-CoV-2 (Chan et al. 2020; Rothe et al. 2020). Thus the control becomes extremely challenging due to this epidemiologic feature. Vertical transmissions (from mother to newborn) is still not proved, but faecal-oral transmission is possible also the recovered patients remains carrier of COVID-19.[1]

## 2. Oral Transmission

1. **Transmission through oral mucosa**: Researchers have shown the role of oral mucosa in COVID-19 infection which suggests that acute respiratory infection might be caused by mucosa contact with particles polluted by COVID-19.[8]
2. **Transmission through saliva**: Recent studies drawn our attention to salivary glands in the epidemic process of asymptomatic infections.[8] ACE2 (Angiotensin Converting Enzyme -2) is an important receptor for COVID-19 (Xu, Chen, et al. 2020). In a previous study about SARS-CoV researches found salivary gland epithelial cells with high expression of ACE2 were infected (Liu et al.2011). In minor salivary glands the expression of ACE2 was observed higher as compared to the lungs this shows that SARSCov-2 targets the salivary glands.[9] It has been noticed that the positive rate of the virus can reach up to 91.7% in infected individuals saliva, also saliva sample of infected individual can cultivate live viruses. This feature strongly suggests that the transmission of the virus can originate from the infected saliva.

### 2.1. SARS-CoV-2 transmission and dental office

There is a potential for transmission of COVID-19 via aerosol, fomites, or the faecal-oral route that may contribute to nosocomial spread in the dental office setting.[10] Routine dental procedures usually generate aerosols; during the course of this pandemic, alterations to dental treatment should be considered to maintain a healthy environment for the patients as well as the dental team.[11]

## 3. Transmission from other objects

Studies have revealed that SARS-CoV could be detected from three major excrements (sputum, faeces and urine) and blood of the patients. At 24°C SARS-CoV could survive about 5 days in sputum and faces, 10 days in urine and 15 days in blood. At room temperature, it could survive about 3 days on the surface of filter paper, gauze, plastics and glass.[12] Thus, disinfection of objects and hand washing are essential. Considering that people touch their face on an average of 23 times per hour, with 44% of these occurrences involves touching mucous membranes of the mouth and/or nose.[13] This strengthened the recommendation of hand hygiene protocols.

## 4. Aim of the Review

1. Development of guidelines for dental health care personnel for the treatment that includes own safety measures.
2. Advisory on antibiotics and analgesics during treatment.
3. Serving the treatment on the basis of severity of the disease.
4. Treatment Considerations.

*4.1. 1. Development of guidelines for dental health care personnel for the treatment that includes own safety measures*

**i. Guidelines for using masks:** One should use a particulate respirator at least as protective as a N95 mask (US National Institute for Occupational Safety and Health-certified), European Union standard FFP2, or equivalent, whenever performing or working in settings where aerosol-generating procedures are done.[14,15] (Table 1)

**ii. Guidelines for use of Personal Protective Equipment (PPE):-** Recommendations from the WHO for the rational use of personal protective equipment (PPE) in health care and community settings[17]. The ministry of health and family welfare India have given the guidelines for rational use of Personal PPE. Components of this PPE includes goggles, face-shield, mask, gloves, coverall/gowns (with or without aprons), head cover and shoe cover. PPE is only one effective measure within a package of administrative and environmental and engineering controls.[16] As of high contamination in dental office PPE is the urgent requirement for dental care professionals.(Figure 1)

*4.2. Advisory on antibiotics and analgesics during COVID Pandemic[17] (Table 2)*

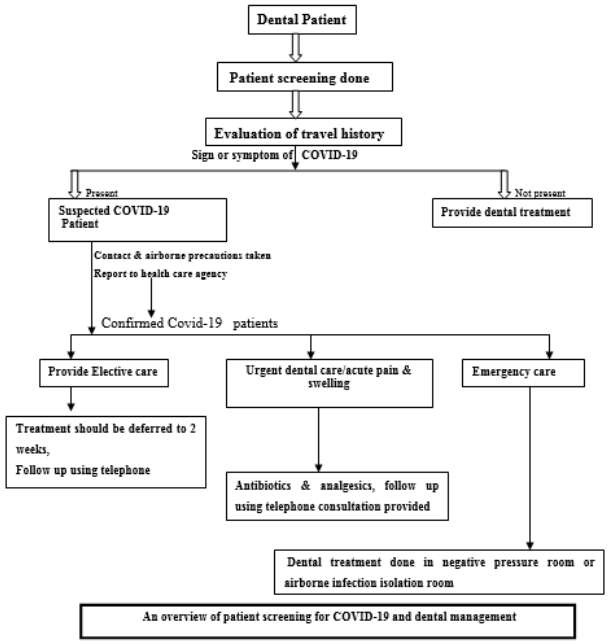
*4.3. Treatment planning (on the basis of severity of disease*

For this categorization of patients has been done on the basis of Probability of different kind of patients that can visit dental care setting.

These are:-

1. Asymptomatic and unsuspected patients of COVID-19
2. Suspected cases of COVID-19
3. Confirmed COVID-19 cases

-Patient screening should be the first step. After the screening of the patient the treatment should be planned accordingly.




According to the above flow chart we can do the treatment categorization according to the patient characteristics and requirement of the treatment. That is listed below:- (Table 4)

**Table 1:** Mask guidelines for dental health care personnel (DHCP)

| Mask Type – With Goggles or Face Shield | Level of Risk to DHCP |
|---|---|
| N95 | Low |
| N95 EQUIVALENT MASK -KN/KP95, PFF2, P2, DS/DL2, KOREAN SPECIAL 1ST | Low |
| Surgical Mask | Moderate |

**Table 2:** Antibiotic recommendation for dental Patients

| Antibiotics | Regimen |
|---|---|
| Amoxicillin or Phenoxymethylpenicillin | 500 mg capsule (Three times a day) 250 mg tablets (Four times daily) |
| Metronidazole | 400 mg tablet (Three times a day) |

## 5. Treatment considerations

1. Using 0.23% povidone-iodine mouthwash for at least 15 s before the procedure can reduce the viral load in the patient's saliva (Eggers et al., 2018), alternatives are pre-procedural mouthrinse with 0.2% povidine iodine or 0.5-1% hydrogen peroxide.
2. Whenever possible disposable and single-use instruments and devices should be used to reduce the risk of cross-infection

**Table 3:** Analgesics recommendation for dental Patients

| Analgesics | Regimen |
|---|---|
| Paracetamol | 500 mg tablets (upto four times a day) |
| Ibuprofen | 200 mg tablets( upto four times a day) |
| Diclofenac | 50 mg tablet (three times daily) |
| Combinations : Ibuprofen and paracetamol Diclofenac and paraetamol | Without exceeding the daily dose and frequency of any drug |

**Table 4:** Treatment categorization according to the severity of disease

| Dental treatment categorization | Intervention required |
|---|---|
| 1. Requirement of emergency treatment (life threatening conditions). | Treatment should be done immediately (to save the life), eg: any maxillofacial fracture or swelling that compromises airway of the patient. |
| 2. Urgent treatment that can be treated by the minimally invasive Procedure and without aerosol production | Such as acute abscess, pericoronitis, pulpal inflamed tooth that requires extraction, dry socket management , treatment should be done as soon as possible |
| 3. Urgent conditions that need to manage with invasive procedure. | Severe dental pain associated with pulpal inflammation requires endodontic intervention immediately, acute periodontal disease, : requires early treatment |
| 4. Non-Urgent procedures | Such as Chronic periodontal disease, adjustment of removable dentures, treatment can be delayed for some days. |
| 5. Elective Procedures. | Such as oral examinations, esthetic dental procedures & recall visit, that can be scheduled after some weeks. |


**Fig. 1:**

3. Extraoral radiographs should be utilized instead of intraoral imaging to reduce the excessive salivation and gag reflex associated with intraoral radiographs.
4. The dental treatment should be as minimally invasive as possible.
5. Rubber dam should be used whenever possible as this will significantly reduce the spread of all microorganisms.
6. Aerosol-generating procedures should be avoided whenever possible.[12]

## 6. Conclusion

COVID-19 has become disease of international concern. We as dental health care personnel are very prone to infection due to the aerosol and splatter production during the different dental procedures. These aerosols and splatter contains salivary droplet, nasopharyngeal secretions, plaque blood etc. that can easily infect the practitioner. The average distance between dentist and the working field is approximately 35–40 cm, and some of the procedures can be time-consuming, that is putting the dentists at a higher risk zone.[18] Thus the contamination control measures should be followed strictly in dental chambers, the ultrasonics should be replaced by hand instruments and the manual techniques. The use of saliva ejectors with low or high volume can reduce the production of droplets and aerosols.[1] As there is rampant spread of COVID-19 in worldwide it's very difficult to diagnose the asymptomatic patients. So, there are very high chances that any clinician can treat the asymptomatic patient of SARS-COV-2. The latest update by the American Dental Association recommends dentists nationwide to defer elective dental treatment for the next three weeks and focus on emergency care only.[19] Therefore, in order to help dentists during this period, we have have suggested the basic outline of the disease as well as developed a guidelines for the self protection as well as the treatment protocol during the pandemic. It is advisable to every clinician to assess the emergencies on a case-by-case basis and use the clinical judgement to aid in the decision making. The 4-handed technique for the infection control is beneficial in dental office. Patient education during the pandemic is also required such as the general guidelines of washing hands, and avoid close contact (maintain distance approx. 6feet) from the suspected or diseased individuals. This article summarizes an overview of the COVID-19 as well a proper guideline provisions for dental treatment. We hope that these guidelines given in this literature will definitely help the clinicians to provide the dental care during the pandemic and also helps them to update their knowledge about the pandemic.

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## 8. Conflict of Interest

None.

## References


1. Meng L, Hua F, Bian Z. Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Dental and Oral Medicine. *J Dent Res*. 2020;99(5):481–7.
2. Gorbalenya AE, Baker SC, Baric RS. The species severe acute respiratory syndrome related coronavirus: classifying 2019-nCoV and naming it SARS-CoV-2. *Nat Microbiol*. 2020;Available from: https://doi.org/10.1038/s41564-020-0695-z.
3. Coronavirus disease 2019 (COVID-19) Situation report -130, Data as reported by national aurthorities by 10:00 CET . 2020;.
4. Gorbalenya AE. Severe acute respiratory syndrome-related coronavirus - the species and its viruses,a statement of the Coronavirus Study Group. *bioRxiv*. 2020;Available from: https://doi.org/10.1101/2020.02.07.937862.
5. Giacomelli A, Pezzati L, Conti L, F. Self-reported olfactory and taste disorders in SARSCoV- 2 patients: a cross-sectional study. *Clin Infect Dis*. 2020;71(15):889–90.
6. Guan W, Ni Z, Hu Y. Clinical characteristics of 2019 novel coronavirus infection in China. 2020;Available from: https://www.medrxiv.org/content/10.1101/2020.02.06.20020974v1.
7. Chaux-Bodard AG, Deneuve S, Desoutter A. Oral manifestation of Covid-19 as an inaugural symptom? *J Oral Med Oral Surg*. 2020;26(2):18.
8. Zhang Z, Zhang L, Wang Y. COVID-19 indirect contact transmission through the oral mucosa must not be ignored. *J Oral Pathol Med*. 2020;49:450–1.
9. Xu J, Li Y, Gan F, Du Y, Yao Y. Salivary Glands: Potential Reservoirs for COVID-19 Asymptomatic Infection. *Int Am Assoc Dent Res*. 2020;.
10. Peng X, Xu X, Li Y. Transmission routes of 2019-nCoV and controls in dental practice. *Int J Oral Sci*. 2020;12:9.
11. Ali A, Alharbi S, Alqaidi S. Guidelines for dental care provision during the COVID-19 pandemic. *Saudi Dent J*. 2020;32(4):181–6.
12. Otter JA, Donskey C, Yezli S, Douthwaite S, Goldenberg SD, Weber DJ. Transmission of SARS and MERS coronaviruses and influenza virus in healthcare settings: the possible role of dry surface contamination. *Journal of Hospital Infection*. 2016;92(3):235–50.
13. Kwok YLA, Gralton J, McLaws ML. Face touching: A frequent habit that has implications for hand hygiene. *Am J Infect Control*. 2015;43(2):112–4.
14. Advice on the use of masks in the context of COVID-19; 2020.
15. Interim Mask and Face Shield guidelines. ADA; 2020.
16. Novel Coronavirus Disease 2019 (COVID-19): Guidelines on rational use of Personal Protective Equipment: Ministry of Health and Family Welfare Directorate General of Health Services. 2019;.
17. 19.Drugs for the Management of Dental Problems During COVID-19 Pandemic; NHS. 2020;.
18. Kamate SK. Assessing Knowledge, Attitudes and Practices of dental practitioners regarding the COVID-19 pandemic: A multinational study. *Dent Med Probl*. 2020;57(1):11–7.
19. ADA recommending dentists postpone elective procedures; 2020. Available from: https://www.ada.org/en/publications/ada-news/2020-archive/march/ada-recommending-dentists-postponeelective-procedures.accessed.


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