



## DENTISTRY AFTER CORONA: SAFETY &amp; PRECAUTIONS

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## ABSTRACT

Corona virus disease 2019 (COVID-19) is a respiratory infection caused by SARS-CoV-2 (COVID-19 virus). The COVID-19 virus is transmitted mainly through close physical contact and respiratory droplets, while airborne transmission is possible during aerosol generating medical procedures. The recent spread of severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) and its associated corona virus disease has gripped the entire international community and caused widespread public health concerns. Despite global efforts to contain the disease spread, the outbreak is still on a rise because of the community spread pattern of this infection. Once in the human body, this corona virus (SARS-CoV-2) is abundantly present in nasopharyngeal and salivary secretions of affected patients, and its spread is predominantly thought to be respiratory droplet/contact in nature. Dental professionals, including endodontists, may encounter patients with suspected or confirmed SARS-CoV-2 infection and will have to act diligently not only to provide care but at the same time prevent nosocomial spread of infection. Thus, the aim of this article is to provide a brief overview of the symptoms, and routes of transmission of this novel infection. In addition, specific recommendations for dental practice are suggested for patient screening, infection control methods, and patient management protocol.

**KEYWORDS :** Bronchopulmonary hygiene therapy, physiotherapy, airway clearance technique, breathing exercises, COVID-19

## INTRODUCTION

A highly infectious pneumonia started to spread in Wuhan, China, from 12 December 2019. In early January 2020, the officials announced the novel corona virus (COVID-19) as the causative pathogen of the disease. This novel viral pneumonia was named "Corona Virus Disease (COVID-19)" by the World Health Organization (WHO). "SARS CoV-2" was also the given name for this novel corona virus by the International Committee on Taxonomy of Viruses (ICTV)<sup>4</sup>. On 30 January 2020, the WHO declared the COVID-19 outbreak as a public health emergency of an international scale<sup>5 & 6</sup>. Given the widespread transmission of SARS-CoV-2 and reports of its spread to health care providers<sup>7 & 8</sup>, dental professionals are at high risk for nosocomial infection and can become potential carriers of the disease. These risks can be attributed to the unique nature of dental interventions, which include aerosol generation, and proximity of the provider to the patient's oropharyngeal region. In addition, if adequate precautions are not taken, the dental office can potentially expose patients to cross contamination. As the understanding of this novel disease is evolving, dental practices should be better prepared to identify a possible COVID-19 infection, and refer patients with suspected, confirmed, or a history of COVID-19 infection to appropriate treatment centers.

## Symptoms

Patients with COVID-19 usually present with clinical symptoms of fever, dry cough, myalgia in more severe cases, abnormal chest computed tomography (CT) scan findings such as bilateral and peripheral ground-glass and consolidative pulmonary opacities have been reported. In addition, less obvious symptoms such as nausea, diarrhea, reduced sense of smell (hyposmia), and abnormal taste sensation (dysgeusia) have also been reported<sup>9&10</sup>. In addition, abnormal chest X-ray and computed tomographic findings such as ground-glass opacities are typically found in the chest<sup>12</sup>. Notably, about 80% of these patients have only mild symptoms that resemble flulike symptoms and seasonal allergies, which might lead to an increased number of undiagnosed cases<sup>13</sup>.

## Various Routes of Transmission

SARS-CoV-2 infections typically spread through respiratory

droplets or by contact. Therefore, coughing or sneezing by an infected person can render SARS-CoV-2 airborne, potentially infecting individuals in close contact (within a radius of approximately 6 ft). This led to the recent recommendation of social distancing to minimize community spread of the disease<sup>14</sup>. Another important route of transmission is if droplets of SARS-CoV-2 land on inanimate objects located nearby an infected individual and are subsequently touched by other individuals. Thus, disinfection of objects and hand washing are essential for halting the spread of this disease. It is known that SARS-CoV-2 can bind to human angiotensin-converting enzyme 2 receptors,

which are highly concentrated in salivary glands; this may be a possible explanation for the presence of SARS-CoV-2 in secretory saliva. Therefore, there is a potential for transmission of COVID-19 via aerosol, fomites, or the fecal-oral route that may contribute to nosocomial spread in the dental office setting<sup>15,16,17</sup>. Thus the transmission of this virus is the most important concern in the medical facilities especially in dental clinics as it is very difficult to avoid the treatments involving aerosol in a dental clinic. In addition to patient's saliva, there are also droplets of the high-speed turbine of a hand piece mixed with patient's blood that is very contagious<sup>18</sup>. Hence we have established a few protocols through this article to reduce down the potential spread of the virus through aerosol in dental clinics or any other medical facilities.

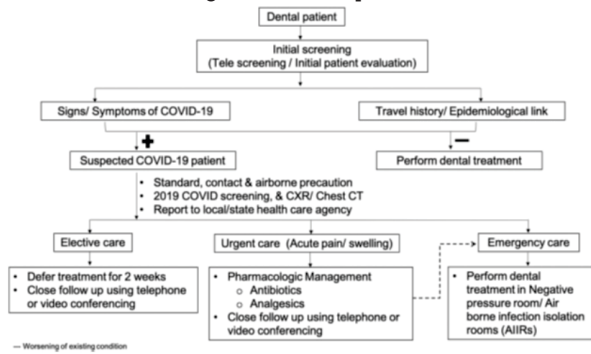
## Patient management and prevention of nosocomial infection

Based on the experience gained from the previous outbreak of SARS-CoV and the data available on SARS-CoV-2 and its associated disease (COVID-19), certain specific measures are discussed for dental patient management in this epidemic period of COVID-19 (summarized in Fig. 1).

## Telescreening and Triaging

Initial screening via telephone to identify patients with suspected or possible COVID-19 infection can be performed remotely at the time of scheduling appointments (Fig. 1). The 3 most pertinent questions for initial screening should include any exposure to a person with known or suspected COVID-19 presentation, any recent travel history to an area with high

incidence of COVID-19 or presence of any symptoms of febrile respiratory illness such as fever or cough. A positive response to either of the 3 questions should raise initial concern, and elective dental care should be deferred for at least 2 weeks (Note: As mentioned previously, the incubation period for SARS-CoV-2 can range from 0–24 days.



**Patient Evaluation and Cohorting**

Upon patient arrival in dental practice, patients should complete a detailed medical history form, COVID-19 screening questionnaire (Fig.2). Dental professionals should measure the patient's body temperature using a noncontact forehead thermometer 19. Patients who present with fever (.100.4 F 5 38°C) and/or respiratory disease symptoms should have elective dental care deferred for at least 2 weeks. As per the Centers for Disease Control and Prevention guidelines, individuals with suspected COVID-19 infection should be seated in a separate, well-ventilated waiting area at least 6 ft from unaffected patients seeking care<sup>20</sup>.

Patients should be requested to wear a surgical mask and follow proper respiratory hygiene, such as covering the mouth and nose with a tissue before coughing and sneezing and then discarding the tissue<sup>20</sup>.

After informing the patients to self-quarantine themselves, dentists should instruct the patients to contact their physician to rule out the possibility of COVID-19.

Date: \_\_\_\_\_  
 Name (last name, first name): \_\_\_\_\_  
 Date of Birth (mm/dd/yy): \_\_\_\_\_

Yes	No	COVID-19 Screening Questionnaire
		In the past 14 days, have you or any household member travelled to areas with known cases of COVID-19? If no, please note location.
		In the past 14 days, have you or any household member had any contact with a known COVID-19 patient?
		Have you or any household member have a history of exposure to COVID-19 biologic material?
		Have you had any history of fever in the last 14 days?
		Have you had any symptoms such as cough, difficulty breathing, diarrhea, nausea, body ache, loss of smell or loss of taste in the last 14 days?
		Urgent Dental Need Question Do you have uncontrolled dental or oral pain, infection, swelling or bleeding or trauma to your mouth?

**Fig 2: Questionnaire**

**Specific dental treatment recommendations**

In order to have a clarity on what constitutes an emergency condition, dentists can refer to recent American Dental Association recommendations.

**Assessment of a True Emergency**

**Figure 3 – Assessment of a true emergency questionnaire.**

(Circle Patient's Response wherever appropriate)

1) Are you in pain?  
Yes or No

2) What is your level of pain on a scale of 0-10?

3) Do you have a dental abscess (Are your gums and/or face swollen?)  
Yes or No  
If Yes, when did you first notice the swelling?

4) Do you have a fever?  
Yes or No

5) Are you having any trouble swallowing?  
Yes or No

6) Are you having any trouble opening your mouth?  
Yes or No

7) Did you experience any trauma?  
Yes or No  
Please describe the trauma

Certain instances such as dentoalveolar trauma and progressive facial space infection warrant emergency dental intervention. In the unlikely event of providing dental care to suspected or confirmed cases of COVID-19 infection, dentists should be cognizant of the following recommendations:

- Dentists should follow standard, contact, and airborne precautions including the appropriate use of personal protective equipment and hand hygiene practices<sup>21</sup>, Figure 4, 5 & 6 illustrate Centers for Disease Control and Prevention guidelines for putting on and removing personal protective equipment. Due to the uncertainty of this outbreak, there might be a shortage of personal protective equipment. Therefore, it is advisable to use them judiciously and follow the Centers for Disease Control and Prevention guidelines for N95 respirator use and reuse.
- Pre-procedural mouth rinse: previous studies have shown that SARS-CoV and MERS-CoV were highly susceptible to povidone mouth rinse<sup>22</sup>. Therefore, preprocedural mouth rinse with 0.2% povidone-iodine might reduce the load of corona viruses in saliva<sup>23</sup>. Another alternative would be to use 0.5-1% hydrogen peroxide mouth rinse, as it has non specific virucidal activity against corona viruses<sup>23</sup>.
- Dentists should use a rubber dam to minimize splatter generation (of course, this is the standard of care for nonsurgical endodontic treatment).
- Use of disposable (single-use) devices such as mouth mirror, syringes, and blood pressure cuff to prevent cross contamination is encouraged.
- Dentists should minimize the use of ultrasonic instruments, high-speed handpieces, and 3-way syringes to reduce the risk of generating contaminated aerosols.

SARS CoV-2 can remain viable in aerosol and survive up to 3 days on inanimate surfaces at room temperature, with a greater preference for humid conditions<sup>24</sup>. Therefore, clinic staff should make sure to disinfect inanimate surfaces using chemicals recently approved for COVID-19 and maintain a dry environment to curb the spread of SARS-CoV-2 (>60% alcohol-based wipes or 0.1% sodium hypochlorite solution)<sup>25</sup>.

- Consider the use of betadine/chlorhexidine solution in the water tanks for air rotors and 3 way syringes. This has a possibility of disinfecting the aerosol by almost 90%. The handpieces must be oiled thoroughly after such use.
- Physical disinfection must be done regularly by the use of fumigators and alcohol/water based disinfectant solutions.
- The dental chair along with the desks/trolleys must be wiped with disinfectant wipes after every patient.
- Autoclaving and packaging of all instrument sets after every patient is a must.
- 2 separate trolleys to be made for sterilized and non-sterilized instruments which will be carried only by the materials/instruments in charge in and out of the operatory.
- They all should carry water impervious gowns with head caps, N-95/3 ply masks, Protective eye wear, Face shield, Shoe covers at all times.
- Dental team (PPE) members should change from personal clothing to scrubs before entering the clinic and vice versa before returning home and must take shower before coming in contact with any family member



Figure 4 - Centers for Disease Control and Prevention recommendations for putting on and removing personal protective equipment for treating COVID-19 patients.

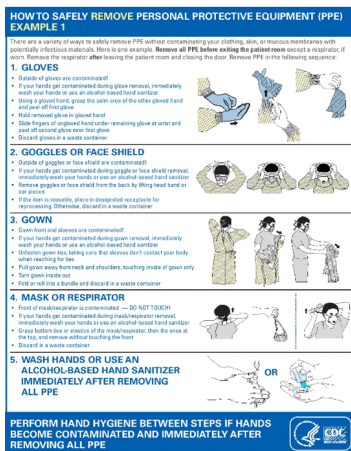


Figure 4 - Centers for Disease Control and Prevention recommendations for putting on and removing personal protective equipment for treating COVID-19 patients.

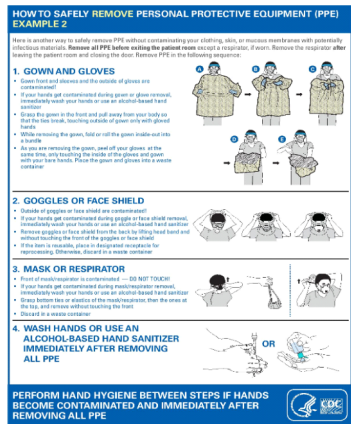


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**DISCUSSION**

The worldwide spread of SARS-CoV-2 increases the likelihood that dental health care professionals will treat this subset of the patient population. Universal precautions are important to minimize the spread of this virus and its associated disease. The latest update (June 30, 2020) by the American Dental Association recommends dentists nationwide to defer elective dental treatment for the next four weeks and focus on emergency care as there is an increase in the number of

COVID-19 cases<sup>26</sup>.

Endodontists are in a unique situation as they may be called upon for the assessment and management of odontogenic pain, swelling and dental alveolar trauma in suspected or known COVID-19 patients and there is a good chance that dental practices might treat some of the patients with asymptomatic COVID-19 infections since the incubation period can range from 0 to 24 days and most patients only develop mild symptoms in initial days. Thus, every patient should be screened properly before entering the dental office. Health care providers must keep themselves up-to-date about this evolving disease & provide adequate training to their staff to promote many levels of screening and preventive measures, allowing dental care to be provided while avoiding the spread of this novel infection.

**CONCLUSION**

In conclusion, COVID-19 has had many complications for dentistry of which some may have further long-term impacts on clinical practice, dental education and dental research. It is important to consider the following points in the long-term: ‘

- Preparedness and planning for modifying clinical practice in dentistry.
- Optimization of cross-infection control protocols.
- Further focus on prevention and oral health promotion for the public.
- Patient empowerment and education.
- Increased role of e-consultancy and tele-medicine.
- Investment in relevant latest dental equipments.

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