

## Covid-19 and dentistry

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### Abstract

The corona virus disease 2019 (COVID-19) caused by severe acute respiratory syndrome corona virus 2 (SARSCoV-2), first detected in Wuhan, Hubei province of China, has emerged rapidly as a health crisis that has challenged health systems and health professionals all over the world. Transmission occurs primarily through droplet spread or contact routes. Due to these characteristics Dental staff and dental practitioners are considered to be at the highest risk of acquiring SARS-CoV-2 infection because of their prolonged face to face exposure to patients and exposure to respiratory secretions and aerosols produced during procedures like ultrasonic scaling and cavity/access preparation using a high-speed air rotor with water jet cooling systems. Present article provides the insight of Covid-19 infection, precautions and considerations to be taken for practice dentistry in this pandemic.

**Keywords:** Covid-19, SARSCoV-2, Dentistry

### Introduction

The corona virus disease 2019 (COVID-19) caused by severe acute respiratory syndrome corona virus 2 (SARSCoV-2), first detected in Wuhan, Hubei province of China, has emerged rapidly as a health crisis that has challenged health systems and health professionals all over the world.<sup>1</sup> The incubation period for individual infected with Covid-19 infection is between 2 to 14 days.<sup>2</sup>

Fever, dry cough, sore throat, loss of taste, loss of smell (anosmia), or tiredness are the most common symptoms at onset of illness and headache, haemoptysis, nausea, vomiting and diarrhoea are the less common symptoms.<sup>3</sup> Some patient may report difficulty in breathing or shortness of breath. Pneumonia is also developed in some cases which can be seen on chest X-ray or chest CT. Novel corona virus infection primarily target lung and most common symptoms is acute respiratory distress syndrome (ARDS), effect were also seen in other vital organ such as heart (acute cardiac injury), kidney (acute kidney injury), liver (liver impairment) and death can occur in severe cases<sup>4, 5</sup>.

Dental staff and dental practitioners are considered to be at the highest risk of acquiring SARS-CoV-2 infection because of their prolonged face to face exposure to patients and exposure to respiratory secretions and aerosols produced during procedures like ultrasonic scaling and cavity/ access preparation using a high-speed air rotor with water jet cooling systems<sup>1, 6</sup>. Therefore, it is the need of the hour for dental professionals to update their knowledge regarding

disease control and modify their clinical strategies recommended by the authorities to provide safe environment for themselves and their team against infections<sup>7</sup>. Hence present review of literature provides an overview of Covid-19 infection, precautions and considerations to be taken for practice dentistry during era of Covid-19.

### Covid-19 infection in healthcare workers<sup>8</sup>

Health care workers are at higher risk for covid-19 with high morbidity, transmission can occurs due to respiratory droplets or emerging evidence suggests that it may also be transmitted through contact or fomites.

### Guidelines for Dental Professionals in Covid-19 pandemic situation<sup>9-11</sup>

Modification required for dental set up can be divided in following three phases.

Phase I - Preparatory Phase

Phase II- Implementation Phase

Phase III - Patient follow-up and Review

### Phase I: Preparatory Phase<sup>9, 10</sup>

#### Preparation of Dental Clinic Ventilation and air quality management

Maintain air circulation through a frequent opening of windows and using an independent exhaust blower to extract the room air into the atmosphere. HEPA air filter system and UV light may be used.

**Preparation of Clinic entrance, reception and waiting** <sup>[12]</sup>

- a. Display visual alerts at the entrance of the clinic and reception area about respiratory hygiene, cough etiquette, social distancing, and disposal of contaminated items in trash cans.
- b. As soon as the patient enters the reception area, ask them to wash their hands using hand wash or alcohol-based hand rub. Use tissue paper or hand dryer to dry the hands instead of towels. Tissue paper dispenser and foot-operated waste bin are mandatory.
- c. Include temperature recordings as part of your routine patient assessment before performing any dental procedure. A noncontact forehead thermometer can be used to measure the patient's body temperature.
- d. Use of glass/plastic protective barrier at the reception desk or registration counter help in reducing the chances of infection and ensure safety of staff members.

Appointments should be scheduled such that social distancing can be maintained in the waiting room. Another alternative is for the patient to wait outside or in their vehicle and they can be contacted via telephone when it is their turn to be seen. It is recommended that the patients avoid bringing companions to their appointment, except for instances where the patient requires assistance. This can be communicated to the patient at the time of scheduling an appointment.

**Changing Room** <sup>[2]</sup>

Separate dedicated area to be available for dentist and other staff members to wear personal protective equipments and donning and doffing of PPE kit.

**Sterilisation room** <sup>[2]</sup>

Dedicated and trained staff should be there to take care of all the instruments that include transport, cleaning, drying, sterilisation (as per manufacture's instruction), storage and testing the quality of sterilisation and maintaining the sterilization record.

**Equipment and instrumentation** <sup>[9, 10]</sup>

Dental operatories should be equipped with following equipments

- i. High volume extra oral suction
- ii. Fumigation systems
- iii. HEPA air filter system
- iv. Ultra-Low Air Penetration
- v. UV lights
- vi. Infrared thermometer
- vii. Pulse oximeter
- viii. N95 masks
- ix. Eye wears
- x. Appropriate PPE kit
- xi. Non touched or automatic sanitizer dispenser

**Disinfection of Dental Clinic** <sup>[9]</sup>

According to the available literatures corona virus has ability to survive in the environment for several hours up to days. Therefore it is necessary to disinfect the operatory area as before their re-use.

**Surface Disinfection** <sup>[12]</sup>**Floors**

1. Mop the floor with 1% sodium hypochlorite solution with a contact time of 10 min. Use separate mops for the clinical area.
2. Unidirectional mopping technique should be followed by mopping from inner to outer area.
3. Ideally the floor should be cleaned after every patient or after a major splash or two hourly periods.
4. Wash and disinfect the mop with clean water and 1% sodium hypochlorite and leave it for sun drying.

**Rest of the surfaces**

1. Freshly prepared 1% sodium hypochlorite (contact time: 10 min) is used.
2. Disinfection should be done daily before starting work, after every procedure, and at the end of the day.

**Delicate Electronic equipment**

It should be wiped with alcohol-based rub/spirit (60%–90% alcohol) swab before each patient contact.

**Fogging**

This method is called “No-touch surface disinfection.” 20% (w/v) working solution of hydrogen peroxide (stabilized by 0.01% of silver nitrate) is prepared. The amount of solution required is approximately 1000 mL per 1000 cubic feet.

1. Immediately after the procedure, exit the room and close the operatory for half hour. This allows the aerosols/droplets to settle down.
2. A 2-step surface cleaning is performed.
3. Fogging is done for 45 min followed by a dwell time of 1 h.
4. The room can then be opened and fans switched on for aeration.
5. Wet surfaces can be dried/cleaned using a sterile cloth or clean cloth.

**Waste Management**

The infectious medical and domestic waste of suspected or confirmed COVID-19 patients should be disposed of in double-layered yellow color bags with gooseneck ligation. The bags should be marked and disposed of in accordance with the Biomedical Waste Management and Handling Rules, 2018.

**Phase II Implementation Phase** <sup>[1, 12]</sup>**Tele-screening/Tele dentistry**

The word ‘tele’ means ‘distant’, and therefore teledentistry satisfies the need for social distancing as has been advocated by the health authorities all across the globe to contain the spread of SARS-COV-2 virus. Teledentistry can be incorporated into routine dental practice as it offers a wide range of applications such as remote triaging of the suspected COVID-19 patients for dental treatment and decreasing the unnecessary exposure of healthy or uninfected patients by decreasing their visits to already burdened dental offices and hospitals. Tele dentistry is a safe, convenient approach to resume dental practice during this pandemic. All instruction to the patient can be delivered effectively and at the same time dentist can also assess the need of the dental treatment.

**Current medical history and past history**

Complete evaluation of current and past medical history particularly pertaining to symptoms of covid-19 infection (fever, cough, chills, sore throat, headache and shortness of breath) must be analysed. All non-emergency dental treatment should be postponed for 3 weeks if patient give any positive response to these questions.

**Arrival of patient at dental clinic**

It is compulsory to all the patients to wear the surgical or similar masks at all times, remove footwear. Perform hand hygiene with alcohol-based hand rub or soap and water. Taking temperature of every patient before initiating any dental procedure.

It has been reported that pre-procedural mouth rinse with povidone-iodine (PVP-I) in form of mouthwashes have a prophylactic effect on covid-19 transmission. Mouth rinse before dental procedure is mandatory to reduce the salivary load of oral microbes. Use of preprocedural mouth rinse containing oxidative agents such as 1% hydrogen peroxide or 0.2% povidone iodine for one minute, should be mandatory as SARS-CoV-2 is vulnerable to these oxidising agents.

**Personal protection in the operatory** [1, 13]

For examination and non aerosols producing procedures only wear a triple layer surgical mask and protective eyewear/face shield and gloves. It is advisable to wear N95 face masks for high risk procedures. Surgical mask can be

used over the N95 masks to increase its shelf life after. Because corona viruses lose their viability significantly after 72 hours, many organizations have promoted a rotation and reuse strategy. It involves acquiring a set number of N95 masks (at least 5 as per the CDC), and rotate their use each day, allowing them to dry for long enough that the virus is no longer viable. However, N95 respirators used during aerosol generating procedures or those contaminated with blood, respiratory or nasal secretions, or other bodily fluids from patients should be discarded.

Dentist and dentist assistant should wear personal protective equipments while treating the patient. Use of rubber dam is also helps reducing the spread of infection. Reinforcing good hand hygiene, the dentists should wash hands before patient examination, before dental procedures, after touching the patient, after touching the surroundings and equipment without disinfection, and after touching the oral mucosa, damaged skin or wound, blood, body fluid and secretion. Dental office staff also should be screened every day at entry for symptoms and risk factors of COVID-19 and should not be allowed in the office if they present with any of the symptoms.

**Phase III Patient follow-up and Review** [2]

It is mandatory to review patient health status telephonically after 24 hrs and in a week time if patient has developed any symptoms of covid-19 than appropriate action should be taken.

**Table 1:** Summary of patient management during Covid-19

Before Dental procedure	During dental procedure	After dental procedure
Plan an effective and pragmatic approach for the treatment to be provided.	Prefer extraoral radiologic techniques.	Keep the surgical mask/respirator on.
Whenever possible, provide multiple services at each visit, to avoid additional visits by the patient to the dental office.	Avoid aerosol-generating procedures whenever possible (ultrasonic scaler, high- or low-speed handpieces, three-way air/water spray).	Replace gloves, discarding the ones used during the visit in a container for contaminated waste.
Check that blinds and curtains are open.	Avoid unnecessary circulation in and out of the dental office.	Disinfect reusable PPE (goggles, face shield, etc.).
Check that the PPE level is compatible with the procedures to be conducted.	Use a rubber dam for isolation whenever possible.	Promote air renewal inside the office.
Check that commonly touched surfaces are protected with a disposable barrier.	Use high-speed suction.	Disinfect the package of all materials that are not used during the visit.
Instruct the patient to rinse with a 1% hydrogen peroxide solution or 0.2% iodopovidone (be aware of allergies to iodine).	Prefer manual instrumentation.	Clean the floor with detergent or a disinfectant solution, avoiding brooms and vacuum cleaners.
	Minimize the amount of coolant used for ultrasonic instruments and hand pieces.	Thoroughly clean and disinfect all surfaces and equipment.

**Discussion**

It is important to realize that, even pre-COVID-19, it was part of routine practice for all OHCP to update medical history and record vital signs including temperature for every patient in every visit. Most providers agree that regardless of COVID-19, patients with symptoms of flu, respiratory, infectious, or other systemic diseases that put patients and providers at risk should seek medical care and elective dental procedures should be delayed [14]. More scientific evidence and studies are required to understand the specific behavior and infectious nature of the novel SARS-CoV-2 virus that could lead to developing vaccine or medications to control the disease. Until then, the aforementioned precautionary measures are highly recommended, and the use of fit tested respirators will be

needed to enhance protection for the foreseeable future [15]. The COVID-19 pandemic presents several opportunities for dental researchers to focus on key issues. Important research priorities may include estimating the costs and benefits of expanded PPE use (and other changes in dental practice workflows), developing and testing innovative approaches to minimize aerosol generation during dental procedures, testing and validating teledentistry models, and evaluating alternative dental workforce models, such as dental therapists [16].

**Conclusion**

Since dental professionals involve close contact with patient and aerosol production during dental procedures, the risk of Covid-19 transmission from an infected patient is high.

Dental health care personnel need to understand the implications of potential transmission of the (SARS)-CoV-2 virus in a clinical setup. Hence, they need to keep themselves updated with any new information regarding this disease. New approaches such as Teledentistry will help dentists assist patients without adding the risk of cross infection. The recent state of affairs obligates the need to strike a balance between the safeties of the healthcare professionals yet providing optimum dental care to the patients requiring emergency intervention.

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