Review Article

COVID-19 (SARS-CoV-2)Impact: Guidelines for Indian Dental Surgeons during dental procedures current scenario and future prospective: A Systematic Review

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Abstract

Dental surgeons, auxiliaries, supporting staff as well as patients undergoing dental procedures are at high risk of cross-infection in this era of COVID-19 (SARS-CoV-2) pandemic. Most dental procedures require close contact with the patient's oral cavity, saliva, blood, and respiratory tract secretions. As the saliva is rich in COVID 19 viral load, there are high chances of spread of infection from dental clinics. Moreover, many patients who are asymptomatic may be carriers. For this reason, it is advised that patients visiting a dental office must be treated with due precautions. All urgent procedures should be undertaken only after consultation, tele-triage, consent, and through pre-fixed appointments.

Keywords: Covid-19, Dental procedures, Dental health care personnel, Disinfection

Introduction

In India, there are more than 3,20,000 dental professionals, 1,75,000 registered dental hygienists, 3,18,000 dental assistants and over 10,000 dental laboratories[1]. Dental health-care personnel (DHCP) refers to all paid and unpaid personnel in the dental health-care setting who might be occupationally exposed to infectious materials, including body substances and contaminated supplies, equipment, environmental surfaces, water, or air. DHCP include dentists, dental hygienists, dental assistants, dental laboratory technicians (in-office and commercial), students and trainees, contractual personnel, and other persons not directly involved in patient care but potentially exposed to infectious agents (e.g., administrative, clerical, housekeeping,maintenance,or volunteer personnel).

Recommendations in this report are designed to prevent or reduce potential for disease transmission from patient to DHCP, from DHCP to patient, and from patient to patient. Although these guidelines focus mainly on outpatient, ambulatory dental health-care settings, the recommended infection-control practices are applicable to all settings in which dental treatment is provided.Several guidelines have been issued earlier by DCI, IDA and other organizations and hence there is a need to issue unified guidelines. These guidelines address dental services in the country and cover[2].

- Health care workers who are required to attend dental ailments in remote locations in the government sector.
- Dental Surgeons working in PHC/ small towns and different locations.
- Dental Surgeons working in government and private hospitals set up.
- Dental surgeons working in cities with solo or multi-speciality practices.

According to the guidelines issued by the Union Health Ministry for dental professionals in view of the ongoing pandemic, dental clinics in the Covid-19 containment zones will remain closed, however, they can continue to provide tele-consultation to patients. It also states that dentists, auxiliaries as well as the patients undergoing dental procedures are at high risk of cross-infection as most dental procedures require a close contact with the patient's oral cavity, saliva, blood and respiratory tract secretions. Covid-19 viral load in saliva is very high and many patients who are asymptomatic may be carriers. For this reason, it is suggested that all patients visiting a dental office must be treated with due precautions.

Emergency procedures

According to the advisory by Govt of India, dental clinics situated in containment zones will remain closed. They are allowed to provide tele-consultation services and the patients in these zones can seek ambulance services to travel to the nearby COVID dental facility.Emergency dental procedures can be performed in the dental facilities falling under Red zones. The dental clinics can provide consultancy, but such operations should be restricted to emergency and urgent treatment procedures only. All routine and elective dental procedures should be deferred for a later review until new policy/guidelines are issued.

Guidelines for ventilation

The Ministry outlined the guidelines for maintaining ventilation and air quality management in stand-alone dental clinics. Air circulation with natural air is advised through frequent opening of windows. Using an independent exhaust blower to extract the room air into the atmosphere is also recommended. Using of ceiling fan while performing a procedure should be avoided and a table fan should be placed behind the operator to let the airflow towards the patient. A strong exhaust fan should be so located to create a unidirectional flow of air away from the patient.The air-conditioners should be frequently serviced and the filters cleaned.In centrally air-conditioned buildings, blocking off the return air vents in the patient area will temporarily stop air circulation, provided the AHU (Air Handling Unit) has a provision to receive adequate outdoor air

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supply. The guidelines also states to allow fresh air into rooms by opening of windows or doors slightly.

Visual alerts should be displayed at the entrance of the facility and in strategic areas (waiting areas, elevators) about respiratory hygiene, cough etiquette, social distancing and disposal of contaminated items in trash cans.Ensure availability of sufficient three-layer masks and sanitizers and paper tissue at the registration desk, as well as nearby hand hygiene stations. The waiting chairs should be kept distant, preferably a meter apart [3].

Guidelines for patients and doctors

The guidelines suggested that the patients should not wear a wristwatch, hand and body jewellery. They should not carry additional accessories and bags and should use their own washrooms at home to avoid the need of using toilets at the dental facility. They should also wear a mask which cover oro-nasal region properly.

For appointments that need examination and do not result in aerosols, doctors can only wear a triple-layer surgical mask and protective eyewear/face shield along with gloves. N95 face masks, protective eyewear/face shields and gloves should be used for high-risk and very highrisk procedures. To increase the shelf life of N95 masks, it may be covered with a surgical mask and only the surgical mask should be discarded after use.When examining patients with moderate risks, the doctor will require all PPE (Personnel Protective Equipment) except that the coveralls can be substituted with surgical gowns.

Rational use ofPPEKit

The PPEs are to be used based on the risk profile of the health care worker. The document describes the PPEs to be used in different settings.

Table 1:Different considerations

S. No.	Setting	Activity	Risk	Recommended PPE	Remarks
1	Reception Desk	Provide information to Patients	Low risk	Triple layer medical mask and Gloves	Minimum distance of one meter needs to be maintained
2	Hospital Attendant	Provide services to the patients	Low risk	Triple layer medical mask and Gloves	Minimum distance of one meter needs to be maintained
3	Temperature recording station	Record Temperature with hand held thermal recorder	Low risk	Triple layer medical mask and Gloves	
4	Holding area/ Isolation facility	Interview & Clinical examination by doctors/nurses	Moderate Risk	N-95 masks and Gloves	
5	Clinical Operatory	Clinical management	Moderate to High Risk	N-95 masks with PPE Kit Gloves	
6	Sanitary staff	Cleaning frequently touched surfaces/Floor/ cleaning linen	Moderate Risk	N-95 masks Gloves	In Contact with Patients
7	Administrative staff	Providing administrative support	Moderate Risk	Triple layer medical mask	No contact with patients

Steps to prevent disease transmission between work and home

1. DHCP who are of older age, having a pre-existing, medically compromised condition, pregnant, etc, are perceived to be at a higher risk of contracting COVID-19 from contact with known or suspected COVID-19 patients. It is suggested that providers who donot fall into these categories(older age; presence of chronic medical conditions, including immunocompromising conditions, pregnancy) should be prioritized to provide care[4].
2. All DHCP should self-monitor by remaining alert to any respiratory symptoms (e.g. cough, shortness of breath, sore throat) and check their temperature twice a day, regardless of the presence of other symptoms consistent with a COVID-19 infection.
   a. To prevent transmission to DHCP or other patients, contact with local health department if a patient is suspected of COVID-19. The state health department can also be contacted.
3. Designate convalescent [DHCP] provision of care to known or suspected COVID-19 patients (those who have clinically recovered from COVID-19 and may have some protective immunity) to preferentially provide care.
4. Conduct an inventory of available personal protective equipment (PPE) supplies [e.g., surgical masks, surgical gowns, surgical gloves, face shields].
5. Remove magazines, reading materials, toys and other objects that may be touched byothers and which are not easily disinfected.
6. Print and place signage in the dental office for instructing patients on standard recommendations for respiratory hygiene/cough etiquette and social distancing.
7. Though it is recommended that only asymptomatic patients, patients who have tested negative for COVID-19 infection, or recovered patients (after 3 days since resolution of signs and symptoms) can be seenin dental settings, DHCP should ensure that there are supplies for infection control etiquette, (e.g., alcohol- based hand rub with 60-95% alcohol, tissues, and no-touch receptacles for disposal at healthcare facility entrances, waiting rooms, and patient check)[5,6].

Modifications for Dental Operatory

1. Since SARS-CoV-2 may be vulnerable to oxidation, use 1.5% hydrogen peroxide (commercially available in the US) or 0.2% povidone as a preprocedural mouth rinse. There are no clinical studies supporting the virucidal effects of any preprocedural mouth rinse against SARS-CoV-2.
2. DHCP may use extraoral dental radiographs, such as panoramic radiographs or cone beam CT as appropriate alternatives to intraoral dental radiographs during the outbreak of COVID-19, becausethe latter can stimulate saliva secretion and coughing.
3. Reduce aerosol production as much as possible, as the transmission of COVID-19 seems to occur via droplets or aerosols and DHCP should prioritize the use of hand instrumentation.
4. DHCP should use rubber dams if an aerosol-producing procedure is being performed to help minimize aerosol or spatter.
5. DHCP may use a 4-handed technique for controlling infection.
6. DHCPshould prefer the use of high-volumee vacuators. DHCP should be aware that in certain situations, backflow could occur when using a saliva ejector and this backflow can be a potential source of cross- contamination.
7. In surgical cases,DHCP should use resorbable sutures (i.e. sutures that last 3 to 5 days in the oral cavity) to eliminate theneed for a follow up appointment.
8. DHCP should minimize the useofa3-in-1syringe asthismay create droplets after dental care is provided

In between patients

1. Change PPE kit,cleananddisinfect reusable facial protective equipment (e.g., clinician and patient protective eyewear or face shields) between patients.
2. Non-dedicated and non-disposable equipment (e.g.Handpieces, dental x-ray equipment, dental chair and light) should be disinfected according to manufacturer's instructions. Handpieces should be cleaned to remove debris, followed by autoclave sterilization after each patient.
3. Routine cleaning and disinfection procedures (e.g., using cleaners and water to pre-clean surfaces prior to applying an EPA-registered, hospital-grade disinfectant to frequently touched surfaces or objects for appropriate contact times as indicated on the product's label) are appropriate for SARS-CoV-2 in healthcare settings, including those patient-care areas in which aerosol-generating procedures are performed.
4. Surfaces such as door handles, chairs, desks, elevators, and bathrooms should be cleanedand disinfected frequently.

Disinfection of Dental Clinic

COVID-19 virus can potentially survive in the environment for several hours/days. Premises and areas potentially contaminated with the virus to be cleaned before their re-use.Remove the majority of bioburden, and disinfect equipment and environmental surfaces[7,8].

Environment and Surface Disinfection:Floors: 2 Step Cleaning Procedure (Detergent and freshly prepared 1% sodium hypochlorite with a contact time of 10 minutes. Mop the floor starting at the far corner of the room and work towards the door. Frequency: after any patient/ major splash or two hourly.

Rest of the surfaces:Freshly prepared 1% sodium hypochlorite (Contact Time: 10 minutes). Damp dusting should be done in straight lines that overlap one another. Frequency: before starting daily work, after every procedure and after finishing daily work

Delicate Electronic equipment Should be wiped with alcohol-based rub/spirit (60-90%alcohol) swab before each patient contact.

Tele-consult and Tele-screening

I. Telephone screening is encouraged as the first point of contact between the patientsand the dentist or reception office is encouraged.

II. Current medical history and past history particularly pertaining to symptoms of Severe Acute Respiratory Illness e.g. shortness of breath or All symptomatic fever, cough, sore throat, runny nose etcmust be analysed.

III. Any positive responses to either of the questions should raise concern, and care should be postponed for 3weeks except in dental emergencies.

IV. Encourage all to download the ArogyaSetu App.

Dental history and remote TRIAGE

I. Oral Health(Mobile Phone-Based Oral Health) screening about dental history and try to manage problems with advice and analgesics and antibiotics as local measures.

II. Clinics can evolve a web-based form which can also include a consent form.

III. Comprehensive dental treatment according to the urgency of the required treatment and the risk and benefit associated with each treatment.

IV. Only pre-appointed patients should be entertained in the clinic whose history, problems and procedures are already identified to some extent through previous telephone and remote electronic or web-based systems.

What can patients do before arrival at a dental clinic?

I. Minimise or eliminate wearing a wrist watch, hand and body jewellery and carrying of additional accessories bags etc.

II. Use their own wash rooms at home to avoid the need of using toilets at the dental facility.

III. Have a mouth wash rinse with 10 ml of the 0.5% solution of PVP-I solution (standard aqueous PVP-I antiseptic solution based mouthwash diluted 1:20 with water). Distribute throughout the oral cavity for 30 seconds and then gently gargle at the back of the throat for another 30 seconds before spitting out.

IV. Wear a triple layer facemask during transport and before entering the premises.

V. Have the body temperature checked and use a sanitiser on the entrance.

VI. Patients consent and declaration to be obtained in a physical print out or electronic system.

VII. Maintain social distance.

Protocols of patient handling in the clinic area

For appointments that do not result in aerosols, and need examination only wear a triple layer surgical mask and protective eyewear/face shield and gloves.Wear N95 face masks, protective eyewear/face shields and gloves along with coverall for High Risk and very high-risk procedures [9].To increase the shelf life of N95 masks, it maybe covered with a surgical mask and discard only the surgical mask after use.When examining patients with moderate risks the treating doctor will require all PPE as high risk except that the coveralls can be substituted with surgical gowns.Practice non-aerosol generating procedures.

Use of rubber dam is encouraged.

The 4-handed technique is beneficial for controlling the infection.

Patient discharge protocol

I. The patient drape should be removed by the assistant, and the patient is asked to perform hand wash and guided out of the clinic towards reception and handed back his foot wears and belongings[10,11].

II. The procedures and prescription is recorded only after doffing the PPE.

III. Patient to perform hand hygiene and to be provided with review /follow up instructions [12].

Patient turn around and disinfection protocol

I. After the patient leaves the treatment room, the assistant should collect all hand instruments immediately, rinse them in running water to remove organic matter and as per standard sterilisation protocol [13-15].

II. All 3 in 1 syringe, water outlets, hand piece water pipelines, etc should be flushed with the disinfectant solution for 30-40 seconds.

III. Remove water containers and wash them thoroughly and disinfect with 1% sodium hypochlorite using clean cotton/ gauge piece and then fill with fresh 0.01% sodium hypochlorite solution and attach back to the dental chair [16].

IV. Then, disinfect the dental chair along with all the auxiliary parts within 3 feet of distance using 1% sodium hypochlorite and clean and sterilised cotton/gauge piece using inner to outer surface approach and leave for drying [17,18]. New cotton/ gauge piece should be used for every surface. The areas include:

a. Patient sitting area and armrests

b. Dental chair extensions including water outlets, suction pipe, hand piececonnector, 3 in 1 syringe, etc.

c. Dental light and handle

d. Hand washing area – slab and tap nozzle

e. Clinic walls around the dental chair and switchboards

f. Hand washing area – slab and tap nozzle

V. Hand pieces should be cleaned using a hand piece cleaning solution to remove debris, followed by packing in the autoclave pouches for autoclaving. Record to be maintained for the same.

VI. Impression should be thoroughly disinfected before pouring or sending to the laboratory using an appropriate disinfectant.

Conclusion

Currently there are no clearcut guidelines or protocols available for management of active or suspected COVID-19 cases. Whole world is waiting for successful vaccine against the Pandemic. Due to that lack of a standard, dental care provision has completely stopped or significantly decreased in several affected countries.The newer guidelines are developed according to the transmission of disease and final judgement is decided by the dental practitioners. DHCP need to

keep themselves updated regarding new information of disease. New approaches like teledentistry, teleconsultation, E Sanjeevani platform can help dental surgeon to assist patient without cross infection.

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