Review Article

Environment Protection in Dental Office for COVID 19

Dr. Richa Khanna[1*], Prof. (Dr.) Rakesh Kumar Chak[2], Prof. (Dr.) Anil Chandra[3]

[1]Dr. Richa Khanna, Professor (Jr Grade) Department of Paediatric & Preventive Dentistry, Faculty of Dental Sciences, King George's Medical University, Lucknow.

[2]Prof. (Dr.) Rakesh Kumar Chak, Professor & Head, Department of Paediatric & Preventive Dentistry, Faculty of Dental Sciences, King George's Medical University, Lucknow.

[3]Prof. (Dr.) Anil Chandra, Professor, Department of Conservative Dentistry & Endodontics, Faculty of Dental Sciences, King George's Medical University, Lucknow.

* Corresponding author.

ABSTRACT

SARS-Cov-2 that is responsible for the recent global outbreak for COVID 19 disease has been reported to be primarily spreading from person to person contact via droplet transmission [1]. In the wake of COVID 19 pandemic, there are several measures that can help protect the dental office environment from becoming the source of transmission to patients and Dental Health Care Personnel (DHCP). The article discusses the general measures, the intra-operatory measures and post-operative measure to prevent transmission of Corona virus through surfaces in dental office. Though the evidence for definite prevention is lacking, still precautionary measures will always be useful.

Key words: Dental office environment, SARS-CoV 2, COVID 19 transmission

Background:

Dental office environment includes all surfaces and air component occupying the facility. The purpose of protecting this environment is to prevent transmission of infection. This is particularly important in case of airborne or droplet infections. SARS-Cov-2 that is responsible for the recent global outbreak for COVID 19 disease has been reported to be primarily spreading from person to person contact via droplet transmission1. In the wake of COVID 19 pandemic, there are several measures that can help protect the dental office environment from becoming the source of transmission to patients and Dental Health Care Personnel (DHCP**).**

General principles/measures for dental office environment protection:

Minimize exposure:

The best way to protect environment from any contamination by infectious agents is to minimize exposure. This can be done by minimizing surfaces in dental office. Any item/equipment not in use or placed only for aesthetic purpose or considered difficult to disinfect can be removed from the dental office, especially in dedicated working areas/operatory. Surfaces which are deemed necessary to be in place but are difficult to disinfect can be covered with protective barriers that can be disposed at the end of the day or at the end of the procedure. These may include computer desktops/keyboards/screens/counter tops etc. Unnecessary movement of patients and contact with DHCP to be avoided. Signage and tapings can be used for the same. Screen guards can be placed at front desks/reception. The maximum/safe number of patients considered for waiting per day should be decided. Contact with surfaces can also be avoided to the maximum for the same purpose, for example preferring cashless transactions, installing sensor based faucets and sanitizer dispensers. All DHCP to be encouraged to change surgical attire (scrub suits) in the dental office, and all personal clothing should be avoided, again to minimize surfaces for disinfection. Personnel involved directly in task of cleaning/disinfection should wear appropriate Personal protective equipment (PPE) and follow strict hand hygiene measures while donning and doffing of PPE and also after completing their tasks Cleaning and disinfection of surfaces:

Centre for Disease Control and Prevention, United States has recently update its guidelines for environment protection in dental office. Earlier CDC recommended cleaning and disinfection of operatory should be deferred at least for 15 minutes after any procedure is completed and patient departure from operatory to allow dispersion of droplets to sufficiently fall from the air and settle down2. In the latest update of 17th June 2020, CDC has recommended that for cleaning and disinfecting operatory after a COVID 19 suspect/confirmed patient, waiting period should be sufficient enough so as to allow enough air exchange to occur2. CDC also recommends that though environmental cleaning and disinfection procedures should be performed consistently and correctly after each patient, there is no mandatory need of sterilizing the operatory between patients.

The dental office surfaces can be broadly divided into high touch and low touch surfaces, depending on frequency of contact and also based on risk of exposure involved. It is suggested that high touch/high risk surfaces should have a strict disinfection protocol than low touch/low risk surfaces. The high touch surfaces may include door handles, faucet knobs etc. High risk surfaces may include parts of dental chair frequently touched, and should be cleaned and disinfected after every patient attended. Low touch – low risk surfaces include floor, ceiling, walls etc. and may be cleaned and disinfected at the beginning and end of the day. Cleaning of floors should be done only with wet mopping. Use of brooms is not suggested. In case of spill on floor or any

other surface, immediate cleaning and disinfection to be done irrespective of cleaning schedule.

The general principle of cleaning/disinfection to be followed for routine purpose is to use cleaners and water to clean surfaces of any visible/gross dirt before applying any hospital-grade disinfectant. Similar protocol for floor involves General principle of environment cleaning to be followed: Visibly dirty surfaces to be first cleaned with detergent and water, followed by rinsing/wiping with clean mop/cloth rinsed in water, allowed to dry, lastly mopping/wiping with disinfectant solution.

All surfaces that can be sterilized by heat should be subjected to autoclaving. This includes all instruments used for patient care. Some equipments / instruments are sensitive to heat and so have to undergo disinfection cycles. These include sensors for digital X-rays, large equipments, stethoscope, sphygmomanometer, etc. Since most of these are metal or plastic based, they can be disinfected by 70 percent isopropyl alcohol. Alcohol based disinfection preferred for metal surfaces. Plastic surfaces can be disinfected by 1% hypochlorite solution. Floor wet mopping can also be done using 1% hypochlorite solution. Triple bucket system should be encouraged. Walls up to 7 feet to be disinfected by 1% hypochlorite. Hydrogen peroxide based wipes can be preferred in high risk areas like operatory where aerosol generating procedures are being done.

Ventilation of Dental Office

The 'air' component of dental office is very important to be maintained and protected as this can pose risk to both DHCP and patients coming for care. The primary objective is to keep the dental office well ventilated. CDC recommends that the dental operatory should be oriented parallel to air flow, air flow should be such that it moves from clean to less clean, and if feasible placing patient's head towards the return air vents2. An industrial hygienist/ventilation engineer can be consulted if possible. Heavy duty exhaust fans can be placed to allow outflow of air. The objective is to create 'negative pressure' so that air flowing out is more than air flowing into the operatory. Portable air purifiers can act as adjunct to maintain this airflow. UV light disinfection is also an adjunct to ventilation. However, CDC recommends that there is no evidence for UV light disinfection, only hospital grade disinfectants are proven to disinfect surfaces2.

Time management:

Time management for ensuring cleaning and disinfection schedules should be considered adjusted to the number of patients being attended by the dental facility. Proper timetable for the same can be prepared.

Maintaining storage and supplies:

A dedicated area for maintaining and storage of supplies required for disinfection should be allocated. Stock checking should be done regularly to avoid falling short of supplies.

Monitoring and quality control:

All disinfection and cleaning protocols should be available to all DHCP in the dental office. Compliance to the protocols can be ensured with short, simple checklists. Any deviation from protocols, under any special circumstances should be documented for future reference.

Environment protection during delivery of care:

The dental surgeon can consider dividing spaces/time slots for aerosol/non aerosol producing procedures. Individual rooms/operatory should be preferred for AGPs. High suction/extraoral suction can be considered during AGPs. With open floor plans, removable barriers between dental chair units should be placed. These barriers should be easy to clean and disinfect. There should be a space of six feet between two dental chair units. Portable Air purifiers can be installed (HEPA 13/14 filters preferred). These HEPA units should be within vicinity of patient's chair, but not behind DHCP. They should be positioned so as to not pull air into or past the breathing zone of the DHCP.

Dental Chair unit may be modified to avoid spitting into spittoon. They may be removed or covered with disposable plastic sheets. Cluttering of instruments should be avoided in the dental operatory. Unnecessary instruments should be kept in closets away from potential contamination. and not exposed/uncovered in the operatory. Only the clean/sterile supplies and instruments should be readily accessible. Oral impressions should be thoroughly disinfected before pouring or sending to the laboratory using an appropriate disinfectant.

Environment protection after delivery of care:

Patients should be asked to recover their face with mask/face cover once the treatment is done. Operator should follow proper doffing of PPE protocol in an area close to waste collection bins. Operator/Assistant should not remove mask in the operatory even after doffing rest of PPE. Mask should be removed only after exit from the operatory. Hand hygiene to be performed and then new mask can be donned. DHCP should not enter the operatory for any cleaning/disinfection before enough air changes have occurred, especially after AGP.

All instruments used in care to be collected and cleaned before disinfecting/sterilization as per instrument requirement. Visible dirt to be removed first. An area of three feet in all

directions of the dental chair unit should be cleaned and disinfected. Fresh cotton/ gauge piece should be used for every surface. Dental unit water lines including 3 in 1 syringes, water outlets, hand piece water pipelines, suction lines to be flushed for 30-40 seconds with water or mild disinfectant. All water containers should be removed from dental chair unit and washed thoroughly, disinfected with 1% sodium hypochlorite using clean cotton/ gauge piece and then filled with fresh 0.01% sodium hypochlorite solution and attached back to the dental chair. MOHFW (Ministry of Health nad Family Welfare) has recommended that fogging to be done for treatment areas3: "Fogging or 'No-touch surface disinfection' after a large area has been contaminated. The commercially available hydrogen peroxide is 11% (w/v) solution which is stabilized by 0.01% of silver nitrate. A 20% working solution should be prepared. The volume of working solution required for fogging is approximately 1000ml per 1000 cubic feet. After the procedure has been completed in the operatory (in case of no negative pressure), exit the room and close the operatory for half an hour for the aerosols/droplets to settle down. Perform the 2 Step surface cleaning followed by fogging. The fogging time is usually 45min followed by contact time/dwell time of one hour. After that the room can be opened, fans can be switched on for aeration. Wet surfaces can be dried/cleaned by using a sterile cloth or clean cloth (other surfaces)."

References:

1. Wu Z McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72?314 cases from the Chinese Center for Disease Control and Prevention. JAMA. 2020;323(13):1239-1242.

2. Centers for Disease Control and Prevention. 2020. Coronavirus Disease 2019 (COVID-19). [online] Available at: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html> [Accessed 29 June 2020].

3. Mohfw.gov.in.2020. [online] Available at: <https://www.mohfw.gov.in/pdf/DentalAdvisoryF.pdf> [Accessed 29 June 2020].