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Review Article

Aerosol: Concern Revived in Dentistry

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Abstract

Routine dental procedures produce aerosol and splatter, which pose a potential risk to the clinician, dental personnel as well immune compromised patient and doctors. As a profession we are generally meticulous with regards to infection control. We have been dealing with other infectious patients like those suffering from AIDS, Hepatitis, HIV, Tuberculosis etc. We already do more than any other healthcare provider. There is always some lax people in any walk of life. That is why this article aims to spread awareness about aerosols and making decisions in partnership with the powers that be, to ensure all of our patients and team members are as safe as possible following COVID-19.

***Keywords:** Aerosol, Covid 19, Precautions ,Dentistry*

1. Introduction

The threat of aerosol infections to dentists and dental personnel has existed since the era when high speed equipment was evolved in the year 1955. Aerosol is created when high powered devices are used. An aerosol is a tiny bit of liquid or solid suspended in air. It is smaller than a splash, spray or splatter. [1,2]

In the dental office, composition of aerosol differs from patient to patient, according to nature of work and operative site. It consists of water, saliva, blood, debris (tooth components) and micro-organisms such as bacteria, fungi, viruses and protozoa, along with their metabolites such as Lipopolysaccharides/Endotoxins (Hallier et al 2020). Taking a good case history of past and current disease is a must; but we can have a asymptomatic carrier or a false negative test; regardless, we must ensure we treat each patient to be an active carrier of disease and take precautions at all times.[3]

Aerosol can be classified in order of size:

A. Splatter: Large droplets greater than 50 microns. When such large size aerosol drops come in contact with any surface such as the dental chair, patient, dentist or storage unit, This is potentially where a contact contamination could take place (Szymanska 2007). Mick and Colleagues stated that these particles behaved in a ballistic manner, this means that these particles or droplets are ejected forcibly from the operating site and have a trajectory similar to that of a bullet until they contact the surface or fall to the floor and as they are large they cannot be suspended in air for long and are air borne only briefly. [2,4]

B. Droplets less than 50 microns can remain within air space until evaporation, leaving residual nuclei, they are much smaller than 10 micron, contain bacteria that relates to respiratory infection (Aikinsn et al 2009) . [4]

C. Droplet nuclei (<= 10 um) in dental setting, 90% of the aerosol produced are extremely smaller (<5 um). They can contaminate surface upto 3 feet and remain suspended in air till water evaporates. [4]

It has been investigated by Harreland Molinari 2009, that dental procedures done using high speed hand pieces or ultrasonics generate large quantities of a very small aerosol 3 microns and less in size and can contaminate surfaces upto one meter away and persists on in animate surfaces for upto 9 days.[1]

When these aerosols are produced, how long they stay in air depends on the size and weight of the suspended material as well as room ventilation, but it can range from seconds to hours, certainly long enough to be inhaled or to settle on nearby surfaces. Very small particles remain suspended at the end of treatment (low settling velocity) and hence can travel further, before they are inhaled and travel through the alveoli of lower respiratory tract and hence chances of infectivity increase due to highly contaminated breathing zone. Whereas invisible aerosol is inhaled inadvertantly by all who enter the office and contaminate the exposed skin, eyes and mucosa. [2]

At this time, it is impossible to determine the exact infection risk represented by aerosolized material. The potential for the spread of infection via an almost invisible aerosol, however, must be recognized and minimized or eliminated to the greatest extent feasible within a clinical situation.

However, any infectious material that is present in a true aerosol form (particles less than 50 μm in diameter) or splatter that becomes airborne as droplet nuclei has the potential to enter the respiratory tract through leaks in masks and contact mucus membranes by going around protective devices such as safety glasses. A true aerosol or droplet nuclei may be present in the air of the operatory for up to 30 minutes after a procedure. This means that after a dental procedure, if the operator removes a protective barrier such as a face mask to talks to a patient when a procedure is completed, the potential for contact with airborne contaminated material remains. Also, there is a potential for an airborne contaminant to enter the ventilation system and spread to areas of the facility where barrier protection is not used. [5]

The susceptibility of developing an infection is influenced by virulence, dose Pathogenicity of the microorganism along with the host immune response.

The oral environment is inherently wet with saliva that continuously replenishes the fluid in the mouth. The fluids in the mouth are grossly contaminated with bacteria and viruses. Dental plaque, both supragingival and in the periodontal pocket, is a major source of these organisms. It should not, however, be overlooked that the mouth also is part of the oronasal pharynx. As part of this complex, the mouth harbors bacteria and viruses from the nose, throat and respiratory tract. These may included various pathogenic viruses and bacteria that are present in the saliva and oral fluids. Any dental procedure that has the potential to aerosolize saliva will cause airborne contamination with organisms from some or all of these sources and pathogenicity of the microorganism along with the hosts immune response. [5]

Saliva droplets are generated when breathing, talking, coughing, or sneezing and formed as particles in a mixture of moisture and droplet nuclei of microorganisms. [6].

The amount, distance, and size of saliva droplets varies among people, suggesting the infectious strength and transmission path of saliva droplets differ when same pathogen was contracted.

Three thousand saliva droplet nuclei could be generated by one cough, which nearly equals to the amount produced during a 5-min talk. Around 40,000 saliva droplets reaching several meters in air can be generated by one sneeze. One normal exhalation can generate saliva droplets reaching the distance of 1m in air contracted. [6]

Large saliva droplets with more mass tends to fall ballistically to the ground and small droplets travel like a cloud over longer distance by air flow. One normal exhalation can generate saliva droplets reaching the distance of 1 meter in air. [6]

Aerosol transmission is well accepted in infection of tuberculosis, measles, and chickenpox, and other infectious agents may behave as airborne transmission in a favorable environment or opportunistically, such as SARS-CoV, influenza virus, and adenovirus. Opportunistically airborne transmission is a mode that infectious agents not only have transmission routines by contacting and droplets but also can reach distant susceptible hosts under restricted conditions by fine particle aerosols in favourable environments. It is possible when aerosol-generating procedure is implemented, such as in dental practice, that 2019-nCoV could possibly spread in airborne transmission. [6]

For acquisition of infectious saliva droplets by a susceptible host, infectious saliva droplets could land in mouth, eyes, or be inhaled into lungs directly. A case report shows that 2019-nCoV infection occurred in a fever clinic when a susceptible person wore an N95 mask covering mouth and nose without eyes protected, suggesting a transmission to eyes. It is also reported that SARS CoV is predominantly transmitted by contacting eye, mouth, or nose. Respiratory virus could lead to respiratory infections of another person through inducing ocular complications. Exposed mucous membranes increased risk of virus transmission by a SARS-CoV study, and close exposure to an infected person increases the chance of infection. [6]

Based on our experience on the SARS and COVID-19 epidemics, some precautions that could reduce the possibility of saliva-mediated spread of diseases in the dental clinic are suggested as follows., The dental team should not rely on a single precautionary strategy in the reduction of dental aerosols. In the late 1980s, the Occupational Safety and Health Administration (OSHA) enacted rules to protect health-care workers, including dentists, dental hygienists, and others in the dental field against blood-borne pathogens. There are many requirements to protect employees when they perform dental procedures. [5,13]. These can be considered under three heads:

A. Dental setup.

B. Personal protective equipment.

C. Patient management.

2. The Dental Setup

2.1 Waiting area

Prepare the waiting area and patient room, post instructions at the entrance of the waiting room, Ensure that all patients cover their nose and mouth with a tissue or their elbow when coughing or sneezing; instruct them to dispose used tissues into a waste bin with a lid immediately after use and ensure hand hygiene. Patients should be placed in an adequately ventilated waiting area. For rooms with natural ventilation, L/s per patient is considered adequate ventilation (Atkinson et al., 2009). Spatial separation of at least 1 m should be maintained between patients. Equipment such as blood pressure cuffs and thermometers should be cleaned and disinfected with 70% ethyl alcohol after each use, as recommended by the WHO (2016). [7]

2.2 Ventilation Management

Aerosol control in confined poorly ventilated spaces where the air exchange with filtration cannot be successfully applied presents a challenge. Another hurdle is to decrease the indoor concentration of bioaerosols. While some indoor air purification techniques aim solely at reducing aerosol concentrations, others are designed to inactivate viable bioaerosols. Strong evidence demonstrates ventilation in a practice setting can impact the spread of airborne infection. [8]

Ultraviolet germicidal irradiation units, commonly employed in hospital operatories and waiting areas, are successful adjunctive means for eliminating aerosols The high spectral emission lamps from these units produce photons that expose microorganisms to a short light wavelength (254 nm) that is lethal to a variety of microorganisms, especially Mycobacterium tuberculosis and E Coli. These Ultraviolet devices should be used at the end of the day & left on overnight. Direct UVC exposure to human skin or eyes may cause injuries, hence they cannot be used when people are working in the area. UV-C radiation can kill the SARS -CoV 2 Corona virus by destroying the outer protein layer of the virus thus inactivating it. It is effective in air, water, inanimate surfaces. UVA and UVB are ineffective. [8]

2.3 Clean air

Dental practices may struggle with ventilation management, especially if they are situated within confined spaces. There is quite strong evidence that good ventilation can impact on the spread of airborne infection (Li et al, 2007). Various studies have shown that air cleaning systems do reduce the amount of aerosol created during dental procedures such as ultrasonic use, tooth preparations and extractions (Martin and Moyer, 2000; Noakes et al, 2004). Few systems are available for dental practice where the systems contain pre filters, carbon filters and UVC lamps. The theory is not only to filter fresh air but to destroy bacteria and viruses, which would be ideal. [4]

Air purifiers are not used widely in dental offices, but they are potentially a very effective way to manage aerosols. Effective equipment uses high efficiency particulate air (HEPA) filters renewed at regular intervals. The efficiency of air purification is measured by the amount of time needed to process all the air in a room of a given size, and the amount and types of particles removed form the air. Due to the many small operatories with floor to ceiling walls in most dental offices, more than one unit is needed for the efficiency necessary. Unfortunately, many so-called air purifiers do little more than create noise and wind. [9]

An efficient air purifier can remove odours and pollens from the office air, as well as airborne microorganisms and debris. In the absence of air purification, good ventilation with fresh air moved through the office constantly can be useful. However, most offices today are sealed, with ability to open few to no windows. Some central heating-air conditioning systems can be designed to filter the air also, but these are costly and best installed during construction of the building. A simple addition of an exhaust fan or two can be installed to allow air to be pushed out of the operatory & waiting area in clinics with windows facing the outside in addition to keeping those windows open. [9]

2.4 Hand hygiene

There is a growing awareness of the importance of hand washing in the prevention of acute respiratory infections and faecal oral transmission which has been reported for 2019nCOV. Although appropriate hand Hygiene is the routine pre-requisite for dental practice its compliance is relatively low, which imposes a great challenge to the infection control during the epidemic period. Several epidemiological studies suggested that hand washing with soap or 70-90% alcohol-based hand rubs is efficient in curbing SARS transmission (Rabenau et al 2005: Fung and Cairncross 2006). WHO has also stressed upon the above method of hand hygiene procedure? ABHR are preferred if hands are not visibly soiled and if they are water and soap should be used. In dental practice the professionals should wash their hands after touching the patient, surroundings, equipment without disinfection and they should avoid touching their own eyes, mouth and nose. [7]

2.5 Disinfection of the clinic settings

The clinic settings should be cleaned and disinfected in accordance with the Protocol for the Management of Surface Cleaning and Disinfection of Medical Environment (WS/T 512-2016) released by the National Health Commission of the People's Republic of China. Public areas and appliances should also be frequently cleaned and disinfected, including door handles, chairs, and desks. The elevator should be disinfected regularly. People taking elevators should wear masks correctly and avoid direct contact with buttons and other objects.

2.6 Anti-retraction handpiece

The high-speed dental handpiece without anti-retraction valves may aspirate and expel the debris and fluids during the dental procedures. More importantly, the microbes, including bacteria and virus, may further contaminate the air and water tubes within the dental unit, and thus can potentially cause cross-infection. Our study has shown that the anti-retraction high-speed dental handpiece can significantly reduce the backflow of oral bacteria and HBV into the tubes of the handpiece and dental unit as compared with the handpiece without anti-retraction function60. Therefore, the use of dental handpieces without anti-retraction function should be prohibited during the epidemic period of COVID-19. Anti-retraction dental handpiece with specially designed anti-retractive valves or other anti-reflux designs are strongly recommended as an extra preventive measure for crossinfection. Therefore, the use of dental handpieces without anti retraction function should be prohibited during the epidemic period of COVID-19. Anti-retraction dental handpiece with specially designed anti-retractive valves or other anti-reflux designs are strongly recommended as an extra preventive measure for cross-infection. [10]

2.7 Surface disinfection

Surfaces that are likely to become contaminated may be de-contaminated after treatment or protected with disposable coverings before they become contaminated. Effective cross-infection control is aided by a strict system of zoning and the use of sterilizable trays. Procedures should be adopted which limit the areas touched and contaminated each time a patient is treated. [11]

2.8 Instrument sterilization

All instruments should be cleaned thoroughly before sterilization by rinsing and scrubbing with detergent and water. Splashing of water should be avoided. Heavy duty gloves and, where appropriate, face protection shield, should be worn. [11]

Items which will penetrate tissues must be sterilized in an autoclave or hot air sterilizer. Items which will touch mucous membrane but not penetrate tissues should similarly be sterilized by heat, or, if not possible, disinfected, e.g., by immersion in 2% glutaraldehyde solution in a closed container according to the manufacturer's instructions. All chemical residues must then be removed by thorough rinsing before use or storage. [11]

Handpieces, ultrasonic scaler inserts/tips and air-water syringe tips where detachable should be flushed for 30 seconds, dismantled, cleaned, oiled where required, and autoclaved between patients. (Handpieces, etc. left overnight should be allowed to discharge water for two minutes at the beginning of the day). Handpieces which cannot be autoclaved are disinfected with an appropriate virucidal agent. [11]

Following sterilization, all instruments should be stored in clean containers to prevent recontamination. Surgical and endodontic instruments should be kept in closed containers. It may be necessary to re-sterilize them immediately before they are used and care should be taken to ensure the instruments are cool prior to use. [11]

2.9 Air and Waterline Precautions

Water in the dental treatment setting should meet U.S. Environmental Protection Agency standards for drinking water (< 500 colony forming units/ml of heterotrophic water bacteria). To ensure the delivery of safe water, manufacturer instructions for use (IFU) should be followed for the dental unit and any waterline treatment products. Water-quality monitoring can be conducted by an outside laboratory or internally with in-office testing kits. The use of independent reservoirs, chemical treatment, filtration, sterile water delivery systems, or combinations of technologies is an additional means for improving and maintaining dental water quality. The CDC recommends water and air should be discharged for a minimum of 20 to 30 seconds after each patient. This should be completed for all devices that connect to a waterline and enter patients mouth, such as handpieces, ultrasonic scalers and air/water syringes. Some IFU recommend purging at the beginning of the workday and between patients for two minutes; therefore, providers should follow the IFU specific to their devices. Additionally, the manufacturer advice for testing and maintaining anti-retraction devices (that prevent water/fluid backflow in a waterline) must be followed. [8]

3. Personal protective equipment (PPE)

Personal protective measures for the dental professionals At present, there is no specific guideline for the protection of dental professionals from 2019-nCoV infection in the dental clinics and hospitals. Although no dental professional has been reported to acquire 2019-nCoV infection to the date the paper was drafted, the last experience with the SARS Coronavirus has shown vast numbers of acquired infection of medical professionals in hospital settings. Since airborne droplet transmission of infection is considered as the main route of spread, particularly in dental clinics and hospitals, barrier -protection equipment, including protective eyewear, masks, gloves, caps, face shields, and protective outwear, is strongly recommended for all healthcare givers in the clinic/hospital settings during the epidemic period of 2019-nCoV. [10]

Based on the possibility of the spread of 2019-nCoV infection, three-level protective measures of the dental professionals are recommended for specific situations.

1) Primary protection (standard protection for staff in clinical settings). Wearing disposable working cap, disposable surgical mask, and working clothes (white coat), using protective goggles or face shield, and disposable latex gloves or nitrile gloves if necessary. [10]

2) Secondary protection (advanced protection for dental professionals). Wearing disposable doctor cap, disposable surgical mask, protective goggles, face shield, and working clothes (white coat) with disposable isolation clothing or surgical clothes outside, and disposable latex gloves. [10]

3) Tertiary protection (strengthened protection when contact patient with suspected or confirmed 2019-nCoV infection). Although a patient with 2019-nCoV infection is not expected to be treated in the dental clinic, in the unlikely event that this does occur, and the dental professional cannot avoid close contact, special protective outwear is needed. If protective outwear is not available, working clothes (white coat) with extra disposable protective clothing outside should be worn. In addition, disposable doctor cap, protective goggles, face shield, disposable surgical mask, disposable latex gloves, and impermeable shoe cover should be worn. [10]

3.1 Surgical mask

These are the ones we use routinely in dentistry and were readily available prior to the COVID-19 crisis at a reasonable price. They have a waterproof outer aspect and protect the wearer from splatter and large droplets. They do not protect against airborne infectious agents such as coronavirus. However, at the very least, if a surgical mask is worn by a contagious person, then this mask will stop the spread to his or her immediate surrounding area. This is the reason some countries, such as the Czech Republic, have made the use of masks mandatory when outdoor. [4]

High filtration face mask with periphery that adapts to facial contours All face masks do not protect from aerosols equally well, and face shields do not provide any protection from aerosols, but block spatter well. The problem with face shields is lack of fit to facial contours. Using a blue dye to test face mask and face shield efficiency, CRA found two criteria must be met: [9]

1. High filtration capability of mask material itself (at least 98-99 percent filtration of particles three microns in size)

2. Close fit to the face all the way around the mask's periphery. [9]

It is important to note that all face masks must be discarded after 20 minutes of use in a high humidity environment (i.e., during cutting or polishing with a water cooled instrument) and after 60 minutes in a low humidity environment (i.e., adjusting a denture or scaling teeth) due to the invisible soak through of aerosolized liquids to the interior side of the mask. This soak through, referred to as wicking, draws microbe laden liquid into direct contact with the mucous membranes of the clinician's nose and lips on the interior side of the mask. Hence, there is more involved in face mask brand choice and use than is generally considered by clinicians. [9]

3.2 Face shields

Pre COVID-19, my personal standard practice was a surgical mask and a full face visor. Given the lack of peripheral seal, face shields should not be used alone as a form of PPE. But their use makes complete sense when dealing with aerosol and splatter coupled with appropriate face masks. An excellent review paper by Raymond Roberge (2016) highlights the advantages and disadvantages of face shields. [4]

Loupe companies are now offering face shields that can adapt over the loupes, which was not feasible with traditional visors and shields. [4]

3.3 Gowns

Personal protective gowns and coveralls are classified based on barrier efficiency that validates protection from fluid penetration under certain pressures. Interestingly, it has been shown that surgical gowns made from non-woven polypropylene showed significantly decreased virus adherence property compared to chemical protective coveralls with the same or higher barrier efficiencies (Katoh et al, 2019). [4]

Barrier protection such as eye covering, protective clothing, and surgical cap over hair. Aerosols go everywhere in the dental operatory but are most dense in a semicircle about 36 inches in front of the patient's face, from ear to ear. Unfortunately, most clinicians prefer to operate within this critical zone. Placing a barrier between the clinician's body and the settling aerosols and splatter is an easy protective strategy. Eyeglasses with side shields, a face shield plus a face mask, clinical clothing with high collar and long sleeves, and use of a surgical cap prevent aerosols from settling on hair, skin, mucous membranes, and street clothes. [9]

Most clinicians use the barriers mentioned routinely. The only question is their design. Does the design chosen cover all the exposed parts of the clinician's body? The clinician must decide if the barriers worn are for a show of infection control or for true protection of the exposed body parts and street clothes. [9]

When truly effective products are chosen and employed, effective aerosol control can be achieved. Dental clinicians need to keep two important points in mind when considering dental office aerosols:

1. Dental procedures inadvertently generate aerosols containing organisms and debris from each patient's oral cavity and these can be harmful to others.
2. All who enter the office must breathe the dental office air continuously in order to sustain life. [9]

4. Patient Management

First of all, dental professionals should be able to identify a suspected case of COVID-19. To date that this paper was drafted, the National Health Commission of the People's Republic of China has released the 5th edition of the Guideline for the Diagnosis and Treatment of Novel Coronavirus Pneumonia. In general, a patient with COVID-19 who is in the acute febrile phase of the disease is not recommended to visit the dental clinic. If this does occur, the dental professional should be able to identify the patient with suspected 2019-nCoV infection and should not treat the patient in the dental clinic, but immediately quarantine the patient and report to the infection control department as soon as possible, particularly in the epidemic period of 2019-nCoV. [10,4]

The body temperature of the patient should be measured in the first place. A contact-free forehead thermometer is strongly recommended for the screening. A questionnaire should be used to screen patients with potential infection of 2019-nCoV before they could be led to the dental chair-side.

These questions should include the following: (1) Do you have fever or experience fever within the past 14 days? (2) Have you experienced a recent onset of respiratory problems, such as a cough or difficulty in breathing within the past 14 days? (3) Have you, within the past 14 days, travelled to Wuhan city and its surrounding areas, or visited the neighbourhood with documented 2019-nCoV transmission? (4) Have you come into contact with a patient with confirmed 2019nCoV infection within the past 14 days? (5) Have you come into contact with people who come from Wuhan city and its surrounding areas, or people from the neighbourhood with recent documented fever or respiratory problems within the past 14 days? (6) Are there at least two people with documented experience of fever or respiratory problems within the last 14 days having close contact with you? (7) Have you recently participated in any gathering, meetings, or had close contact with many unacquainted people? If a patient replies "yes" to any of the screening questions, and his/her body temperature is below 37.3°C, the dentist can defer the treatment until 14 days after the exposure event. The patient should be instructed to self-quarantine at home and report any fever experience or flu-like syndrome to the local health department. If a patient replies "yes" to any of the screening questions, and his/her body temperature is no less than 37.3°C, the patient should be immediately quarantined, and the dental professionals should report to the infection control department of the hospital or the local health department.

If a patient replies "no" to all the screening questions, and his/her body temperature is below 37.3°C, the dentist can treat the patient with extra protection measures, and avoids spatter or aerosol-generating procedures to the best. If a patient replies "no" to all the screening questions, but his/her body temperature is no less than 37.3 [10]

Mouth rinse before dental procedures A preoperational antimicrobial mouth rinse is generally believed to reduce the number of oral microbes. However, as instructed by the Guideline for the Diagnosis and Treatment of Novel Coronavirus Pneumonia (the 5th edition) released by the National Health Commission of the People's Republic of China. [10]

Chlorhexidine, which is commonly used as mouth rinse in dental practice, may not be effective to kill 2019-nCoV. Since 2019-nCoV is vulnerable to oxidation, preprocedural mouth rinse containing oxidative agents such as 1% hydrogen peroxide or 0.2% povidone is recommended, for the purpose of reducing the salivary load of oral microbes, including potential 2019-nCoV carriage. A preprocedural mouth rinse would be most useful in cases when rubber dam cannot be used. [10]

4.1 Mouth Rinse

CRA data show two consecutive 30-second rinses with one of the commercially available 0.12 percent chlorhexidine mouth rinses before dental procedures lowers the number of viable microbes before treatment. Two consecutive rinses are needed for optimal effectiveness. The first rinse mainly complexes with the saliva and the second rinse, performed immediately after expectoration, provides the main effect in lowering microbe counts. We believe this simple procedure should become the routine as each patient is seated in the operatory before any dental procedure, and intermittently during oral hygiene procedures and any other procedures where the rubber dam cannot be used. [9]

It is proved that the use of rubber dam could s reduce airborne particles in ~3-foot diameter of the operatory by 70%.extra high-volume suction is recommended along with regular suction.such cases make four-hand operation necessary. Any situation rendering rubber dam application impossible manual devices should be preferred for procedures such as Carisolv and hand scaler, are recommended for caries removal and periodontal scaling.

Table 1: Strategies to reduce droplet generation in different dental discipline.

Dental discipline	Special precaution
Endodontics	• Rubber dam must be applied during endodontic treatment Root canal treatment usually requires a number of endodontic instruments and devices, therefore minimizing unnecessary hand contact with surfaces and equipment in the dental office to reduce possibility of fomite transmission
Restorative dentistry and paediatric dentistry	• Avoid using rotary instruments during cavity preparation. In selective cases, consider using chemo chemical caries removal or atraumatic restorative techniques. • If rotary instrumentation must be performed, rubber dam isolation should be apply.
Periodontics	• Hand and ultrasonic instrumentation are equally effective in removing plaque and calculus deposits; if required, manual scaling and polishing are recommended (Krishna and de Stefano, 2016).
Prosthodontics	• Salivary suction must be performed with care to avoid gagging. • Select and adjust trays to the right size for impression taking to avoid cough reflex. For highly sensitive patients, consider applying oral mucosa anesthesia to the throat before impression taking. • During fixed partial denture or single-crown preparation, treatment alternation may be considered to incorporate rubber dam application. For example, design supra-gingival margin for posterior bridge or use a split-dam technique (Li et al., 2004). • During removable partial denture or complete denture try-in, avoid touching other objects in the dental office after contacting patients' saliva. • Upon removal from patient's mouth, dental prosthesis, impressions, and other prosthodontics materials (e.g., bite registration) should be thoroughly disinfected by a disinfectant having at least intermediate level activity.
Oral-maxillofacial surgery	• When performing simple extraction, treat the patient in a supine position to avoid working in the breath way of a patient. [7]

5. How to prevent transmission

The objective of the Strategic Preparedness and Response Plan for COVID-19(1) is to control it by suppressing transmission of the COVID-19 virus along with preventing associated illness and mortality. As we understand more studies are warranted to investigate spread mechanism of virus, the airborne transmission along with contact and respiratory droplets is not denied so far. To prevent transmission, especially in context with dental setup following are the excerpts derived from WHO

• Use appropriate fabric masks in specific situations, for example, in public places where there is community transmission rendering other prevention measures, such as physical distancing impossible.

• Use of appropriate contact and droplet precautions when dealing with suspected and confirmed COVID-19 patients, and use of airborne precautions to minimised aerosol generating procedures.

• Continuous use of a medical mask by health care associates working in all clinical spaces during all routine activities throughout the entire working shift.

• At all times, practice frequent hand hygiene, recommended physical distancing from others when possible, and respiratory etiquette; avoid crowded places, close-contact set-ups and confined and enclosed spaces with compromised ventilation; wear fabric masks in closed, overcrowded settings to protect others; and ensure good environmental ventilation in all closed settings along with appropriate environmental cleaning and disinfect. [12]

6. Conclusion

Dentists are at high risk of exposure to infectious disease specially aerosol related. In present context COVID-19 has produced t new challenges and responsibilities to dental personnel's A clear understanding of aerosol generation in dentistry will help us to improve operating protocols in daily dental practice. Saliva as a body fluid besides having biological and defensive function also is a potential route for the spread of infection.

As the modern practice has changed i and every healthcare profession must use procedural mouth rinses along with high volume suction devices ensuring significant reduction of aerosol and chances of cross infection. The risk of infectious transmission associated with dental aerosols, precaution and management are the key factors of daily practice.

Conflict of Interest

The authors declare no conflicts of interest.

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