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Coronavirus disease 19(covid-19): implications for clinical prosthodontics dental care

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Abstract

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus.the recent spread of this pandemic condition has affected India and majority countries of the world.The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it's important that you also practice respiratory etiquette (for example, by coughing into a flexed elbow). Dental professionals including Prosthodontics may encounter patients with confirmed or suspected COVID patients 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 brief overview of epidemiology, symptoms, routes of transmission and how to control infection in clinical prosthodontics practice by patient screening infection control strategies.

Keywords: Covid-19, Infection Control, Biosafety Guidelines, Basic safety protocols

Introduction

Coronavirus disease (COVID-19) is an contagious disease, now declared as the pandemic condition[1].

The extensive transmission of COVID-19, is now reported to affects the health care workers[6-14].

Dental professionals are at high risk because of the probability of the aerosols formation from the salivary droplets[1-2].

Now, it becomes responsibility of the Prosthodontists to adopt the preventory and infection control measures to

avoid and reduce the spread of infection during their clinical practice.

In this article, we will discuss about clinical manifestations, basic safety protocols to be followed by the prosthodontists.

Clinical Manifestations

COVID-19 patients are usually present with the symptoms of fever, dry cough and myalgia, hyposmia(reduced sense of smell) and dysguesia(abnormal taste sensation) have also been reported[3-15].

Aerosol and fomite spread is plausible. Some researchers have shown that few strains of COVID-19 will remain in saliva for 29 days.

Pathogenesis

Studies have shown that virus damages cells and trigger the production of the inflammatory mediators which increase nasal secretion and causes local swelling and inflammation.

Basic safety protocols

These are described under the following headings:

- ✓ PERSONAL CARE PROTOCOLS FOR DOCTOR AND STAFF
- ✓ PATIENT CARE
- ✓ CLINIC & OPERATORY CARE
- ✓ LABORATORY CARE

Personal Care Protocol

Hand hygiene is already well emphasized and stated for all concerned by Alcohol-based hand rub and use of soap and water with standard steps recommended by WHO.

Whenever possible don't carry out the any aerosol generating procedures(Air rotor/ ultrasonic scaler) until there is containment of the spread.

Proper Donning & Doffing protocols of PPE(Personal Protective Equipment) should be made mandatory.

a) Gown: Wearing the full cover gown should be made mandatory that covers from neck to knee, arms to end of wrist and wraps on to the back.
b) Mask or respirators: Preferably N-95 Respirator should be used and FFP3 standard triple layer surgical mask should be used.
c) Face shield & Goggles: use these equipment after proper disinfecting them.
d) Gloves: Surgical/ Nitrile gloves are preferred. Avoid using non-sterile examination gloves.

WHO doesn't recommend using an alcohol based sanitizer when wearing gloves.

Donning Procedures Sequence: Refer to Figure no.1

Doffing Procedure Sequence: Refer to Figure no.2

Patient Care Protocol

It is divided into three categories:

1)**Before The Arrival Of The Patients In The Clinic:**

- Install all the physical barriers like- glass, plastic windows at the reception areas to limit close contact with any infectious patient.
- Clean and disinfect the public areas frequently including door handles, chairs and washrooms.
- Physical/social distancing(minimum of "6 Feet") should be maintained between the reception area and the patient.
- Limit the paperwork in the operatory as much as possible.
- Keep the minimum required staff in the operatory.
- Train and retrain workers on how to follow established protocols.
- Initial screening could be done via telephone and appoint the patients according to their level of dental care i.e. EMERGENCY, URGENT, & ELECTIVE.
- Schedule minimum appointments during the day after tele-triaging patients.

- Prosthodontists should defer all the elective treatment procedures like Crowns, Bridges, inlays, onlays, veneers, removable and complete dentures, implant prosthodontics etc. and handles only emergency and basic procedures.

Protocols to be followed when patients arrive at the clinic:

- Keep in mind, and consider all the patients as a potential asymptomatic COVID 19 carrier.
- Ask the patient to wear the surgical or similar masks at all times, wash hands prior to entry with soap or alcohol based hand rub and remove the footwear outside.
- Ask patients to don't carry any accessories like rings,earrings and handbags.
- Strict written informed consent, screening and undertaking should be procured from all the patients regarding Covid and other diseases in general. (Several standard consent forms are available online).
- Patient evaluation and cohorting : upon patient arrival in clinic patients should complete a detailed medical history form, COVID 19 screening questionnaire and assessment of a true emergency questionnaire.
- Dental professionals should measure the patient's body temperature using a *non-contact forehead thermometer or with cameras having infrared thermal sensor*[4]
- Prosthodontists should take strict personal protection measures and avoid or minimizen operations that can produce droplets or aerosols. Four handed technique is beneficial for controlling infection.
- Rubber dam isolation should be mandatory.
- 2.5% sodium hypochlorite or 0.5% hydrogen peroxide can be added in water reservoir of the dental chair.
- The use of saliva ejectors can reduce the production of droplets and aerosols.
- If dental prosthetic treatment can be delayed, provide patients with detailed home care instructions and any appropriate pharmacologic intervention.
- Before starting the procedure it is made mandatory to patient to do the mouth wash with 1% H_2O_2 (15 ml of solution for 30 seconds),betadiene or with povidine iodine for atleast 15 seconds. Don't use spittoon, use the same sink that had been used for washing the hands and face.
- Patients should be covered with full length drape.
- To prevent aerosol formation, use of rubber dam should be made mandatory.
- After the completion of patient procedure it must be make ensure to completely disinfect all the instruments, equipments and the PPE kit is to be disposed as per the protocols guidelines.
- Encourage the minimal direct contact visit and encourage and educate patients to pay fees by digital routes.
- Patients using the removable prosthesis should be given additional hygiene instructions and educate them to disinfect the prosthesis regularly with extra care.

Protocols to be followed after the patient assessed

- Proper doffing should be followed after patient treatment.
- Proper fumigation of the clinic should be done.
- All the instruments should be disinfected after patient visit.
- All water outlets, handpieces should be flushed with disinfectant solution
- Dental disinfection agents for inanimate surfaces:

1% Sodium hypochlorite; 7-9% Quaternary ammonium; 70% alcohol.

- Follow standard protocol of infection control from dipping and rinsing in chemical disinfectant, washing and packing colour coded autoclave able packets after drying.
- SARS CoV-2 can remain viable in aerosol and survive upto 3 days on inanimate surfaces at room temperature, with a greater preference for humid conditions[22]. 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 COVID-19[23].

Clinic & Operatory Care

All the clnical and auxillary staff should be provided proper PPE and should be trained in sterilization and infection control.

In one study[17] it was found that 67% of the materials sent from the dental clinics to the laboratories were contaminated with infections of varying degrees.

Covid related safety protocols posters or audio-visual should be present in your clinic. Figure no.3

- Hand pieces, Burs, diagnostic instruments etc, have to be stringently autoclaved, in sealed pouches.
- Scrubbing the diagnostic instruments in a concentrated soap solution for 20 seconds prior to autoclaving may be a good practice as soap is one of the best *anti-viral* means.
- Disinfection of impression: ADA(American Dental Association) guidelines state that impressions should be rinsed to remove saliva, blood and debris and then rinsed with soap solution,then disinfected before being sent to the laboratory.
- Spraying disinfectants onto the surface of the impression reduces the chance of distortion, especially in the case of alginate,hydrocolloid and polyether materials, but may not adequately cover areas of the undercuts[5,18].
- Thorough rinsing of the impression is necessary before and after disinfection.
- For Alginate-0.5% Sodium Hypochlorite/ iodophors.
- Zinc-oxide eugenol impression paste-2% Glutaraldehyde or chlorine compounds.
- Rubber-base impression materials-2% Glutaraldehyde or cidex.
- It is also understood that the Covid-19 virus can survive on metal for upto two weeks or more. So the metal instruments sterilization should be made mandatory.
- Impression trays(Aluminium-chrome-plated trays) can be disinfectant with Sodium hypochlorite.
- Non-sterilizable equipments such as some face bow components must be cleaned with soap and disinfected with a hospital-level disinfectant. The method of choice is spraying or soaking these items in the disinfectant in a separate container or bag[5].
- Laboratory equipments & infection control: All brushes, rag wheels and other laboratory tools should be heat sterilized or disinfected daily.
- The lathe machine should be cleaned and disinfected daily. Surface disinfection protocols are the same in the dental laboratory as in the dental office.

Possible Transmission Routes In Prosthodontic Practice

- COVID-19 has direct transmission such as- cough, sneeze, droplet inhalation transmission, and contact transmission such as contact with oral, nasal and eye mucous membranes.
- It can also transmitted by saliva and the fetal-oral routes and may also have high person to person transmission routes.

- The prosthodontists exposed to high risk of infection due to the droplet and aerosol transmission are the most important concerns in dental practice because it is hard to avoid the generation of large amounts of aerosol and droplet mixed with patient's saliva and even blood during dental practice.
- Particals of droplets and aerosols are small enough to stay airborne for an extended period before they settle on environmental surfaces or enter the respiratory tract.

Management In Prosthodontics During Covid-19 Situations

- After impression taken it should be properly disinfected prior to the delivery to prothodontic laboratory.
- The application of rubber dam is an all time necessity for crown and bridge/ other prosthodontic preparations.
- Modifications of treatment plans can also be considered e.g. supra-gingival margins for posterior bridges.
- The potential for the spread of an pathogen via an invisible aerosol must be recognized and minimized or eliminated to the greatest extent feasible within clinical situation[19]. It was shown that droplet nuclei can remain suspended in the air for upto 30minutes[20].therefore, removing the mask before 30 minutes in this environment may increase the risk of contact with infectious particles.
- Efficient removal of contaminated ambient air could include improvements in the general ventilation and the use of High-volume evacuator.
- Reinforce biosafety guidelines for auxiliary staff of dentists.
- Double-layer yellow color medical waste package bags and "gooseneck" ligation should be used. The surface of the package bags should be marked and disposed according to the requirement for the management of medical waste.
- To dispose the waste from general dental procedures in specific packages for infected waste. These must be replaced when reaching2/3 of their capacity or atleast within 48hrs or in compliance with the institution's infection control committee protocols.

Discussion

Considering the fact that the working environment of a dental professional is unique in a way that it requires a close operator and patient contact in addition to the amount of bioaerosol production, the risk of COVID-19 transmission from an infected patient is very high. Since the number of COVID-19 cases may increase in future, dental professionals should be well informed and educated about not only the signs and symptoms of the condition but also how to follow infection control measures in such clinical scenarios.

Universal precautions and CDC(Centre for disease controls) guidelines(2003) of infection control are very important to minimize the spread of COVID-19 virus.

It is essential that in the present scenario, priority is given to dental procedures labeled as emergencies by the WHO and that all dental treatments are deferred until a time when the outbreak goes into recession. This would be an appropriate step in attempts to curtail the further spread of COVID-19.

Without the ability to prevent community infection, prevention of health care transmission will remain a challenge. The practitioner will use this review as a starting point and continue to update themselves with useful online information as this outbreak continues.

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Legend Figures

Figure 1

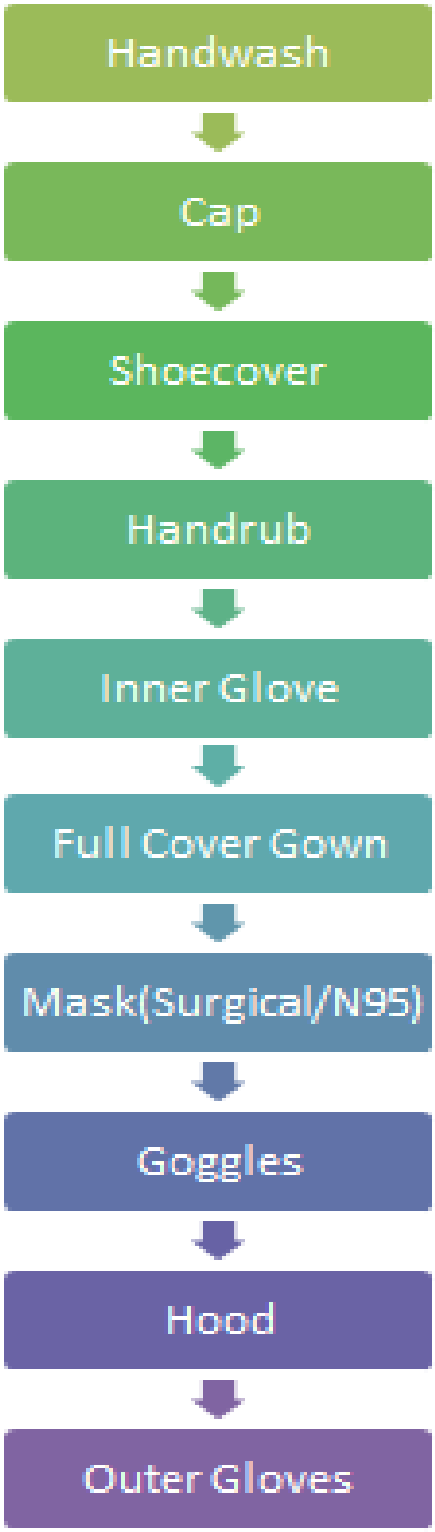

Figure 2