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Prosthodontic practice in post Covid era: A new protocol

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Abstract

The outbreak of COVID-19 has a detrimental effect on healthcare systems worldwide with a far reaching consequence on every aspect of human life as we know it. The World Health Organization (WHO) declared the COVID-19 outbreak as a disease of public health emergency concern on January 30, 2020 when the disease spread to 18 countries. SARS-CoV-2 has left a long lasting impact and continues to do so on everyone worldwide specially the medical fraternity. Several dental care centers in affected countries have been completely closed or have been only providing minimal treatment for emergency cases. However, several facilities have started providing regular dental treatment in due course of time. There is an obvious lack of universal protocol or guidelines regulating the dental care provision during such a pandemic. This lack of guidelines can on one side increase the chances of nosocomial COVID-19 spread through dental health care facilities, and on the other side deprive patients' in need of the required urgent dental care. A robust guideline will not only help the practitioner but will also help to allay the fears of a visiting patient in these testing times. This work aimed to develop a protocol after comprehensively reviewing the existing literature for prosthodontic clinic set up and dental patients' management safely during and after the COVID-19 pandemic.

Keywords: Coronavirus, SARS-CoV-2, COVID-19, Prosthodontics, Protocol, Pandemic

Introduction

Overview: Seen as a one of its kind of doomsday event akin to the economic crisis of World War II, the outbreak of COVID-19 (the disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-COV-2)) has a detrimental effect on healthcare systems worldwide with a far reaching consequence on every aspect of human life as we know it. The World Health Organization (WHO) declared the COVID-19 outbreak as a disease of public health emergency concern on January 30, 2020 when the disease spread to 18 countries [1]. SARS-CoV-2 has left a long lasting impact and continues to do so on everyone worldwide specially the medical fraternity.

COVID-19 is the common name given to the scientific name SARS-CoV-2 which has been studied by Coronavirus Study Group of the International Committee on Taxonomy of Viruses and has found its clinical manifestations in similar lines with severe acute respiratory syndrome coronavirus (SARS-CoV) whose outbreak occurred in 2002 and this re-emerged ten years later as the Middle East respiratory syndrome coronavirus (MERS-CoV)[2]. With the research done on its origin, it is linked to a family of single-stranded RNA viruses which are also known as Coronaviridae having diameter in the range of 100nm.

The rampant rise in the total number of cases reported worldwide as of 28th May 2021 is 169,166,435 while includes an unfortunate death of 3,514,288 humans worldwide, and the overall recovery number has been 150,827,185. India has been the second most affected country with more than 27,369,093 cases and 315,263 deaths[3]. The high surge in the numbers of cases in the second wave of the pandemic has put our healthcare system under severe strain with severe shortage of medical supplies, infrastructure and personnel.

Rampant transmission of SARS-CoV-2 and reports of its spread to health care services providers, health care professionals are at high risk and can become potential bearers of the infection. Front line health care providers has mortality rate of 1.4% but in some severely affected European countries it has gone up to 9%[4]. Though not a substantial proportion of this ratio are of practicing dentists.

Common symptoms at onset of illness include fever, nonproductive cough, myalgia, or fatigue; less common symptoms are sputum production, headache, haemoptysis, diarrhea, anosmia and ageusia. Another common symptom is respiratory pneumonia which can be seen on chest X-ray or chest CT as multiple small patchy shadows and interstitial changes, remarkably in the lung periphery[5].

Current clinical management of COVID-19 consists of infection prevention and control measures and supportive care, including supplemental oxygen and mechanical ventilator support when indicated. As with any new disease the treatment protocol is not well established and it keeps changing[5]. As of now different countries follow different regime with mostly antivirals, antibiotics, anticoagulants and steroids being the mainstay of management though there are no long term studies documenting their effectiveness/ adverse effects.

The main strategy of the governments worldwide to halt the ongoing pandemic is currently to vaccinate all of its population by an array of approved vaccines available. The battle is far from over as of today only 5.2% of the total population is fully vaccinated worldwide whereas in India it is only 3.1%[3].

Dental Perspective

According to Occupational Safety and Health Administration (OSHA), dental health care personnel (DHCP) are categorized in very high exposure risk category as dentists work in close proximity to the patient's oral cavity. Also, dental procedures involve the use of rotary instruments such as handpieces and scalers,

which generate aerosols, one of the primary modes of transmission of this disease apart from transmission through direct person to person contact and indirect contact by touching contaminated surfaces followed by self-delivery to the eyes, nose, or mouth[6].

Keeping this in mind most of the healthcare policies refrained dental clinics on functioning in a regular basis since last year. Mostly the treatment modality offered was limited to the emergency management. Though this was an important measure in containing the pandemic, slowly it is imperative that dental offices need to function normally in a new modified secure environment. The long break not only creates an economic impact but also in the psychological and social condition of the Dental Health Care Personnel (DHCP)s. It also created a good amount of discomfort to the needy patients whose treatment was halted at the onset or midway due to the pandemic[7].

As and when the government policies like which are released from Ministry of Health & Family Welfare, India allows, the dental clinics should gear up with the new protocols in place in reopening and providing all the facilities. The set up should be safe to work upon for both the clinician and the patients.

This article attempts to provide a generalized protocol which can be followed in the Prosthodontic clinics while practicing in the post COVID era.

Discussion

The prosthodontics practice was limited to managing emergencies like loss of function due to fracture of complete denture, RPD, dislodgement of long span FPD, loose implants causing pain and fabrication of surgical obturators for a long time now. Nevertheless it is time to start practicing the urgent and elective procedures under safe conditions to avoid further avoid increasing economic burden both on the doctor and the patients. To ensure the dental clinic is secure from the dangers of cross contamination a strict protocol needs to be followed with variety of minor and major changes in the clinic arrangement, functioning and personnel awareness. The preparation should be in an optimum level keeping in mind that quite a number of clientele in these clinics will be in geriatric age group with comorbidities possibly and immunocompromised individuals with maxillofacial defects possibly following tumor resection surgeries or specially post resection of mucormycosis patients which has been declared an epidemic these days[8].

Reorganized Dental Office Set Up

- Screen in front of reception/ May I help desk
- Multiple hands free sanitization/ hand washing facility
- Well ventilated rooms
- Posters educating about COVID manners
- Posters depicting safety measures taken in the clinic
- Catering for separate donning and doffing areas
- Avoiding centralized air-conditioning system

General Guidelines

- Regular screening of the office staff
- Priority vaccination of the DHCPs
- Staggered work schedule of staff
- Psychological monitoring/counseling of DHCPs
- Practicing teledentistry and triage over online modes
- Prioritizing patients according to emergency, urgent & elective needs[8]
- Adequate training of staff regarding new sanitization protocols including donning and doffing of PPE[6]
- Planned appointment scheduling of patients to avoid crowding in waiting room
- Social distancing to be maintained at all places
- Procedures requiring shorter appointment times/ reduced visits/ no aerosol generation to be preferred

- Emergency equipment/ recovery room should be updated with special consideration to availability of oxygen delivery through face mask if required
- Preferably disposable instruments to be used
- Use of Rubber dam wherever applicable[7]
- Digital impressions/shade matching to be made wherever applicable
- Advances in technologies such as computer-aided design/computer-aided manufacturing and three-dimensional printing systems and use of surgical guides can shorten dental surgical time and in turn the time of exposures
- Fogging/ Fumigation to be carried out at regular intervals.

It is prudent to divide the dental office into GREEN and RED Zone for better management purposes. Any movement between the two should be strictly monitored and avoided. If any unavoidable movement of personnel/ item/ equipment to take place from RED Zone, it should only be done after proper disinfection measures carried out.

Green Zone

1. Reception

- Thermal & SpO_2 screening
- Detailed history taking (COVID related)
- Vaccination status to be recorded
- Informed consent to be taken
- Minimal paper transaction (Online receipt/ prescription/ payment)
- Allowed only on prior appointment basis
- No attendants to be allowed unless otherwise indicated
- Following sanitization protocol all patients to wear disposable protection wear and not to carry any belongings inside[6]

2. Waiting Room

- No surfaces/items which cannot be disinfected easily should be kept (Magazines, books etc.)[9]

3. Office area

- Staff to wear minimum protection gear and not to maintain Covid appropriate behavior at all times
- No contact with patients/ health care personnel

4. Toilets

- Cleaned, dried, disinfected(1% Hypochlorite) and fumigated at regular intervals
- Housekeeping staff to wear full protective gear including PPE while working

Red Zone

1) Non-Aerosol Generating Dental Surgery

- All patients to be treated are to be considered asymptomatic Covid 19 infection carriers if not proven otherwise and adequate precautions has to be compulsorily taken
- Date of recovery from COVID should be recorded and patient's systemic status should be carefully evaluated especially following long term medications which are given in moderate to severe COVID Pneumonia & Post COVID complications and whenever in doubt patient's treating physician should be consulted
- Using 0.23% povidone-iodine or 1.5%–3% hydrogen peroxide mouthwash for at least 15 s before the procedure can reduce the viral load in the patient's saliva[7]
- The dentist and all other auxiliaries will strictly adhere to the principles of universal protection which will mandatorily include PPE, masks, goggles, and face shields)
- Autoclave/disinfection of all non-disposable instruments/ equipment/ surfaces are mandatory in between patients

- Avoiding display of any unwanted items/equipment and removal of any item which is not easily disinfected
- Extraoral Imaging procedures like OPG & CBCT should be preferably used to avoid contact with oral secretions and however, if intra oral sensors are to be used, they should have double barriers to avoid cross contamination[10]
- Adequate hand-washing protocols and alternate use of alcohol-based hand sanitizer with approximately 70% alcohol by all people perioperatively[11]
- Usage of hand instrumentation wherever possible and complete restriction on usage of high speed handpieces, ultrasonic scalers etc.
- Restriction of spitting and rinsing of the patient
- Operating the 3 way syringe in reduced pressure whenever cannot be avoided
- Impression made should be disinfected with Iodophors(1:213 dilution) or Chlorine compounds(1:10 dilution of commercial bleach). Spray/dip, rinse, repeat spray /dip again at least 4 to 5 times and delay the pouring for approx. 10 min and then to be dispatched to the lab in a sealed bag[12]
- The model prepared should also be disinfected(Chlorine compounds; Iodophors; Combination of synthetic phenols; 2 %Glutaraldehyde; Microwave irradiation of the casts for 5 minutes at 900 W)[12]
- The biomedical waste generated during surgery should be disposed according to the proper guidelines laid down
- Whenever pharmacologic management of pain is required, Ibuprofen should be avoided in suspected and confirmed COVID-19 cases
- Follow up records to be maintained digitally and visits will be requested only on requirement basis.

2) Aerosol Generating Dental Surgery

- Ideally RAT for Covid 19 is to be performed before any aerosol generating procedure
- Procedures taken up ideally at the last part of the working hours
- Ideal working position being 12 o' clock position to avoid any direct splatter[7]
- Usage of low speed handpieces with anti-retraction mechanism to avoid contamination of DUWLs [13]
- High volume suction equipment should be used in a well-ventilated negative air pressure maintained surgery preferably with HEPA filter[11]
- Use of four-handed dentistry at the chair side and a circulating assistant for other help, thus reducing treatment time and maintaining effective control of droplet and aerosol spread[14]
- Preferably 20-30 minutes gap is given in between patients to ensure proper sanitization.

3) Dental Laboratory

- Separate Receiving/ Dispatch area where strict Disinfection protocol would be followed before accepting/ dispatching any item
- Online work authorization/ directions form
- Disposable items to be preferred to use (Burs, Buffs, etc.)
- Protective gear to be worn by the technicians

Specific Treatment considerations:-

Removable Dentures

The impressions should be ideally made in an autoclaved stainless steel tray. The final/trial prosthesis/ wax occlusal rims/ special trays should be disinfected (1% sodium hypochlorite solution or 2% glutaraldehyde sol or iodophors (1:2 dilution)) before trying in the patients mouth and again any adjustment should be done

extraorally with sandpaper/ laboratory handpiece whose burs should be disposable/ autoclave-able[12].

Fixed Dentures

The burs used should be sharp and autoclaved after every use.

The final/trial prosthesis should be disinfected before trying in the patients mouth and again any adjustment should be done preferably extra orally. If it is to be done intraoral, the use of HVE suction apparatus is mandatory[14].

Implant Prosthetics

A sharp drill in a low speed handpiece with intermittent irrigation is advised.

Use of ultrasonic/ piezoelectric equipment's is avoided and instead osteotomes are preferred[7].

Single stage surgery with immediate loading can be practiced wherever applicable to reduce exposure time.

Maxillofacial prosthodontics

Evaluation of systemic conditions and clearance from the treating physician should be taken before commencement.

Risk benefit ratio to be calculated.

Post Mucormycosis Resection

Generally, these patients will present with some co morbidities & will be in an immunosuppressed state, which warrants recording of a detailed medical history (including the treatment and drugs being used by patient).

These patient generally require radical resection which may include partial or total maxillectomy, mandibulectomy and/or orbital exenteration.

Patient must be free of active fungal disease before taking up for prosthodontic rehabilitation.

Multidisciplinary approach should be undertaken with the involvement of the treating physician and surgeon and mandatory clearance from them should be obtained.

Prosthodontist should also be actively involved in the presurgical planning and the intraoperative management of the patient which will include delineation and surgical debridement of the defect and the prospective design and mode of retention of the prosthesis[15].

Conclusion

Both the dental professionals and the patients are in a state of ambiguity in the current scenario. The DHCPs on one hand suffer from anxiety; fear and dilemma while on the other looms the danger of financial crisis. Where the patients' are wary of the current situation and in the same time are also suffering from the lack of dental treatment. As already the GDP loss is estimated to be around 3o lakh crore rupees in India due to the raging pandemic which has shown no signs of containment[16]. It is high time for the dentists' to take an informed decision and also to reassure and motivate their patients to avail the required dental services rather than ignoring it. The evidence based measures suited to each clinic's requirement would pave the way for rejuvenating their practice successfully and safely.

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