



## Prosthodontics During Novel Corona Virus

Gayathri Bandari<sup>1\*</sup>, Shanti Priya Kota<sup>2</sup>, Dubhakunta Sriteja<sup>3</sup>, Ganji Devi<sup>4</sup>, M Rajesh<sup>5</sup> and Koineni Rajender<sup>6</sup>

<sup>1</sup>Assistant Professor, Department of Prosthodontics, Malla Reddy Institute of Dental Sciences, Hyderabad, India

<sup>2</sup>Associate Professor, MNR Dental College and Hospital, India

<sup>3</sup>Private Dental Practitioner, Hyderabad, India

<sup>4</sup>Senior Lecturer, C.K.S Theja Institute of Dental Sciences and Research, India

<sup>5</sup>Senior Lecturer, HKE's Nijalingappa Institute of Dental Sciences and Research, India

<sup>6</sup>Senior Lecturer, HKE's. S. Nijalingappa Institute of Dental SCIENCES and Research, India

**\*Corresponding Author:** Gayathri Bandari, Assistant Professor, Department of Prosthodontics, Malla Reddy Institute of Dental Sciences, Hyderabad, India.

**Received:** July 17, 2023

**Published:** August 11, 2023

© All rights are reserved by **Gayathri Bandari, et al.**

### Abstract

On January 30, 2020, the world health organization [WHO] designated an outbreak of a novel coronavirus in humans to be a “public health emergency of international concern (PHEIC), this was followed by the declaration of a pandemic on March 11, 2020. Ever since then, it has been clear that practicing Dentistry in the future (post -covid) is never going to be the same as the pre-covid -19 era. This article aims at providing a brief overview of the specific recommendations for dental practice, patient screening, infection control strategies and patient management protocol during this covid times.

**Keywords:** Coronavirus Disease; Prosthodontics; Aerosol

### Introduction

The novel coronavirus was initially named 2019-nCov and officially as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [1]. As of 24 May 2021, a total of 167,653,596 lab confirmed covid 19 cases and 148,687,724 deaths were reported by WHO worldwide. A total of 26,799,070 cases were reported in India and 304,338 deaths were confirmed. Viewing these large figures, it is obvious that Dental professionals including prosthodontists may encounter patients with suspected or confirmed SARS- CoV-2 infection and will have to act diligently not only to provide care but at the same time prevent nosocomial spread of infection [2].

From a prosthetic point of view, several important aspects must be considered. Prosthodontists have direct contact with the patient during prosthetic treatment, which increases the risk of infection (aerosols formed during high-speed tooth preparation, contact with saliva during conventional or digital impression making, prosthesis or contact with contaminated acrylic residue during finishing). polishing of temporary restorations, etc.), impressions, plaster casts, fixed and removable prostheses, indirect contact with dental laboratories and dental technicians [4].

Therefore, a narrative literature review was conducted to focus on protocols that may help prevent the spread of COVID-19 in prosthetic dentistry.

### Effects and influence of Covid-19 on prosthodontic practice

While practicing Prosthodontics, in addition to droplets, procedures that mandate the use of high-speed handpieces or use of ultrasonic instruments for de-bonding various prostheses on patients may aerosolized the virus into the surroundings. Virus transmission can also occur through indirect contact by touching contaminated surfaces followed by self-delivery of virus to the eyes, nose, or mouth [4]. After announcing COVID-19 as a pandemic by the WHO, The New York Times magazine published an article ranking the health professions at the highest risk of COVID-19 infection, amongst which dental professionals occupied the top of the ranking [5].

In response to this challenging pandemic, the Center for Disease Control and Prevention (CDC), American Dental association (ADA), the National Health Service (NHS), as well as other health regulatory bodies has provided advice to dentists to regulate dental services and to provide them with guidance in order to protect themselves, their co-workers, and their patients from this infection. The growing fear of cross infection, have obliged Prosthodontists to step aside and to confine themselves in home quarantine similar to other non health care sectors of the population [5].

### Infection control and prevention in prosthodontics

In addition, there has been an increased demand for personal protective equipment (PPE), which consists of gloves, mask, face shield and gown. However, in case of COVID-19, additional equipment should be utilized including face protection, goggles, face shield, head cover, and rubber boots [6]. An attempt should be made to triage all potential patients who require Prosthodontic care telephonically so as to reduce overcrowding of patients in the Prosthodontic clinics. Hence, exploring Tele-dentistry can be of a great assistance in this current pandemic situation [7].

Tele dentistry is defined as “the use of information and communication technology to perform dental care remotely by a dental professional within a dental office” [8]. Their goals should not differ from personal care goals and may include diagnosis, prevention, post-treatment monitoring, professional counselling, treatment, prescribing, referral, and other practices. Nonetheless, tele dentistry appears to be a promising tool for tele treatment of patients requiring non-surgical or surgical treatment, especially by reducing costs and waiting times [9]. To this end, patients with chronic conditions who require regular treatment, elderly patients, or patients with special needs, as well as those living in remote areas and in poorly accessible areas can get advantage most from tele dentistry [10].

On the other hand, tele dentistry comes with many challenges. These are mainly related to the lack of guidelines, standardization, scientific validation of the procedures and tools used in tele dental care, and data security and privacy issues. Other limitations are the inability to perform clinical tactile testing, lack of direct patient contact, risk of misdiagnosis, lack of technical infrastructure, poor access to the Internet, lack of hardware, low information technology literacy and lack of training and consumer awareness [10].

### Teleprosthodontics and virtual consultations

Initial tele-screening all patients should be to identify suspected COVID-19 carriers. Before fixing an appointment, a detailed medical and travel history taking into account all symptoms of COVID-19 should be recorded and relevant associated questions should be asked via telephonic conversation. In case of a recent travel to any foreign nation, the appointment should be re-scheduled. Every patient should be considered as a potential asymptomatic COVID-19 carrier and also engaging recently recovered patients by considering them as potential virus carriers for at least 30 days after the recovery confirmation by a laboratory test [11,12].

Patients who seem fit for appointment after tele-screening should be advised to wear surgical face mask and gloves while visiting clinics and should be advised to come alone or with a single attendant at the time of their visit. Accompanying persons should only be allowed in case of emergency, major Prosthodontic procedure and special cases like elderly and those who are medically or

physically unfit. Patients should be instructed to arrive on time for their appointments. Appointments should be scheduled in such a way to minimize possible contact with other patients in the waiting room [11].

All Patients should be instructed for hand sanitization and proper hand washing as soon as he/she enters the clinic. Hand washing is one of the most frequently emphasized measures by World Health Organization (WHO) and other Health regulatory authorities to limit the spread of coronavirus. All personnel must be advised and encouraged to avoid touching their own eyes, nose and mouth every time. Use of alcohol based hand rubs with at least 60% ethanol or isopropanol has also been documented as a simple and effective cross infection control technique which can inactivate enveloped viruses, including coronaviruses [13]. Prosthodontic Clinics and the waiting area should be kept well ventilated at all times along with spaced out seating for the patients. Installation of enhanced air ventilation systems in the clinics can also help to facilitate removal of airborne pathogens from clinical environments and reduce the risk of infection [14].

Prosthodontists in their clinic should ensure that entire team is well versed with the universal precautions while instituting holistic care to their patients.<sup>11</sup> Scheduled appointments should be fixed in such a manner that there is enough time gap between two patients, making disinfection of clinic and sterilization of the instruments possible. Time overlap should be strictly avoided for proper implementation of the sanitization protocol. Whole of the Prosthodontic treatment instituting unit should be covered with disposable sheets that can be changed after every patient [7].

In the field of prosthodontics, the most common complaints are dislodged prosthesis and broken dentures. Such complaints can be handled by dentists by teaching the people on how to handle the situation at home by talking to laboratory technicians to collect the dentures from the patient’s residence and provisionally fixing them [15].

Recently, computer-aided design and computer-aided manufacturing (CAD/CAM) techniques have been used to manufacture dentures. The introduction and further development of computer-aided technology overcomes the complexity associated with traditional methods and facilitates the manufacturing process. The digital technology denture manufacturing process digitizes the clinical information registered in the patient’s mouth, uses computer software to digitally design the dentures, and automates the manufacturing process [16].

### Safety and precautions [17]

It is important for every practice in place has a protocol and training for their team on how to screen for patients at risk of COVID-19.

ADA recommendations and guidelines

Sl no	Ada Recommended Steps
1	Insist the patient for on time arrival for their appointments, rather too early, since that will minimize the time in the waiting room or reception area. Maintain social distancing.
2	Remove reading materials, and other objects that may be touched by others and which are not easily disinfected.
4	Include temperature readings as part of routine assessment of the patient prior to performing dental procedures.
5	Use of rubber dam whenever possible.
6	Use of high-speed evacuation for all procedures producing an aerosol.
7	Autoclave hand pieces after each patient.  Make patient to rinse with 1% hydrogen peroxide before each appointment.
8	Hand sanitizers are to be placed at vantage points.
9	All lab equipment as well as clinic transfers including impressions, casts & frameworks should be handled strictly using gloves.
10	While using the trimmers and buff other than using the PPE see that the flints or fragments are sucked out using a high vacuum suction.

Table 1

Prosthodontic Emergencies [18]

The word ‘emergency’ may not be applicable to prosthodontics treatment in the true medical sense, there are many situations where a prosthodontist attention is required immediately as specified in the ADA guidelines. Some of such situations are

- Dental trauma due to denture fracture
- Repair of broken dentures
- The need for temporary or immediate dentures
- Final crown/bridge repair or cementation if the temporary restoration is lost or broken.
- Problems with implants or implant prosthesis
- Ulceration due to sharp edges of tooth or prosthesis Management of Prosthodontic emergency/urgency related to CD/RPD
- Denture causing tissue trauma
- Fractured denture
- ill-fitting denture - Discontinue wearing the denture. - Disinfect it and pack. - Prefer sending it with some young family member.

Treatment protocols for different procedures [18]

S No	Type of work	Treatment Procedure
1	Complete Denture	Impression making followed by disinfection with glutaraldehyde.  Modification of final impression technique such as single step border molding.  Virtual face bow records and jaw relation records can be made instead of the conventional technique. to reduce chair side time followed by teeth arrangement and try-in.  Try-in followed by fabrication of denture with Digital work flow for precise prostheses.  Note: Non-sterilizable equipment such as some face bow components must be cleaned with soap.
2	Fixed Prosthodontic	Use of laser for tooth preparation to generate aerosol free procedure to reduce the risk of cross contamination.  Useof high suction.  Cordless gingival retraction to reduce the chair side time.  Possibly recording the digital impression followed by prostheses fabricated by CAD/CAM.  Digital work reduces the chair side adjustments thus reducing the time safeguarding the operator.
3	Implant Prosthodontics	Guided implant placement with stents to reduce the splatter during surgical procedure.  Immediate loading to reduce the number of appointments.  If immediate loading is contraindicated post uncovering the Osseo integrated implants digital impression can be made and prosthesis can be fabricated with CAD/CAM.
4	Interim or Cast Partial Denture	Virtual face-bow and bite records registrations can be made.

Table 2

Special instructions for dentist [17]

S no	Protocols mentioned by IDA and CDC
1	Post a sign at the entrance to the dental practice which instructs patients having symptoms of a respiratory infection (e.g., cough, sore throat, fever, sneezing, or shortness of breath) to please reschedule their dental appointment and call their physician. The same thing applies if they have had any of these symptoms in the last 48 hours.
2	Take a detailed travel and health history when confirming and scheduling patients. Do not provide non-emergent or cosmetic treatment to the above patients and report them to the health department immediately.
3	Take the contact details and address of all patients treated and detailed case history.
4	Install physical barriers (e.g., glass or plastic windows) near the working area.
5	Make sure the personal protective equipment being used is appropriate for the procedures being performed and follow the guidelines mentioned above.
6	Make the impression and disinfect it with benzalkonium chloride-based disinfectant. Since conventional sterilization methods, such as dry heat sterilization.
7	We should consider using Povidone Iodine as an irrigant in high-speed handpieces too, as it has already been a recommended irrigant in the ultrasonic scaler. (Recommendation -10% povidone-iodine diluted 1:9 with water).

Table 3

**Conclusion**

Dentists, dental assistants, dental staff, and patients are potentially at increased risk of contracting COVID-19 when undergoing restorative dental care. Restorative dental procedures can pose a low to very high risk of COVID-19 infection. Dental teams need to update their knowledge and use new approaches such as teledentistry wherever possible to manage patients and avoid the risk of cross-infection. The probability of contracting COVID-19 is either very low or very high, depending on the treatment protocol used in the clinic when introducing holistic prosthetic care to the patient. Prosthetic procedures should therefore be performed in accordance with nursing guidelines and COVID-19 recommendations.

However, most elective dental procedures can be deferred through triage and prioritization of the patient’s therapeutic needs. Appropriate care of acute patients who do require prosthetic treatment will be meticulously facilitated to reduce the potential for the spread of COVID-19 in the community.

**Bibliography**

1. Bhanushali P, et al. “COVID-19: Changing Trends and Its Impact on Future of Dentistry”. *International Journal of Dentistry* (2020): 29.
2. Harrel SK and Molinari J. “Aerosols and splatter in dentistry: a brief review of the literature and infection control implications”. *The Journal of the American Dental Association* 135.4 (2020): 429-437.

3. Batista AUD., et al. “Prosthodontic practice during the COVID-19 pandemic: prevention and implications”. *Brazilian Oral Research* 35 (2021): e049.
4. Centers for Disease Control and Prevention, Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 (COVID-19) in Healthcare Settings, Centers for Disease Control and Prevention, Atlanta, GA, USA (2020).
5. The Workers Who Face the Greatest Corona virus Risk-The New York Times (2020).
6. World Health Organization (WHO). Personal Protective Equipment (2020).
7. ND Jampani., et al. “Applications of teledentistry: a literature review and update”. *Journal of International Society of Preventive and Community Dentistry* 1 (2011): 37-44.
8. Butera A., et al. “Bio-Inspired Systems in Nonsurgical Periodontal Therapy to Reduce Contaminated Aerosol during COVID-19: A Comprehensive and Bibliometric Review”. *Journal of Clinical Medicine* 9.12 (2020): 3914.
9. Expósito-Delgado AJ., et al. “Delivery of Health Care by Spanish Dental Hygienists in Private and Public Dental Services during the COVID-19 De-Escalation Phase (June 2020): A Cross-Sectional Study”. *International Journal of Environmental Research and Public Health* 18 (2021): 8298.
10. Goriuc A., et al. “The Impact of the COVID-19 Pandemic on Dentistry and Dental Education: A Narrative Review”. *International Journal of Environmental Research and Public Health* 19.5 (2022): 2537.
11. Bensy Varghese., et al. “Covid 19 and Prosthodontic Practice: A review”. *International Journal of contemporary Medical Research* 8.1 (2021).
12. Dr. MainakKantiSaha., et al. “Pandemic and Prosthodontics”. *International Journal of Applied Dental Sciences* 6.3 (2020): 508-512.
13. Guan W., et al. “Clinical characteristics of 2019 novel coronavirus infection in China”. *The New England Journal of Medicine* 382 (2020): 1708-1720.
14. Lotfinejad N., et al. “Hand hygiene and the novel coronavirus pandemic: The role of health care workers”. *Journal of Hospital Infection* (2020).
15. Villafruela JM., et al. “Assessment of displacement ventilation systems in airborne infection risk in hospital rooms”. *PLoS One* 14 (2019): e0211390.

16. Deshpande S., et al. "Teledentistry: A Boon Amidst COVID-19 Lockdown-A Narrative Review". *International Journal of Telemedicine and Applications* (2021): 8859746.
17. Dismukhamedov S., et al. "Digital Denture Fabrication: A Technical Note". *Applied Sciences* 11 (2021): 8093.
18. Bizzoca ME., et al. "Covid-19 Pandemic: What Changes for Dentists and Oral Medicine Experts? A Narrative Review and Novel Approaches to Infection Containment". *International Journal of Environmental Research and Public Health* 17.11 (2020): 3793.
19. Dr MainikkantiSaha., et al. "Pandemic and prosthodontics". *International Journal of Applied Dental Sciences* 6.3 (2020): 508-512.