

Changing Trends in Prosthodontic Practice in COVID Era: A Review

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Abstract

From the beginning of 2020, the world has been affected by SARS-CoV-2 which is considered to be the biggest health crisis the world has witnessed in the current century that created chaos and confusion across the globe. The rapid spread of infection resulted in a pandemic that was beyond human capability. Like all other health professions, a timely and major reorganization of prosthodontic services is difficult because it serves services more for Geriatric patients, where most of the treatment or practice such as tooth preparation leads to aerosol generation. Since the older generation is more vulnerable to covid19, it is necessary to manage these patients with proper precaution and care to minimize the spread of cross-contamination. This review focus on various guidelines and precaution as well as emergency

management of the various situations in prosthodontic practice.

Keywords: Coronavirus, Geriatric, Prosthodontics, Pandemic

Introduction

A novel human coronavirus also called Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) led to large scale disruption and confusion in all walks of life. Due to the widespread transmission of SARS-CoV-2 and the unique characteristics of dental offices both the dental healthcare professionals as well as the patients have an increased risk of cross-infection. The rapid spread of infection or a fundamental concept is that the transmission of the virus is mainly through inhalation or ingestion or direct mucous contact with saliva droplets (1). SARS-CoV-2 was first discovered in 2019 in Wuhan, China, unfortunately spreading globally, resulting in the 2019–

2020 pandemic, as declared by the World Health Organization (WHO) and the Public Health Emergency of International Concern (PHEIC) (2).

SARS-CoV-2 that causing the disease COVID-19 belongs to the family Coronaviridae, in the order Nidovirales. Coronaviruses contain a single-stranded RNA as a nucleic material with size 65–125 nm in diameter and 26 to 32 kbs in length. The subgroups of coronaviruses family are alpha (α), beta (β), gamma (γ) and delta (δ) coronavirus. Whereas other rare strains include MERS-CoV, which causes the disease MERS, and SARS-CoV, the virus responsible for SARS (3).

Dentists are often the first line of diagnosis, as they work in close contact with patients. On 15 March 2020, the New York Times published an article entitled “The Workers Who Face the Greatest Coronavirus Risk”, where an impressive schematic figure described that dentists are the workers most exposed to the risk of being affected by COVID-19, much more than nurses and general physicians (4). Dentists have been recommended to take several personal protection measures and avoid or minimize operations that can produce droplets or aerosols; moreover, the use of saliva ejectors with a low volume or high volume can reduce the production of droplets and aerosols (4).

The most recommended guidelines suggest the need to avoid minor procedure so that dentists can minimize interpersonal contact. When the dentists treat patients, they should intercept the potentially infected person before they reach the operating areas; for example, those with a fever measuring $>37.5^{\circ}\text{C}$. The questionnaire method can be used to identify high-risk groups based on medical history as well as a systemic condition (5).

This review is focused to provide a detailed summary, guidelines, and protocol that should be followed in the dental setting and also to provide insight into the

management of the geriatric patient in the prosthodontic practice.

Clinical Sign and Symptoms of Covid 19 Infection

COVID-19 usually present with clinical symptoms of fever, dry cough, and myalgia, along with other clinical conditions like pneumonia, ARDS, sepsis, whereas atypical symptoms can be seen in immunocompromised individuals (6). In serious illness, it is likely to see symptoms like pharyngeal pain, dyspnoea, dizziness, abdominal pain, and anorexia. fatality is associated more with patients who are suffering from a condition like diabetes, cardiovascular disease, and cerebrovascular disease (7). Significant lowering of CD4 and CD8 levels can be seen in the initial stages of infection whereas in chest imaging, bilateral opacities, lobar or lung collapse, or nodules can be seen (8).

Diagnosis of COVID-19 Infection

Since the outbreak of the COVID-19 (coronavirus disease 2019) pandemic, clinicians have been struggling with the optimal diagnostic approach of suspected patients. RT-PCR (real-time reverse transcriptase-polymerase chain reaction) testing of respiratory samples is generally being considered as the reference standard for establishing SARS-CoV-2 infection (9). However, RT-PCR results take hours to become available and, although highly specific, sensitivity is moderate (10).

Several reports have suggested a potential role for chest CT (computed tomography) in patients with suspected COVID-19. The radiological probability of pulmonary manifestations of COVID-19 was reported based on the ‘CO-RADS classification’, a standardized reporting system for patients with suspected COVID-19, ranging from 1 (very unlikely) to 5 (very likely) (11).

Measures for COVID-19 Prevention in Prosthodontic Practice

Currently, various measures are being taken to limit the spread of COVID-19. In prosthetic dental treatment, the following necessary precautions can be taken. The following are the standard recommendations to be implemented in prosthodontic dental practice.

Self-assessment tools are published by the CDC and the Mayo Clinic includes the following questions like recording a patient's body temperature, updating patient medical history, and asking targeted questions mandatory (12).

Measures during prosthodontic emergency management

The prosthodontist, dentists, and staffs are at a potentially higher risk of COVID-19 infection due to their proximity to patients. Hence, proper risk assessments should be carried out by both staff and patients. During prosthetic dental treatment, important considerations should be given for approaches to aerosol-generating exposures, procedural risk mitigation, decontamination, and personal protective equipment (13).

In the prosthodontic practice, the following guidelines can be taken to prevent transmission of the COVID-19 infection:

- a. It is advisable to use disposable instruments or materials to reduce the spread of the risk of infection.
- b. Reduce more invasive procedures especially in geriatric patients and also in patients with comorbidities since they are more vulnerable to be affected by it.
- c. It should be kept mandatory to use pre-procedural mouth-rinse such as hydrogen peroxide (1%) or povidone-iodine (0.2%), to reduce the salivary load of microbial flora as the SARS COV-2 virus is vulnerable to oxidation (14,15).

- d. Clinician or prosthodontist should evaluate or examine the patient with Personal Protective equipment, which includes face mask (fit-tested N95 masks), double gloving, eye protection, face shield, and gowns (16).
- e. Rubber dam can be used during various restorative procedures inlay, onlay, or fillings as it may significantly reduce the spread of infection (17).
- f. Disinfection of small surfaces disinfected with 0.1%-0.2% of sodium hypochlorite for 1 minute or Ethanol in the concentration of 62%-95% can be used regularly as a precautionary measure to prevent cross-infection (18).

Various Prosthodontic Emergencies and its management

In this phase of the COVID-19 pandemic, the reorganization of prosthodontic services is very challenging. While most of the minor procedures have been avoided though, it is necessary to manage acute emergencies to avert patients from further complications.

Dental emergencies are potentially life-threatening and require immediate treatment to stop ongoing tissue bleeding, alleviate severe pain or infection, and include:

- a. Uncontrolled bleeding.
- b. Orofacial pain or trismus.
- c. Cellulitis or a diffuse soft-tissue bacterial infection with intra-oral or extra-oral swelling that potentially compromises the patient's airway.
- d. Trauma involving facial bones, potentially compromising the patient's airway (19).

When considering prosthodontic practice, various emergencies include:

Dental trauma due to denture fracture

The most common treatment procedure in a prosthodontic setting is the fabrication of a complete denture prosthesis. Fracture of denture leading to an emergency is less

compared to other treatments. Even though it doesn't need immediate attention, the patient required replacement of fractured denture, since it affects his daily routine and mastication. It should be noted to clean impression followed by disinfection with glutaraldehyde, single-step border molding, virtual face bow records, and jaw relation records can be used to reduce chairside time followed by teeth arrangement and try-in. Verification of try-in followed by fabrication of denture with Digital workflow for precise prostheses can be advocated (20,21).

Problems with implants or implant prosthesis

Complication associated with the implant, most importantly involves loss of primary stability which can be attributed to overworking of the implant bed, poor bone quality, or use of short implants (22). An increase in temperature due to the excessive speed of the drill produces necrosis, fibrosis, osteolytic degeneration, and increased osteoclastic activity (23).

Loss of primary stability can be managed by using a wider and longer self-tapping implant (24). Another possible complication is the manifestation of dehiscence or fenestration, managing which involves filling the bone defect with bone grafts and resorbable or non-resorbable membranes (25). Emergency replacement can be based on guided implant placement with stents to reduce the splatter while surgical procedures and also immediate loading under the proper diagnosis of the existing clinical situation to reduce the number of appointments. If immediate loading is contraindicated post uncovering the Osseointegrated implants digital impression can be employed and the prosthesis can be fabricated with CAD/CAM and the prosthesis can be delivered (20).

Ulceration due to sharp edges prosthesis

Ulceration and pain associated with the prosthesis, require immediate attention and treatment measures. Here either prosthesis can be removed temporarily followed by proper

medication until symptoms subside can be an option in the current scenario. If the case requires, immediate replacement then it should be done with a rubber dam or under proper precautions (17).

As the uncertainty and nature of the pandemic continue, it is evident that there is a need for the most up-to-date recommendations. Virtual based consultation that includes zoom calls or web-based communication can be used in the current scenario. It allows monitorisation of the patient without the need for personal contact, psychologically helps the patient understand the situation. It is cost-effective for patients. It has certain disadvantages like a lower standard of care, virtual care is new, no clear rules or guidelines are available, legal issues, etc.

Conclusion

Most prosthodontic treatment procedures do not require emergency attention. Unlike other health service fields, a prosthodontic practice focused more on the geriatric patient. Therefore it has become all the more important for dental professionals to incorporate all precautions, standard guidelines, and recommendations for COVID-19 in their routine practice. With advances in the modern web-based communication system, the management of minor emergencies can be easily managed.

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