Periodontal Management during COVID-19 Pandemic: Mini Review

SUMMARY

A few cases of pneumonia were reported by Wuhan Municipal Health Commission in Wuhan, Hubei Province, Republic of China and this mysterious pneumonia was recognized as novel coronavirus disease (COVID-19) in the course of time on 31 December 2019. Based on the literature knowledge, COVID-19 outbreak was came into existence through an animal-to-human transmission, then continued human-to-human diffusion. Especially dentists among the medical professionals are at high-risk group of SARS-CoV-2 virus contamination because of several routine dental procedures having the risk to convey the SARS-CoV-2 virus via droplets and close contact. In this mini review, it was aimed to give information about patient management during COVID-19 pandemic for dental practitioners, periodontologists and dental hygienists.

Key words: COVID-19, Dentistry, Periodontology, Periodontologists, Dental Hygienists

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Introduction

Due to rapid human-to-human transmission, the novel coronavirus raised one of the most crucial global health challenges that humankind has ever faced. The long and unpredictable incubation period (up to 27 days) of the virus further challenges infection control measures¹. The novel coronavirus disease (COVID-19) caused by SARS-CoV-2 virus, present with non-specific symptoms such as fever, dry cough, shortness of breath, weakness, headache and diarrhea^{2,3}. But having in mind that the rate of asymptomatic carriers is as high of 80%, execution of strict isolation measures in dental settings is necessary⁴.

The aim of this paper is to highlight the importance of awareness of dental professionals who provide periodontal treatment about risks of SARS-CoV-2 airborne transmission and to make recommendations about periodontal approach during the pandemic era.

Material and Methods

This informative paper involved review of the current literature using *PubMed* and *MEDLINE* using following keywords: COVID-19, Dentistry, Periodontology. The literature search involved data published in English.

Transmission of the virus

The envelope spike (S) glycoproteins on the surface of SARS-CoV-2 interact with human angiotensin converting enzyme-2 (ACE-2) molecules and play a crucial role in invading the body. The expression of ACE-2 has also been reported on tongue, gingival epithelium and salivary gland, implementing oral cavity as a potential risk path for COVID-19 (similar to other ACE-2 expressing organs such as lungs)^{3,5}.

The main routes for transmission of the virus are direct transmission through coughing, sneezing, and

inhalation of droplets and contact transmission through contact with nasal, oral, and ocular mucosa. The presence of SARS-CoV-2 in blood, sputum and feces of infected patients and rare transmission by fecal-oral route has also been reported^{6,7}. To et al detected SARS-CoV-2 in 91.7% of saliva samples from patients with COVID-19⁸. The presence of virus in saliva has been associated with 3 different pathways. In short, *a*) the exchange of liquid droplets between lower and upper respiratory track and oral cavity, *b*) the access of blood to oral cavity via crevicular fluid, and *c*) major- and minor-salivary gland infection, with subsequent release of particles in saliva via have been implied⁹.

Preventing droplet transmission before dental treatment

All dental professionals or dentists and dental hygienists who provide periodontal treatment are among the highest risk groups in terms of transmission of the disease through droplets and aerosols^{6,7,10,11}. Ultrasonic scalers, piezotomes, hand tools, rotary instruments, air/water syringes, air polisher and lasers generate considerable amount of aerosols and increase the risk of cross-transmission between the professional and patient^{6,10,12}. Due to these risks, there have been countries around the world making new decisions for dental procedures. Several countries (e.g., California, USA) closed their dental facilities, some countries (e.g., UK) continued emergency dental treatments only; in addition, there were also countries that maintained regular dental treatments in this pandemic era¹³. The uncertainty of the patients' path to access to emergency care created an additional healthcare burden and increased the risk of contamination^{13,14}. In addition, the absence of a universal functioning has exhausted dental health professionals. What we know today on infection control during a pandemic bases on our experience gained from previous outbreaks of different coronaviruses and current data on SARS-CoV-2. In fact, in such pandemics, the ways to prevent transmission should be determined universally and in a way that does not differ by country.

All dental facilities should be obligated to adapt triage protocols including a detailed medical history and certain queries targeting to identify suspicious COVID-19 cases. All patients should be considered as potentially asymptomatic. Necessary hygiene measures should be applied and minimal personal protective equipment (PPE) including long-sleeved disposable gown, disposable cap, surgical face masks, and protective eyewear should be used during the screening protocol⁷. The dental practitioner should question the patient and decide whether the complaint qualifies as a dental emergency⁶. The ADA recommends that dental practitioners should use their professional judgment to determine the need for urgent or emergency care^{15,16}. For initial interview, alternative strategies to minimize face-to-face contact

such as telemedicine or tele-triage can be accomplished through internet or telephone. If the patient declares to have symptoms or a recent contact with a COVID-19 patient during the interview, a pharmacologic pain and/or infection control agent may be prescribed if appropriate^{6,17}.

Prevention of droplet transmission during dental treatment

Caution should be given to surface cleaning (0.5% hypochlorite, for 1 min) and sterilization of non-disposable items^{6,17,18}. External mouth suction, air purifiers and air exchangers have been evaluated for utilization in dental clinics¹⁹. It is recommended that dental treatments for COVID-19 patients and suspicious cases should be performed in negative pressure rooms/chambers to prevent aerosol spread, however this may be a heavy economic burden for low and middle income countries and may not be fulfilled^{10,19}.

The number of periodontal emergencies is limited and includes acute abscesses (e.g. periodontal or gingival abscess, endo-perio lesions), painful necrotizing conditions (i.e. necrotizing ulcerative gingivitis and periodontitis, possible due to stress during pandemic), dentin hypersensitivity²⁰ and oral lesions that decrease quality of life (e.g. painful ulcers, viral and fungal infections, cases required the biopsy). During these difficult times, pharmacological treatment is a safer option for these cases if applicable and appropriate. After initial examination, dental hygienists and periodontologists should consider debridement and maintenance treatments as non-emergency conditions (with the exception of specific and painful cases) and postpone all such elective procedures^{12,13}. The efficacy of ultrasonic scalers have been found to be similar to manual instrumentation, but involve more risk in terms of aerosol spread^{10,21}. It was reported that the amount of aerosols is regardless of the type of scaler and power level used and most of the droplets accumulate in inner corners of the eyes and around the nose^{22,23}. Therefore, if the patient's complaint qualifies as a dental emergency, manual scaling/polishing procedures should be preferred instead of ultrasonic instruments¹². Mouth rinses with 0.2% povidone-iodine or 0.5-1% hydrogen peroxide are recommended before all of dental procedures to reduce the viral load in saliva. A history of allergy or thyroid disorders must be questioned before prescribing povidone-iodine rinses.

It should be remembered that oral rinses only reduce the amount of virus load in saliva and do not completely eliminate SARS-CoV-2^{6,11}. The effect of chlorhexidine, a commonly used compound in periodontology practice, against SARS-CoV-2 has not been demonstrated²⁴. The development of more effective mouthwashes and rinses directly aiming to reduce SARS-CoV-2 load in oral cavity

will facilitate dental treatments and provide a better means for infection control for our profession.

The selection of pharmacological agents should be made with caution. Although there are no comprehensive epidemiological studies demonstrating a possible adverse reaction of ibuprofen in COVID-19 patients, some controversy still exists in this regard^{25,26}. In accordance with World Health Organization (WHO) reports, paracetamol can be used for pharmacologic pain control for dental pains as a first line treatment option. Patients should be advised not to self-medicate to relieve their pain and redundant drug use should be prevented. Telemedicine systems may also be effective during this process by direct communication with the patient for treatment planning⁷.

In case of aerosol generating procedures (such as using ultrasonic scalers, hand tools, air / water syringes), PPE such as aprons, masks, face shields and gloves should be used to protect the skin and mucous membranes from aerosol, and attention should be paid to hand hygiene. In such procedures, instead of surgical masks, N95 and N95 equivalent masks with more protective properties than surgical masks should be used^{27,28}.

Prevention of oral disease

The periodontists, general dentists and dental hygienists who provide periodontal treatment should focus on oral hygiene training, emphasize the importance of maintaining good oral hygiene and raise awareness among the society on dental care during and after COVID-19 pandemic (through social media, telecommunication etc). This proposal has two main foundations: First of all, oral hygiene measures can reduce or control certain conditions that require emergency treatment and secondly periodontal health may have an influence on the course of COVID-19^{24,29}. Periodontal disease has been associated with an increased risk of several disorders such as cardiovascular diseases, diabetes and hypertension as well as bacterial pneumonia³⁰⁻³³. This suggests that periodontal disease may also be associated with COVID-19, even if we do not have detailed information on this issue at the moment.

COVID-19 oral symptoms

COVID-19 disease associated oral ulcer, oral herpes simplex-1, and vesiculobullous lesion have recently been reported³⁴⁻³⁶. Periodontologists should be aware of these lesions, as they may present as initial or proceeding symptoms of COVID-19. Additionally, Chloroquine, a commonly used agent for treatment of COVID-19, may cause melanotic pigmentation and lichenoid reaction in oral mucosa. Some post-identified and rare symptoms of COVID-19 include loss of taste and smell and may cause metallic taste and burning mouth syndrome³⁷.

There is uncertainty on how long the pandemic era will last and what kind of measures will be taken in order

to protect dental practitioners, staff and patients during dental treatments. A possibility of a second wave spread has already been mentioned. It may be wise to assume that humankind will be living with SAR-CoV-2 and future pandemic threads longer than we first assumed. We still have much to learn and discover about the new COVID-19 disease and as dental professionals we must pay attention to oral disorders associated with the disease and inform dental society to protect our community and increase professional knowledge.

Conclusions

In conclusion, as of today SARS-CoV-2 virus and associated COVID-19 are not completely understood to their full extend. Their exact mechanism of action in human body and oral cavity remains to be solved. It is inevitable that a new era in dental profession will begin during normalization period and afterwards. This is informative paper on periodontal patient management during COVID-19 pandemic for dental practitioners, periodontologists and dental hygienists. We still need to review and revise our current practice of infection control and develop more strict protocols that will prevent nosocomial spread of infection during future pandemics. Furthermore, all dental professionals must follow recent reports and updates on the possible effect of COVID-19 on oral cavity, drug interactions and emerging of oral lesions associated with the disease and keep in mind that it is our obligation to protect ourselves, our patients and staff while providing dental care during present and future pandemics.

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