

BAU Journal - Health and Wellbeing

Volume 3 Issue 3
SPECIAL ISSUE
COVID-19

Article 3

ISSN: 2617-1635

April 2021

COVID-19: WHAT ABOUT DENTISTS?

HANIA ALAMEDDINE

Student, Faculty of Dentistry, Beirut Arab University, Beirut, Lebanon, hoa224@student.bau.edu.lb

JULIEN ISSA

Faculty of Dentistry, Beirut Arab University, Beirut, Lebanon, jii041@student.bau.edu.lb

NAYER ABOELSAAD

Professor, Faculty of Dentistry, Beirut Arab University, Beirut, Lebanon, n.mohamedaboelsaad@bau.edu.lb

Follow this and additional works at: <https://digitalcommons.bau.edu.lb/hwbjournal>



Part of the [Dental Public Health and Education Commons](#), [Other Dentistry Commons](#), and the [Periodontics and Periodontology Commons](#)

Recommended Citation

ALAMEDDINE, HANIA; ISSA, JULIEN; and ABOELSAAD, NAYER (2021) "COVID-19: WHAT ABOUT DENTISTS?," *BAU Journal - Health and Wellbeing*: Vol. 3 : Iss. 3 , Article 3.

Available at: <https://digitalcommons.bau.edu.lb/hwbjournal/vol3/iss3/3>

This Article is brought to you for free and open access by Digital Commons @ BAU. It has been accepted for inclusion in BAU Journal - Health and Wellbeing by an authorized editor of Digital Commons @ BAU. For more information, please contact ibtihal@bau.edu.lb.

COVID-19: WHAT ABOUT DENTISTS?

Abstract

Coronavirus (COVID-19) has been associated with person-to-person transmission. This includes droplets inhalation, exposure to saliva, and contact with the oral or nasal mucosa. The World Health Organization (WHO) made it public that the novel coronavirus initiated an international public health emergency. COVID-19 cases are rising up until this day, as of End-April 2021, around 141 million confirmed cases and 3 million deaths were reported worldwide. Due to the characteristics of dental clinics, dental health care personnel are at a higher risk of getting exposed to the COVID-19 infection. Thus, there is an urgent need to improve the current implemented recommendations and strategies in order to prevent transmission of the disease. Despite the huge efforts made by the countries affected in an attempt to restrain this pandemic, there is still a daily flare-up of cases. Dental health personnel will come across patients with COVID-19, and thus will have to abide by strict infection control measures to prevent its spread.

The aim of this article is to introduce a brief overview about the basic knowledge of COVID-19, its routes of transmission, as well as its clinical symptoms. Based on relevant research and guidelines, this study also provides recommendations for patients screening, management protocols, infection control as well as recommendations for dental health care personnel in different affected areas.

Keywords

COVID-19, Infection control, Dental healthcare personnel, Dental guidelines, Prevention

BAU Journal - Health and Wellbeing

Manuscript 1139

COVID-19: WHAT ABOUT DENTISTS?

HANIA ALAMEDDINE

JULIEN ISSA

NAYER ABOELSAAD

Follow this and additional works at: <https://digitalcommons.bau.edu.lb/hwbjournal>



Part of the [Dental Public Health and Education Commons](#), [Other Dentistry Commons](#), and the [Periodontics and Periodontology Commons](#)

COVID-19: WHAT ABOUT DENTISTS?

Abstract

Coronavirus (COVID-19) has been associated with person-to-person transmission. This includes droplets inhalation, exposure to saliva, and contact with the oral or nasal mucosa. The World Health Organization (WHO) made it public that the novel coronavirus initiated an international public health emergency. COVID-19 cases are rising up until this day, as of End-April 2021, around 141 million confirmed cases and 3 million deaths were reported worldwide. Due to the characteristics of dental clinics, dental health care personnel are at a higher risk of getting exposed to the COVID-19 infection. Thus, there is an urgent need to improve the current implemented recommendations and strategies in order to prevent transmission of the disease. Despite the huge efforts made by the countries affected in an attempt to restrain this pandemic, there is still a daily flare-up of cases. Dental health personnel will come across patients with COVID-19, and thus will have to abide by strict infection control measures to prevent its spread.

The aim of this article is to introduce a brief overview about the basic knowledge of COVID-19, its routes of transmission, as well as its clinical symptoms. Based on relevant research and guidelines, this study also provides recommendations for patients screening, management protocols, infection control as well as recommendations for dental health care personnel in different affected areas.

Keywords

COVID-19, Infection control, Dental healthcare personnel, Dental guidelines, Prevention

1. INTRODUCTION

On March 11, 2020, a pandemic was declared: Coronavirus disease 2019. This novel virus is from the family of viruses Coronaviridae, which is a single-stranded RNA (Mahendra et al., 2020). This family includes the Middle East respiratory syndrome (MERS), as well as the severe acute respiratory syndrome (SARS) (Ather et al., 2020). Although the first case of COVID-19 was reported in Wuhan, China, the disease was transmitted to all provinces in China, and almost every other country (Alharbi et al, 2020).

Dozens of facilities have been affected by the measures used to fight against this virus. Of these are the dental facilities, where some facilities have completely closed while others are providing only minimal care treatment. Nonetheless, many dental facilities are still operating normally (Alharbi et al., 2020).

According to the World Health Organization (WHO), COVID-19 involved 201 countries up until now. Knowing that the following is constantly changing by the minute, the mortality rate of COVID-19 was shown to be 2%, with a reproduction number of 1.4–5.5 (Baghizadeh Fini., 2020).

2. CLINICAL PRESENTATION

COVID-19 clinical symptoms vary from asymptomatic cases to multiple organ dysfunction (Cascella et al., 2020). The major reported symptoms of COVID-19 are fever, muscle ache, dry cough, shortness of breath (dyspnea), dysgeusia, anosmia and recently angular cheilitis has been reported (Riad et al.,2020). Other non-usual symptoms exist such as confusion, stomach pain, diarrhea and vomiting (Baghizadeh Fini., 2020).

According to the National Health Commission of China (CHCC), up to 25% of cases show serious symptoms (Meng et al., 2020) while approximately 80% of infected patients showed only mild symptoms that can be mistaken for seasonal flu or allergy (Ather et al., 2020). Besides, computed tomography of infected patients showed bilateral pneumonia, bilateral patchy shadows, and ground-glass opacities (Peng et al., 2020).

3. PATHOPHYSIOLOGY

ACE-2 (Angiotensin Converting Enzyme), is an enzyme found in type II alveolar cells of lungs (Xu et al., 2020). High number of ACE-2 receptors indicated a huge potential of infection with COVID-19 (Baghizadeh Fini., 2020). ACE-2 expression was significantly high in tongue cells compared to buccal and gingival tissues, indicating that dentists pose greatest risk of infection with COVID-19 compared to other health sectors as dentists are directly exposed to saliva droplets (Xu et al.,2020). Furthermore, it is suggested that COVID-19 occurs in the oral cavity through infection of minor and major salivary glands, followed by particle release in saliva which shows that salivary glands are the main source of this virus transmission (Sabino-Silva et al., 2020).

4. ROUTES OF TRANSMISSION IN DENTAL CLINIC

Spread of COVID-19 occurs by way of four main major routes as shown in Fig.1 (Fallahi et al., 2020). The major cause of COVID-19 spread is known to be through respiratory droplets (Ather et al., 2020). This virus can also be transmitted by aerosol or by direct contact (Ather et al., 2020). Moreover, it has been shown that a potential route of transmission of this virus is through fecal-oral route, particularly in regions with low sanitization (Yeo et al., 2020). When coughing or sneezing, respiratory droplets can travel a distance of 6 ft or 1.8 meters (Ather et al., 2020). Droplets can also be transferred via objects and surfaces touched by infected patients. Thus, it is extremely necessary to disinfect all objects around the clinic to decrease the transmission of this disease. Due to the nature of the dentist's close contact with patients, the spread of disease can increase tremendously. Dentists use on a daily basis many sharp instruments and dental equipment that come in contact with blood, saliva, and many other bodily fluids. Furthermore, working in a closed environment like clinics, has been shown to increase the risk of aerosol transmission (Yang et al., 2020). Besides symptomatic patients, asymptomatic patients can also be carriers of this disease. In fact, asymptomatic carriers are the main source of transmission (Meng et al., 2020). They constitute a very challenging group because asymptomatic patients are more likely to participate in daily life activities (Sabino-Silva et al.,2020).

Therefore, it is very crucial for dentists to emphasize on preventive strategies to avoid transmission of COVID-19 (Sabino-Silva et al., 2020).

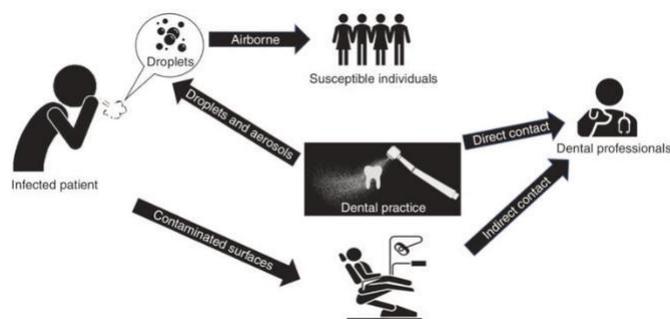


Fig1.: Routes of COVID-19 transmission in dental clinic
(Permission granted)

5. THE IMPACT OF TEMPERATURE AND HUMIDITY ON COVID-19

A study conducted by (Yi et al., 2020) showed that COVID-19 might have similar properties as SARS-CoV-2: in dry environments it is able to survive for 48 hours, while in around 50% humidity under a temperature of 20°C, the virus survives up to 5 days. This makes the use of the rotary high-speed handpiece, which produces droplets and contributes to humidity, a major concern for contamination and a high yield transmission means (Sabino-Silva et al., 2020).

6. INCUBATION PERIOD

It is very crucial to know the exact quarantine time based on an accurate incubation period, in order to prevent transmission of the virus from asymptomatic patients (Yi et al., 2020). The COVID-19 incubation period varies in different studies from 1 day up to 24 days (Meng;2020; Park;2020; Yi;2020). The 14 days incubation period is now more accepted (Baghizadeh Fini., 2020). A study of 425 cases in Wuhan showed that incubation period is approximately 3 to 7 days (Yi et al., 2020). In addition, another study in Wuhan has shown that out of 10 confirmed infected patients, an average of 5.2 days incubation period has been shown with a 95th percentile at 12.5 days (Park et al., 2020). However, a recent study including 1,099 cases, showed that incubation period can range from 0 to 24 days (Yi et al., 2020).

7. RECOMMENDATIONS FOR DENTAL CLINICS

7.1 Before Visit

7.1.1 Dental team preparation

According to the Center for Disease Control and Prevention (CDC), dental personnel complaining from flu-like-symptoms; fever, cough, sore throat, muscle aches, should not appear to work (CDC., 2020)

According to Occupational Safety and Health Act (OSHA) Standards, medically compromised health personnel are at higher risk of being infected with COVID-19 (CDC., 2020). In addition, COVID-19 has shown to affect elderly people more than the younger generation and men more than women. Therefore, it is advised that priority be given to people who do not have medically compromised conditions (CDC., 2020).

Posting signages right at the entrance and inside the waiting, with instructions for patients, would be considered very effective (CDC., 2020) as shown in Figure 2.



Fig.2: Stop the Spread of Germs poster sample signage

Apart from scheduling appointments with enough time to avoid crowding the waiting area (CDC,2020). The dental health personnel must make a triage for patients in order to determine if the appointment is necessary or if it could be manageable at home (Guo et al., 2020).

To limit the number of people in the clinics, patients need to be informed to come alone. Companions can be allowed for pediatric patients, elderly patients, or those with special needs (CDC, 2020).

Otherwise in case any of the above present, the companion should also be screened for any symptoms. If companions are medically compromised or are seen as high risk of being infected, they should not be allowed in the dental clinic.

Toys, magazines, and any objects that could be frequently touched must be removed (Sexton et al., 2018). Infected surfaces are considered a major infection risk if they are touched, as the virus has a high risk to be transferred to either conjunctiva, nasal mucosa, or mouth (Puttaiah et al., 2006). In a study by Nicas and Best, it was shown that people touch their faces up to 15 times/hour, which could provide a very high risk of infection (Ugwumba et al., 2014).

When the virus has ideal conditions, it can in fact persist for hours to days on different types of surfaces. (Fiorillo et al., 2020). On the other hand, it was found that the virus remains in aerosols for almost to 3 h and up 6.8h on stainless steel and plastic (Amato et al., 2020).

With the development of the COVID-19 vaccines, the primarily targeted group for the vaccine are frontline healthcare workers and individuals above 60 years old with chronic problems (Kaur, S. P, Gupta, V. 2020). As dentist are at high-risk exposure to the virus it is important to point out to the concerned parties that dentists should fall into the category of healthcare workers, as dentist are at high-risk exposure to the virus. Hence dentists must be part of each health infra structure and should take the vaccine as soon as available.

7.1.2 Patients screening and dental treatment triage

A study conducted in Beijing, China to determine how the pandemic affected the need for emergency dental visits by patients showed a 38% decrease in patients seeking dental emergency care from the start of the pandemic (Guo et al., 2020).

While treating any patient during this pandemic, extreme care should be taken. At first a tele-screening is recommended to screen for any COVID-19 symptoms, a history of travel to any country, or any history of contact with confirmed COVID-19 patients.

For patients active or recently recovered from COVID-19, a physician consultation should be made and according to the emergency of dental treatment, the dentist decides either to delay or to perform the procedure in a negative pressure room.

According to recent records, to consider a case as a confirmed recovery, symptoms should not be detected for at least 30 days after a negative laboratory test (Alharbi et al., 2020).

Recently published articles recommended the use of pain evaluation questionnaires by dentists in order to assess the severity of the case. Nonetheless, pain is a subjective feeling that is influenced by culture, patient psychology and previous experience (Melzack et al., 2020). Hence, asking patients to evaluate their own level of pain is subject to bias. According to the American Dental Association, dentists have to use their experience and professional judgement in addition to the patients' pain complaints to consider if the case needs urgent treatment or not. To reach that conclusion, telemedicine with the patient is considered a useful tool for diagnosis and case evaluation (American Dental Association (ADA), 2020).

Dental treatments can be divided into four categories in order to facilitate and decrease the dentist and patient exposure to COVID-19 transmission as shown in Table 1.

Regardless of the patient's COVID-19 state, the emergency treatment for life-threatening cases should always be taken with extreme PPE protection and disinfection standards or in a negative pressure room. Urgent conditions can also be performed in cases of unsuspected, stable or recovered COVID-19 patients. Facultative and non-urgent procedures are postponed until patient recovery is confirmed as shown in Fig.3

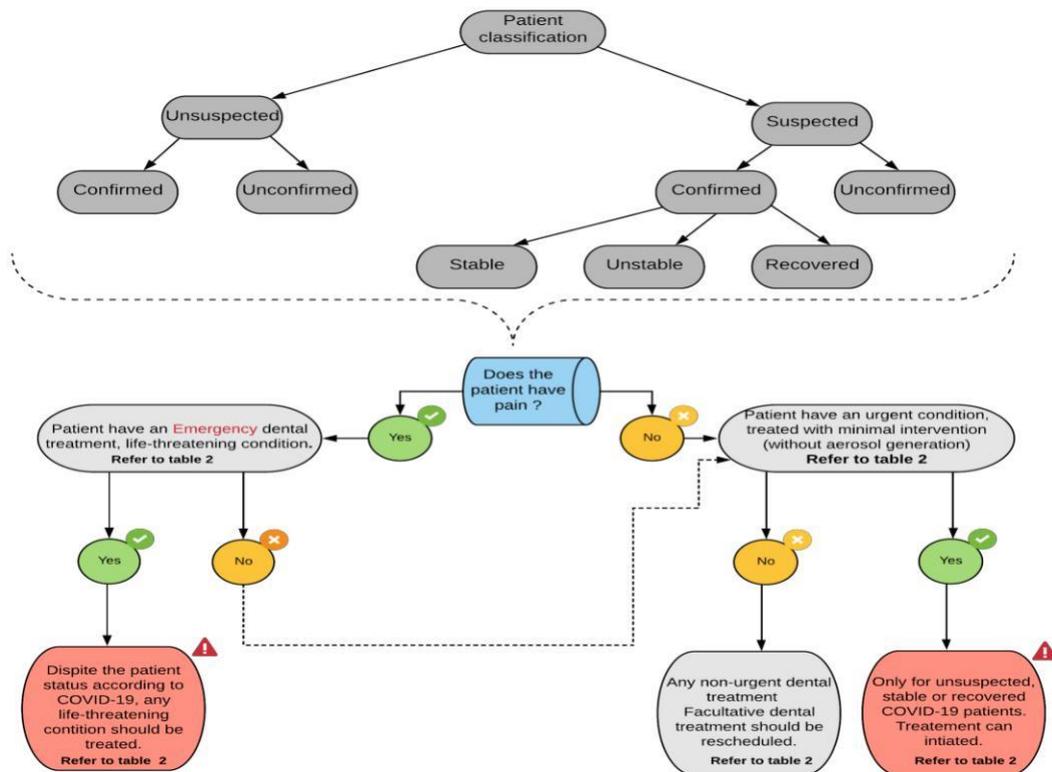


Fig.3: Patient Classification and dental treatment during pandemic

Table 1: Examples of dental treatment categories

Emergency Dental treatment; Life-Threatening Condition	Urgent Condition, Treated with Minimal Intervention (without aerosol generation)	Non-Urgent Dental Treatment	Facultative Treatment	Dental
Uncontrollable bleeding. Swelling in or around the oral cavity. Dental or jaw bone trauma. Severe dental pain. Pericoronitis. Dry socket pain.	Postoperative checkup after surgery. Temporary restoration cementation. Protheses adjustment of patient under radiotherapy. Painful orthodontic problems.	Dental regular checkup and cleaning. Regular orthodontic appointments. Asymptomatic carious lesion. Extraction of non-painful teeth.	Cosmetic, aesthetic and whitening procedures.	

7.2 Upon Patient Arrival

After the patient's tele-screening, the dentist decides if the patient can visit the dental office. During this period, practitioners must be familiar with COVID-19 symptoms. Once the patient is at the dental office, the patient should be asked again about any COVID-19 exposure or history of any symptoms. Using a non-contact infrared thermometer, the patient's body temperature should be measured (Ather et al., 2020) (Peng et al., 2020).

If a patient has or had any COVID-19 symptoms and his body temperature is above 37.3°C, dental treatment should be postponed, and the patient should be instructed to self-quarantine and reported to the health community authorities. However, if the patient's body temperature is below 37.3°C, the patient should be instructed to self-quarantine and the public health authorities should be informed for further examinations, but in case of emergency, treatment can be conducted in a hospitalized room (negative pressure room).

Even in the absence of COVID-19 symptoms, if the body temperature is above 37.3°C dental treatment should be postponed, the patient should be instructed to self-quarantine, and he/she should be reported to the public health authorities for further investigations.

In the case of an asymptomatic patient with a measured temperature below 37.3°C, dental treatment can be performed with extreme preventative methods in place against all modes of transmission. (Ather et al., 2020) (Peng et al., 2020) (Fallahi et al., 2020)

Waiting room: Social distancing should be applied at all times in the waiting room. If the waiting room doesn't provide a 2 meters-apart-distance, the accompanying patient should wait in their vehicle or in a place away from people. These instructions must be told to the patient when scheduling an appointment. (CDC., 2020)

Infection control material should be placed in the waiting room (alcohol hand gel, tissues, and no-touch receptacles disposables) right at the entrance and the waiting rooms (CDC., 2020)

Monitoring dental clinic entry points and installing glass or plastic barriers at the reception in order to limit contact with potential infectious patients (CDC., 2020).

Managing visitors' movement within the dental facility to make sure of social distancing rules (CDC., 2020).

In case of visits of patients suspected to have COVID-19, Patient must not for any reason be present in an aerosol generating procedures or move any other location in the dental facility except the patient room (CDC., 2020).

7.3 During Visits

7.3.1 Personal protective equipment (PPE)

To ensure the dentists, dental staff and patient protection, dentists should use PPE every day to avoid any aerosol contamination. Starting from working clothes (scrubs), disposable head cap, gown (disposable surgical clothes), disposable mask, goggles or face shield and at the end disposable gloves. Disposable PPE should be used for a single time and changed from patient to another. (Ather et al., 2020) (Peng et al., 2020)

When treating symptomatic patients, the National Institute for Occupational Safety and Health (NIOSH) recommended the use of N-95 masks instead of disposable masks for more safety (CDC., 2020).

Dentists have to check the seal of their used mask every time. This can be checked by the fit test described by NIOSH: after blocking all mask sides where air can enter or escape, a positive (exhale) or negative (inhale) pressure is applied by the dentist, and if the mask slightly pressurizes or collapses respectively, the test is considered successful (ADA., 2020).

According to ADA, dentists should follow a specific sequence for wearing and removing the PEE, described by the centers of disease control and prevention (CDC) Donning: Gown, followed by mask, then goggles or face shield, then gloves Doffing: Gloves while removing the gown, followed by goggles or face shield, then mask, followed by washing hands immediately.

7.3.2 Rubber dam

According to studies, using rubber dams during dental treatment isolates the operational field from the rest of the oral cavity and consequently reduces the generation of saliva droplets with or without blood (Fallahi et al., 2020). Rubber dam also limit other disease transmission as AIDS, hepatitis and tuberculosis and COVID-19 (Baghizadeh Fini., 2020). In order to ensure the reduction of aerosol production, an extra high suction is required with rubber dam's isolation (Fallahi et al., 2020) (Peng et al. 2020). Manual instruments (hand scalers, carisolv) are indicated to be used when rubber dam isolation can't be achieved to perform dental treatment in order to decrease aerosol production. (Peng et al. 2020)

7.3.3 Single use tools

Due to lack of knowledge on COVID-19, the adequate sterilization of some reusable dental devices is not guaranteed and because of the long sterilization and disinfection process that exposes the dentist and dental staff to cross-contamination (Puttaiah,2020), it is advisable to use disposable dental instruments as a diagnostic kit, syringes and burs during dental treatment as an efficient method to decrease that risk (Baghizadeh Fini., 2020).

7.3.4 Radiographic imaging

Studies have shown that some dentists as well as radiology technologists have been infected with the virus while examining patients with COVID-19 (Ding et al., 2020) Therefore, it is extremely important to abide by guidelines that reduce the rate of transmission. It is advisable to use extraoral imaging techniques such as CBCT and panoramic radiograph instead of intra oral ones in an attempt to reduce coughing, excessive saliva production, or gag reflex that would otherwise happen in intraoral images (Men et al, 2020). If intraoral images are necessary, appropriate covering for sensors and wrapping should be required in order to prevent cross contamination (Gutzeit et al., 2020).

7.3.5 The 4 handed technique

Dental health care personnel are advised to use 4 handed technique in order to control aerosols transmission (Meng., 2020).

7.3.6 Anti-retraction handpiece

For extra means of prevention, anti-retraction handpieces are highly recommended to use. In addition, a study that compared the function of a normal handpiece with an anti-retraction handpiece showed that, the use of anti-retraction handpiece can diminish backflow of oral fluids and HBV, inside the handpiece unit tubes, which could be a source of cross contamination. (Peng et al., 2020). In addition, dental healthcare personnel must use a high suction vacuum at all times to prevent this backflow (ADA., 2020).

7.3.7 Resorbable sutures

It is advised to use resorbable sutures that last 4 days on average in the oral cavity, in an attempt to cancel the need for another appointment and thus decrease contact with patients (Kalenderian et al., 2020).

7.3.8 Antimicrobial mouthwash

The administration of 0,2% Chlorhexidine decreases the risk of postoperative bacterial or viral complications and decreases the number of microbes in the oral cavity (Ugwumba et al., 2020) .It is believed that the use of preoperative Chlorhexidine does not eliminate COVID-19 as indicated in Diagnosis and Treatment of Novel Coronavirus Pneumonia Guidelines (the 5th edition) declared by The National Health Commission of the People's Republic of China, whereas the use of oxidative contained mouthwashes (0.2% povidone, 1.5% hydrogen peroxide) appears to be efficient in decreasing the amount of microbes as well as COVID-19 elimination (Peng et al., 2020).

The last dental appointments of the day should be booked for the Aerosol generating dental operations (AGDP) in order to avoid cross-contamination. According to the CDC, if accidental direct contact with an asymptomatic patient's aerosol occurred with the absence of N-95 mask, the dentist is at moderate risk. A 14 day of quarantine is recommended, and for extra precaution the patient can be asked to perform COVID-19 test following the dental appointment. If the test is positive the dentist must quarantine for 14 days, and all treated patients after this accident have to be informed. (ADA., 2020) (CDC., 2020)

7.4 After Visit

7.4.1 Between patients

After each patient, the dentist should discard properly all disposable PPE and clean with soap and running water all indispensable PPE as face shields or goggles. Indispensable dental equipment should also be disinfected as indicated by the manufacturer. (Peng et al., 2020) (ADA., 2020)

According to the CDC, dentists should always follow the manufacturer's instruction for disinfecting handpieces. Cleaning and heat sterilization are indicated for handpieces that are detachable, and non-detachable handpieces are disinfected by the use of US Food and Drug Administration (FDA) cleaning devices. For handpieces that can't be disinfected by any of the mentioned procedures, dental handpieces should not be used.

Water lines machines, ultrasonic scalers and air-water syringes must be flushed for at least 30 seconds, cleaned and autoclaved after each patient. This helps to flush out physically any impurities that might enter water lines (Xu et al., 2020).

7.4.2 When Going Home After a Workday

Before arriving home, dental Health Care personnel must remove their scrubs and change to their personal clothes. Once home, health care personnel must first of all remove their shoes, and then, personal clothes should be removed and washed separately from the rest of the household (CDC., 2020).

7.4.3 Waste disposal management

Medical waste should be one of the major concerns in dental clinics because of its high risk of cross contamination. Waste should not be stored longer than stated in the guidelines. Reusable Waste should be delivered to the organization's temporary storage place according to the appropriate frequency (Peng et al., 2020). In addition, According to WHO, transportation methods should be monitored to make sure that the wastes are transported by the right means of transportation to reach the disposable site.

Waste includes many materials like reusable tools, human tissue, sharp needles, cotton and tissue soaked with body fluids and any material that comes in contact with the patient. (Singh et al., 2020). These instruments must be cleaned, sterilized and stored according to the “Protocol for the Disinfection and Sterilization of Dental Instrument” (Baghizadeh Fini., 2020) (Peng et al., 2020)

- Placement of the infected waste into a collection bag, that should not be filled more than $\frac{3}{4}$.
- Spraying of 5000 mg/L of disinfectant containing chlorine (except for chlorhexidine).
- Sealing of the inner layer and outer layer in a “Goose- Neck-Type”.
- Spraying the layers with 5000 mg/L disinfectant containing chlorine (except for chlorhexidine).
- Marking the bag with a special tag on the outer layer, Storing medical waste in the specialized temporary storage of the organization.

8. FUTURE PERSPECTIVE

In such a rapidly changing situation, it is necessary to point out some issues yet to be solved:

- A. Are there any new dental transmission routes under study?
- B. Instead of 14 days, should the quarantine period be extended to 24 or 30 days?
- C. Should we rely solely on pain as criteria to classify dental emergencies? What about patients' subjectivity?
- D. Are there any studies on an emergency action plan in case of dental PPE shortages?

With all means, it is very crucial to have answers for the above questions in order to get a better insight regarding this pandemic. Until now, abiding by the health care guidelines should be the primary source of reference for dental health personnel.

REFERENCES

- ADA Interim Guidance for Minimizing Risk of COVID-19 Transmission, American Dental Association. Available at: www.anesthesiadental.com
- Alharbi, A., Alharbi, S., & Alqaidi, S. (2020). Guidelines for dental care provision during the COVID-19 pandemic. *The Saudi dental journal*, 32(4), 181–186.
- Amato et al., 2020. Infection Control in Dental Practice During the COVID-19 Pandemic. *Int J Environ Res Public Health*, 2020 Jul; 17(13): 4769.
- Ather, A., Patel, B., Ruparel, N. B., Diogenes, A., & Hargreaves, K. M. (2020). Coronavirus Disease 19 (COVID-19): Implications for Clinical Dental Care. *Journal of endodontics*, 46(5), 584–595.
- Baghizadeh Fini, M. (2020). What dentists need to know about COVID-19. *Oral Oncology*, 105.
- Cascella, M., Rajnik, M., Cuomo, A., Dulebohn, S. C., & Di Napoli, R. (2020). Features, Evaluation, and Treatment of Coronavirus. In *StatPearls*. StatPearls Publishing.
- CDC Statement on Reprocessing Dental Handpieces Centers for Disease Control and Prevention. Available at: www.cdc.gov/. Accessed: November 26, 2020
- COVID-19 Dental Services Evidence Review (CoDER) Working Group. Recommendations for the re-opening of dental services: a rapid review of international sources. Cochrane database of systematic reviews. November 2020. www.oralhealth.cochrane.org/

- Fallahi, H. R., Keyhan, S. O., Zandian, D., Kim, S. G., & Cheshmi, B. (2020). Being a front-line dentist during the Covid-19 pandemic: a literature review. *Maxillofacial plastic and reconstructive surgery*, 42(1), 12.
- Fiorillo et al., 2020. COVID-19 Surface Persistence: A Recent Data Summary and Its Importance for Medical and Dental Settings. *Int J Environ Res Public Health*, 2020 December; 17(9): 3132.
- Guo, H., Zhou, Y., Liu, X., & Tan, J. (2020). The impact of the COVID-19 epidemic on the utilization of emergency dental services. *Journal of dental sciences*. Advance online publication.
- Gutzeit, A., Li, Q., Matorri, S., Li, B., & Wang, L. (2020). What can European radiologists learn from the outbreak of COVID-19 in China? A discussion with a radiologist from Wuhan. *European radiology*, 30(7), 3609–3611.
- 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. Available at: www.cdc.gov/
- Kalenderian, et al. (2020) COVID-19 and Dentistry: Challenges and Opportunities for Providing Safe Care
- Kaur, S. P, Gupta, V. (2020). COVID-19 Vaccine: A comprehensive status report. *Virus research*. 288, 198114.
- Mahendra, et al. (2020) Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2): An Update. 12(3),1-2.
- Melzack, R., & Katz, J. (2001). *The McGill Pain Questionnaire: Appraisal and current status*. In D. C. Turk & R. Melzack (Eds.), *Handbook of pain assessment* (p. 35–52). The Guilford Press.
- Meng, L., Hua, F., & Bian, Z. (2020). Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Dental and Oral Medicine. *Journal of dental research*, 99(5), 481–487.
- Park, M., Cook, A. R., Lim, J. T., Sun, Y., & Dickens, B. L. (2020). A Systematic Review of COVID-19 Epidemiology Based on Current Evidence. *Journal of clinical medicine*, 9(4), 967.
- Peng, X., Xu, X., Li, Y., Cheng, L., Zhou, X., & Ren, B. (2020). Transmission routes of 2019-nCoV and controls in dental practice. *International journal of oral science*, 12(1), 9.
- Riad, A., Kassem, I., Issa, J., Badrah, M., & Klugar, M. (2020). Angular cheilitis of COVID-19 patients: A case-series and literature review. *Oral diseases*, 10.1111/odi.13675. Advance online publication.
- Sabino-Silva, R., Jardim, A., & Siqueira, W. L. (2020). Coronavirus COVID-19 impacts to dentistry and potential salivary diagnosis. *Clinical oral investigations*, 24(4), 1619–1621.
- Sebastian Kamps, B., Hoffmann, C. (2020). COVID Reference www.CovidReference.com Fifth Edition 2020.5 CR.
- Singh, T., Ghimire, T. R., & Agrawal, S. K. (2018). Awareness of Biomedical Waste Management in Dental Students in Different Dental Colleges in Nepal. *BioMed research international*.
- Ugwumba, C. U., Adeyemo, W. L., Odeniyi, O. M., Arotiba, G. T., & Ogunsola, F. T. (2014). Preoperative administration of 0.2% chlorhexidine mouth rinse reduces the risk of bacteraemia associated with intra-alveolar tooth extraction. *Journal of cranio-maxillo-facial surgery: official publication of the European Association for Cranio-Maxillo-Facial Surgery*, 42(8), 1783–1788.
- Xu, H., Zhong, L., Deng, J. et al. (2020) High expression of ACE2 receptor of 2019-nCoV on the epithelial cells of oral mucosa. *Int J Oral Sci*.
- Yang, Y., Zhou, Y., Liu, X., & Tan, J. (2020). Health services provision of 48 public tertiary dental hospitals during the COVID-19 epidemic in China. *Clinical oral investigations*, 24(5), 1861–1864.
- Yeo, C., Kaushal, S., & Yeo, D. (2020). Enteric involvement of coronaviruses: is faecal-oral transmission of SARS-CoV-2 possible? *The lancet. Gastroenterology & hepatology*, 5(4), 335– 337.
- Yi, Y., Lagniton, P., Ye, S., Li, E., & Xu, R. H. (2020). COVID-19: what has been learned and to be learned about the novel coronavirus disease. *International journal of biological sciences*, 16(10), 1753–1766.