A CONTRACT OF THE SECOND

Original Research Paper

Prosthodontics

PREVENTIVE & PROSTHODONTIC CONSIDERATIONS FOR DENTAL PROFESSIONALS DURING COVID-19 PANDEMIC – A REVIEW

Dr. P.K.Monika	Postgraduate student, Department of prosthodontics, Lenora institute of dental sciences, NTR University, Andhra Pradesh.
Dr. B.L.Rao*	Professor & Head, Department of prosthodontics, Lenora institute of dental sciences, NTR University, Andhra Pradesh. *Corresponding Author
Dr. Nibha Kumari Singh	Reader, Department of prosthodontics, Lenora institute of dental sciences, NTR University, Andhra Pradesh.
Dr. Jibi Joseph	Postgraduate student, Department of prosthodontics, Lenora institute of dental sciences, NTR University, Andhra Pradesh.
Dr. TLG Sravanthi	Postgraduate student, Department of prosthodontics, Lenora institute of dental sciences, NTR University, Andhra Pradesh.
Dr. GVRSR Krishna Teja	Postgraduate student, Department of prosthodontics, Lenora institute of dental sciences, NTR University, Andhra Pradesh.

ABSTRACT The recent outbreak of SARS-CoV-2 and its associated coronavirus disease(COVID-19) has affected the entire international community and caused worldwide public health concerns. Notwithstanding global efforts to contain the disease spread, the outbreak is still on the rise because of the community spread pattern of this virus. Dental professionals, including prosthodontists, may experience patients with suspected or confirmed SARS-CoV-2 infection and will have to act conscientiously not only to provide care but at the same time to prevent the spread of the nosocomial disease. This article aims to lay out a brief overview of the symptoms, specific recommendations for the dental practice are indicated for patient screening, infection control strategies, and patient management protocol. One aspect is, however, getting clear; practising Dentistry in future (Post -COVID-19 eras) is never going to be the same as the Pre-COVID-19 era.

KEYWORDS: COVID-19; Pandemic; Dental; Prosthodontic considerations; SARS-CoV-2; Infection control.

INTRODUCTION:

The epidemic of coronavirus disease 2019 (COVID-19), originating in Wuhan, China, has become a significant public health concern for not only China but also other countries around the world and now is considered as a pandemic by WHO.¹ The novel coronavirus belongs to a family of singlestranded RNA viruses known as Coronaviridae.² These comprises of severe acute respiratory syndrome coronavirus (SARS-CoV), first identified in 2002, and the Middle East respiratory syndrome coronavirus (MERS-CoV), first identified in 2012.³ This family of viruses are recognized to be zoonotic or transmitted from animals to humans.

This is a zoonotic infection, homogeneous to other coronavirus infections, which are believed to have originated in bats and pangolins and later transmitted to humans.⁴⁵ In the human body, this coronavirus (SARS-CoV-2) widely exists in salivary secretions and nasopharyngeal of affected patients, and its spread is widely thought to be respiratory droplet/contact in nature.

Infection control measures are mandatory to prevent the virus from further spreading and to help control the pandemic situation. Due to the trait of dental settings, the risk of crossinfection can be high between patients and dental practitioners. These risks can be ascribed to the unique nature of dental interventions, which include aerosol generation, and it can be handling of sharps and the close proximity of the dental provider to the patient's oropharyngeal region. Moreover, if adequate precautions are not taken, the dental office can potentially expose patients to cross-contamination.

As the comprehension of this new disease is evolving, one must have the essential knowledge of COVID-19 and nosocomial dental infection and provides recommended management protocols for dentists and students in (potentially) affected areas; and Dental practices should be expertly formulated to identify a potential COVID-19 infection, and direct patients with suspected, confirmed, or a history of COVID-19 disease to pertinent treatment centres. The maximum incubation period for COVID-19 has been estimated at 5 to 6 d, although there is evidence that it may be as long as 14 d, which is now the widely accepted length for medical monitoring and quarantine of (potentially) exposed individuals.

In this article, we summarize current recommendations for diagnosing and managing patients with COVID-19 and to provide a brief overview of the symptoms, specific recommendations for dental practice for patient screening, infection control strategies (mainly prosthodontic considerations) and patient management protocols. Symptoms

Medical signs of fever, dry cough, and myalgia typically occur in COVID-19 patients. Moreover, less apparent symptoms such as nausea, diarrhoea, reduced sense of smell (hyposmia), and irregular sensation of taste (dysgeusia) were also recorded.⁶ Furthermore, irregular chest X-rays and computed tomographic findings including ground-glass opacities are usually found in the chest.⁷ Notably, nearly 80% of these patients have only mild symptoms that mimic flulike symptoms and seasonal allergies, which can result in an increased number of undiagnosed cases.⁸ Such asymptomatic patients may act as "carriers" and may also serve as a reservoir for infection re-emergence. While SARS-CoV-2 is known to be highly transmissible when patients are most symptomatic, it is noteworthy that the time of incubation can vary from 0 to 24 days; thus, the transmission may occur before any symptoms become apparent.^{7,9} Severe types of this

disorder have a predilection with pre-existing chronic conditions, such as cardiovascular disease or immuno suppression, for people with a mean age 56. The population of patients at higher risk has signs indicative of pneumonia or acute respiratory distress syndrome.⁷

Routes of Transmission

The virus can transmit via respiratory droplets directly from person to person; emerging evidence indicates it can also be transmitted by touch and fomites.¹⁰ So coughing or sneezing by an infected person will make SARS-CoV-2 airborne, potentially infecting people in close contact (within a radius of about 6 ft). This led to the recent suggestion of social distancing to reduce the spread of the disease in the group.

Dental care settings often bear the risk of infection due to the complexity of their procedures, which includes face-to-face communication or direct transmission (transmission of cough, sneeze and droplet inhalation) and indirect transmission (indirect with dental, nasal, and eye mucosa). Consequently, COVID-19 can be transmitted via aerosol, fomites or the faceal-oral route which can lead to the spread of nosocomial disease in dental offices.¹¹

Safety and Precautions

It is essential that each practice has in place a protocol and training for their team on how to screen for patients at risk of COVID-19. Dentists should take strict personal protection measures and avoid operations that can generate droplets or aerosols or reduce them (summarized in Flowchart 1).¹³

Telescreening and Triaging:

Initial telephone screening to identify patients with suspected or probable COVID-19 infection can be done remotely at scheduling appointments.

The 3 most pertinent questions for initial screening should include

I. Any exposure to a person presenting with a confirmed or suspected COVID-19,

ii. Any recent history of travel to an region with high COVID-19 incidence or

iii. Certain febrile respiratory disease signs such as fever or cough.

A positive response to any of the 3 questions would lift initial concern, and postponement of elective dental treatment for at least two weeks. Such patients ought to be allowed to take care of themselves (Self Quarantine) and contact their primary care physician by telephone or email.¹³

General Instructions for dental setup Functioning:

1) Tell patients to be on time instead of too early for their appointments, because that will reduce the amount of time that they spend waiting room or reception area.

2) Schedule appointments to minimize possible contact with other patients in the waiting room.

β) Patient waiting area to be spacious and chair arrangements to be made in accordance with social distance guidelines.

4) Remove magazines, reading materials, and other objects that may be touched by others and which are not quickly disinfected.

5) Pens, log papers(OP sheets), and records of appointments to be held in a sealed formalin chamber to keep it safe from contamination. 6) In dental practices, patients with active febrile and respiratory disease are most likely not present. Based on an emergency questionnaire **(Tab 1)**¹³ assessment, doctors may assess the seriousness of the dental condition and make an informed decision either to provide or to delay dental care.

7) At the entrance, axillary staff should test the patient's body temperature using a non-contact thermometer on the forehead or with cameras with thermal infrared sensors.

8) Patients who present with fever (100.4F/38C) and/or symptoms of respiratory illness can be postponed with elective dental care by at least 2 weeks and inform the patients to self-quarantine themselves, dentists should instruct the patients to contact their physician to rule out the possibility of COVID-19.

9) As per the guidelines of the Centers for Disease Control and Prevention guidelines, individuals with suspected COVID-19 infection should be seated in a clear, well ventilated waiting area at least 6 ft from patients receiving treatment who are not infected.

10) Place visual alerts symbols (e.g. signage, posters) at the entrance and in strategic places (e.g. waiting rooms, elevators, cafeterias) to provide patients with guidance on hand hygiene, respiratory hygiene and cough etiquette (in relevant languages).

11) Instructions may include how to use tissues when coughing or sneezing to cover the nose and mouth, how to dispose of tissues and infected products in waste receptacles and how and when to practice hand hygiene.

12) Patients should wear a surgical mask and adopt appropriate respiratory hygiene, such as sheathing the mouth and nose with a tissue before sneezing and coughing, then dispose of the tissue.

13) Minimise the use of cell phones during the working hours. Use plastic sheets to cover as cell phones are the most common devices to store fomites and contaminants.

14) The 4-handed technique is beneficial for controlling the infection. The use of saliva ejectors with low or high volume can reduce the production of droplets and aerosols.

15) Use a rubber dam whenever possible to decrease possible exposure to infectious agents.

16) Use high-speed evacuation for all dental procedures producing an aerosol.

17) Autoclave your handpieces after each patient.

18) Provide services for respiratory hygiene and cough etiquette, including alcohol-based hand rub (ABHR) with 60-95% alcohol, tissue and non-touch receptacles for disposal at exits, waiting areas, lobbies and patient check-ins.

19) SARS CoV-2 can remain viable in aerosol and live up to 3 days at room temperature on inanimate surfaces, with a higher preference for humid conditions.¹⁴ Clinical workers should, therefore, ensure that inanimate surfaces are disinfected with chemicals (NaOCl) recently approved for COVID-19 and a dry atmosphere is maintained to curb COVID-19 spread.¹⁵

20) Negative-pressure treatment rooms/airborne infection isolation rooms (AIIRs): It should be remembered that patients with suspected or confirmedCOVID-19 infection should not be

treated as part of routine dental practice. Alternatively, only negative-pressure rooms or AIIRs should manage this group of patients. Therefore, anticipatory knowledge of health care centres with provision for AIIRs would help dentists to provide emergent dental care if the need arises.¹⁰

Oral Examination

1) Preprocedural mouth rinse: previous research found that SARS-CoV and MERS-CoV were particularly sensitive to mouth rinse with povidone. Hence, pre-procedural mouth rinsing with 0.2% povidone-iodine may reduce a load of saliva coronaviruses. $^{\rm 11,16}$

2) Another approach will be to use 0.5-1 % mouth rinse with hydrogen peroxide because it has non-specific virucidal activity against coronavirus.¹⁷

3) Use of disposable (single-use) devices such as mouth mirror, syringes, and blood pressure cuff to prevent cross-contamination are encouraged.

4) To reduce the splatter generation, dentists should use a rubber dam. Placing the rubber dam so it protects the nose may be beneficial.

5) Dentists should reduce the use of ultrasonic instruments, high-speed handpieces, and 3-way syringes to reduce the risk of generating contaminated aerosols.

6) Radiographs:

Extraoral imaging such as panoramic radiography or conebeam computed tomographic imaging can be used to avoid vomiting or cough reflexes that may occur with an intraoral imaging technique. While mandating intraoral imagery, sensors should be double-barriered to avoid perforation and cross contamination.¹⁸

Aerosol generating procedures

Extensive environmental contamination can occur following an aerosol-generating procedure. Given that clinically generated aerosols may be infected with the human coronaviruses and that the virus can survive on hard surfaces and can remain viable for up to 3 days, aerosol-generating procedures should be limited to those procedures associated with the delivery of essential dental care only.

1) Aerosol generating procedures include; triplex syringe (3:1 syringe), high-speed handpieces, mechanical/ultrasonic scalers, air abrasion (includes Air-flow, Rondo flex, Prophy flex, Prophy mate) intra-oral sandblasters.

2) Where possible any treatment that may generate an aerosol should be delayed. If the delay is not possible:

- mouthwashes for 30 seconds supervised with either: Hydrogen peroxide 1% (dilute 3% to 1%), Chlorhexidine 0.2%, Povidine iodine mouthrinse (0.2%).
- Consider the use of hand instrumentation (+/-temporary restorations)
- Use of slow speed handpiece without water spray.

3) If an aerosol-generating procedure is necessary, close attention must be paid to managing this aerosol:

- Use appropriate PPE
- Use a single patient treatment room (where possible) with the door closed
- Work with an assistant and use four-handed dentistry
- Use rubber dam (or Isolite if available)
- · Swab teeth and tissues with hydrogen peroxide (1%) or

chlorhexidine 0.2% before the procedure especially if a pre-procedural mouth rinse has not been possible (e.g. children)

- Use high volume evacuation with correct tip placement at the source of the aerosol
- Patient and team are positioning to optimize visibility of the operative field and access to the mouth.
- Where possible, open windows after the procedure to assist with aerosol dispersion.

Hand Hygiene

- Wash hands with water & soap for at least 20 seconds after direct contact with patients or use an alcohol-based hand sanitizer with at least 60% alcohol if soap and water are not available. (These guidelines already are part of Standard Precautions.)
- Whether or not gloves are worn before and after any direct patient contact and between patients.
- Immediately after gloves are removed.
- Before handling invasive devices.
- After contacting blood, body fluids, secretions, excretions, non-intact skin, and infected items, even though gloves are worn.
- During patient care, when switching from an infected to a clean body site of the patient.
- After contact with inanimate objects in close proximity to the patient.
- The WHO describes the '5 moments of hand hygiene' in dental care as:
- 1. Before touching a patient
- 2. Before clean/aseptic procedure
- 3. After body fluid exposure risk
- 4. After touching a patient
- 5. After touching patient surroundings.

Hand washing:

- scrub your hands with liquid soap at the following times, appropriate for use in a healthcare setting:
- When your hands are visibly dirty or infected with proteinaceous material, blood or other body fluids.
- At the start and end of each clinical session.
- After a toilet break.
- Using sinks dedicated to hand washing that are equipped with non-touch tapware or using a non-touch technique when washing your hands. Dry your hands with single-use linen or disposable paper towels (not air-dryer) after washing your hands.

Alcohol-based hand rub:

- Use an ABHR, indicated for use in health care environments, at the following times when your hands are clearly and clinically clean:
- Before and after every contact with a patient.
- Before gloves are put on and after they are removed.
- Upon entering and leaving the reprocessing areas of the instrument.
- After hands accidentally touch contaminated environmental surfaces, instruments or other equipment.
- Apply the required volume of ABHR as specified by the manufacturer to dry hands and leave your hands to dry naturally; do not dry with linen or paper towels.

Waterlines and water quality

- All dental equipment with water lines that supply water to any equipment accessing the patient's mouth (such as handpieces, scalers, and air/water syringes) shall be fitted with an anti-retraction valve to limit the backflow of infected oral cavity fluids.
- · Flush air and water lines for at least two minutes at the

beginning and end of each day, and for 30 seconds in the middle of patients.

- Clean and disinfect water lines according to the manufacturer's recommendations.
- Make sure the water is safe to drink within your oral health practice environment; information on water quality can be collected from the local water authority. The use of distilled water or water treated by reverse osmosis (RO), in an independent water supply (fitted bottle) system, is recommended for dental units.

Personal protective equipment

Personal protective equipment (PPE) is a common term used by health professionals for the clothing and equipment that serves as a barrier to protecting their own tissues from exposure to potentially infectious material. PPE includes gloves; masks; protective eyewear; outer protective clothing; and enclosed footwear. The use of dental handpieces, sonic and ultrasonic devices and air/water syringes creates large amounts of aerosols, with the associated possibility of harmful microorganisms being transmitted in the air. Figures 1&2 illustrates the Centers for Disease Control and Prevention guidelines for putting(Donning) on and removing(Doffing) personal protective equipment.¹⁹

NIOSH-Approved N95 Filtering Facepiece Respirator:-

"N95 respirator" is a term used to identify the type of respirators that use N95 filters to eliminate airborne particles that are breathed into them. The NIOSH respirator approval regulation describes the term N95 as referring to a filter class that removes at least 95% of airborne particulate matter during the "worst-case" test using a "most penetrating" particle size during NIOSH tests. Filters meeting the criteria are given a 95 rating. Most filtering facepiece respirators have a class N95 filter, and those that meet this filtration requirement are often referred to as N95 respirators simply.

Reuse of N95 respirators is also called "limited reuse." Restricted reuse during previous respiratory pathogen outbreaks and pandemics was recommended and commonly used as an alternative for the conservation of respirators. 20,21,22,23,24

If reuse of N95 respirators is permitted, the Respiratory Protection Program Administrators should ensure compliance with administrative and engineering controls to limit the potential of N95. Respiratory surface contamination (e.g., use of barriers to prevent contamination by droplet spray) and consider additional training and/or reminders (e.g. posters) for staff to reinforce the need to minimize unnecessary contact with the respirator surface, strict adherence to hand hygiene practices, and proper PPE donning and doffing technique, including physical inspection and performing a user seal check.19 Healthcare facilities should establish clearly defined protocols to encourage staff to take the following measures to reduce contact transmission:

Discard N95 respirators:

- Following use during aerosol-generating procedures.
- Contaminated with patients' saliva, nasal or respiratory secretions, or other body fluids.
- After close contact with any patient co-infected with an infectious disease which needs precautions for contact.Consider the use of a cleanable face shield (preferred) over an N95 respirator and/or other steps (e.g., masking patients, use of engineering controls), when feasible to reduce surface contamination of the respirator.
- Hang used respirators in a designated storage area or keep them in a clean, breathable container such as a paper bag between uses. To minimize potential crosscontamination, store respirators so that they do not touch

each other and the person using the respirator is clearly identified. Storage containers should be disposed of or cleaned regularly.

- Clean hands with soap and water or an alcohol-based hand sanitizer before and after touching or adjusting the respirator (if necessary for comfort or to maintain fit).
- Avoid touching the inside of the respirator. If inadvertent contact is made with the inside of the respirator, discard the respirator and perform hand hygiene as described above.
- Use a pair of clean (non-sterile) gloves when donning a used N95 respirator and performing a user seal check. Discard gloves after the N95 respirator is worn and any adjustments are made to ensure that the respirator seats comfortably with a good seal on your face.
- Discard any respirator which is clearly impaired or is difficult to breathe through.

Prosthodontics considerations

1) On confirming and scheduling patients to take a detailed history of travel and health care. Do not provide the abovementioned patients with non-emergent or cosmetic treatment, and report them immediately to the health department. Monitor for travel patients and for signs and symptoms of illness while reviewing their medical history.

2) Post a sign at the entrance to the dental office that instructs patients with respiratory illness symptoms (e.g., cough, sore throat, headache, sneezing, or shortness of breath) to reschedule their appointment and call their doctor. The same holds if they have encountered any of these symptoms in the last 48 hours.

3) Before conducting dental operations, take temperature readings as part of routine patient assessment.

4) Take the contact details and address of all patients treated and detailed case history.

5) Install physical barriers (e.g., glass or plastic windows) near the working area.

6) Make sure the personal protective equipment being used is appropriate for the procedures being performed and follow the guidelines mentioned above.

7) Use high-speed evacuation for dental procedures producing an aerosol. Autoclave hand-pieces after each patient. Have patients rinse with a 1% hydrogen peroxide solution before each appointment. Clean and disinfect public areas which also includes door handles, chairs and bathrooms.

8) Make the impression and disinfect it with benzalkonium chloride-based disinfectant.

In dental practice, dental impressions are classified under semi-critical artifacts and involve disinfection or sterilization at a high level.²⁵ Immersion disinfection method is the most commonly used method for disinfection of impression. Various disinfectant solutions used are sodium hypochlorite (0.525%), quaternary ammonium compounds, glutaraldehyde, phenols and iodophors in various concentrations and immersion times. Among all the 10 minute disinfection time for the 0.525% sodium hypochlorite immersion disinfection was selected according to ADA specifications.²⁶ Spraying disinfection, steam autoclave, ozone, microwave, ultraviolet light, etc. are the other methods used to disinfect impressions. The 5 minute ozone disinfection time was selected based on previous work²⁷ which showed efficient disinfection results. The 15 minute microbiology experiments (regarding different bacteria or viruses) show that more time is needed for disinfection.

9) Microorganisms from the dental cast were also recovered. These dental casts can act as a cross-infection medium between patients and dental health care workers. Therefore, dental casts should also be disinfected.²⁸ The American Dental Association(ADA) recommends numerous methods for cast disinfection. These include use of disinfectant spray, immersion in a disinfectant solution, and incorporation of disinfectant in stone at the time of mixing.²⁹ NaOCl immersion in 0.525% did not change dimensional accuracy, surface detail quality and compressive strength.³⁰ Microwave irradiation can also be used to disinfect casts. The dental cast can also be sterilized.²⁵

10) Wax rims and wax bites are disinfected using an iodophor, chlorine dioxide, or sodium hypochlorite spray and a "spraywipe-spray" technique. Following the second spray, the wax bites can be enclosed in a sealed plastic bag for the proper contact time.

Immersion disinfection may cause distortion to some items.

11) According to Dr Rajeev Chitguppi³¹ that we cannot prevent aerosol generation in dental clinics, but can we minimize the viral load in the aerosols?" 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. The recommendation is to use 10% povidone-iodine diluted 1:9 with water.

12) All the above said precautions should be taken when making an impression, jaw relation, insertion, and even doing cementation.



Flowchart 1: An overview of patient screening for COVID-19 and dental management.

Name: Place: Date of Birth:

Tab 1: COVID-19 screening questionnaire

	YES	NO	COVID-19 Screening Questionnaire
			In the past 14 days, have you or any household member travelled to areas with known cases of COVID-19? If so, please note the location.
			In the past 14 days, have you or any household member had any contact with a known COVID-19 patient?
			Have you or any household member have a history of exposure to COVID-19 biologic material?
			Have you had a history of fever in the last 14 days?
			Have you had any symptoms such as cough, difficulty in breathing, diarrhoea, nausea, body ache, loss of smell or loss of taste in the last 14 days?



Fig 1: Donning of PPE.



Fig 2: Doffing of PPE.



REFERENCES:

- Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID-19 in real time. Lancet Infect Dis 2020.
- Gorbalenya AE, Baker SC, Baric RS, et al. The species Severe acute respiratory syndrome-related coronavirus: classifying 2019-nCoV and naming it SARS-CoV-2. Nat Microbiol, 2020.
- Wax RS, Christian MD. Practical recommendations for critical care and anesthesiology teams caring for novel coronavirus (2019-nCoV) patients. Can JAnaesth 2020. Accessed 18 March 2020.
- Zhou P, Yang X-L, Wang X-G, et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. Nature, 2020;579:270–3.
- Wahba L, Jain N, Fire AZ, et al. Identification of a pangolin niche for a 2019-Nov-like coronavirus through an extensive meta-metagenomic search. bioRxiv 2020. https://doi.org/10.1101/2020.02.08.939660.
- Giacomelli A, Laura Pezzati L, Conti F, et al. Self-reported olfactory and taste disorders in SARS-CoV-2 patients: a cross-sectional study, Clinical Infectious Diseases, ciaca30, https://doi.org/10.1093/cid/ciaca330.
 Guan W, Ni Z, Hu Y, et al. Clinical characteristics of 2019 novel coronavirus
- Guan W, Ni Z, Hu Y, et al. Clinical characteristics of 2019 novel coronavirus infection in China. medRxiv. Available at: https://www.medrxiv.org/content/ 10.1101/2020.02.06.20020974v1. Accessed March 11, 2020.
- Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. JAMA 2020. https://doi.org/10.1001/jama.2020.2648.
- Rothe C, Schunk M, Sothmann P, et al. Transmission of 2019-nCoV infection from an asymptomatic contact in Germany. N Engl J Med 2020;382:970–1.
- Centres for Disease Control and Prevention. Transmission of coronavirus disease 2019 (COVID- 19). Available at: https://www.cdc.gov/coronavirus/ 2019-ncov/about/transmission.html. Accessed 18 March 2020.
- 11) Peng X, Xu X, Li Y, et al. Transmission routes of 2019-nCoV and controls in dental practice. Int J Oral Sci 2020;12:9.
- 12) Amber Ather, Biraj Patel, Nikita B. Ruparel, Anibal Diogenes and Kenneth M. Coronavirus Disease 19 (COVID-19): Implications for Clinical Dental Care. J Endod 2020;1–12.
- Wang Y, Wang Y, Chen Y, Qin Q. Unique epidemiological and clinical features of the emerging 2019 novel coronavirus pneumonia (COVID-19) implicate special control measures. J Med Virol 2020. https://doi.org/10.1002/jmv.25748.
- 14) Van Doremalen N, Bushmaker T, Morris DH, et al. Aerosol and surface stability of HCoV-19 (SARS-CoV-2) compared to SARS-CoV-1. N Engl J Med 2020 March 17. https://doi.org/10.1056/NEJMc2004973.
- 15) Hokett SD, Honey JR, Ruiz F, et al. Assessing the effectiveness of direct digital

- radiography barrier sheaths and finger cots. J Am Dent Assoc 2000;131:463–7.
 Kariwa H, Fujii N, Takashima I. Inactivation of SARS coronavirus by means of povidone-iodine, physical conditions, and chemical reagents. Jpn J Vet Res 2004;52:105–12.
- 17) Kampf G, Todt D, Pfaender S, Steinmann E. Persistence of coronaviruses on inanimate surfaces and its inactivation with biocidal agents. J Hosp Infect 2020;104:246–51.
- 18) List N: EPA's registered antimicrobial products for use against novel coronavirus SARS-CoV-2, the cause of COVID-19. Washington, DC: The United States Environmental Protection Agency. Available at: https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-againstsarscov-2. Accessed March 18, 2020.
- CDC: "Sequence for donning personal protective equipment PPE/Sequence for removing personal protective equipment." [Online] Available at https://www.cdc.gov/HAI/pdfs/ppe/ppeposter148.pdfpdficon
- 20) Beckman, S., B. Materna, S. Goldmacher, J. Zipprich, M. D'Alessandro, D. Novak et al.: Evaluation of respiratory protection programs and practices in California hospitals during the 2009-2010 H1N1 influenza pandemic. American Journal of Infection Control 2013;41(11): 1024-1031.
- 21) Hines, L., E. Rees, and N. Pavelchak: Respiratory protection policies and practices among the health care workforce exposed to influenza in New York State: Evaluating emergency preparedness for the next pandemic. American Journal of Infection Control (2014).
- 22) CDC: "Questions and Answers Regarding Respiratory Protection For Preventing 2009 H1N1 Influenza Among Healthcare Personnel" [Online] Available at https://www.cdc.gov/h1n1flu/guidelines infection control qa. htm, 2010.
- 23) Rebmann, T., S. Alexander, T. Cain, B. Citarella, M. Cloughessy, and B. Coll "APIC position paper: extending the use and/or reusing respiratory protection in healthcare settings during disasters." Available at http:// www.apic.org/Resource /TinyMceFileManager/Advocacy-PDFs/ APIC Position Ext the Use and or Reus Resp Prot in Hlthcare Settings12091.pdfpdf icon external icon, 2009.
- 24) IOM: Reusability of facemasks during an influenza pandemic: Facing the flu. Washington, D.C.: National Academies Press, 2006.
- Rutala WA. APIC guideline for selection and use of disinfectants. Am J Infect Control; 1996;24(4):313-42.
- 26) Bustos J, Herrera R, González U, Martínez A, Catalán A, Effect of immersion disinfection with 0.5% sodium hypochlorite and 2% glutaraldehyde on alginate and silicone: Microbiology and SEM study Int J Odontostomat 2010 4:169-77.
- 27) Poulis N, Kyriacou A, Kotsou M, Bezirtzoglou E, Prombon as A, Drakoulis N, Effectiveness of low-flow high-ozone concentration disinfection of dental impressions: A comparative study to immersion disinfection Br J Appl Sci Technol 2014 4:2528-37.
- 28) Leung RL, Schonfeld SE. Gypsum casts as a potential source of microbial cross-contamination. J. Prosthet. Dent; 1983;49(2):210-1.
- Infection control recommendations for the dental office and the dental laboratory. J Am Dent Assoc; 1996;127(5):672-80.
- Abdullah MA. Surface detail, compressive strength, and dimensional accuracy of gypsum cast after repeated immersion in hypochlorite solution. J Prosth Dent. 2006; 95(6):462-8.
- 31) Dr Rajeev Chitguppi. Reducing aerosol viral load to minimize spread of SARS-COV-2 in dental clinics. Available at https://www.dentaltribune.com/news/reducing-aerosol-viral-load-to-minimise-spread-of-sarscov-2-in-dental-clinics/, 2020.