

Impact of COVID-19 on the daily routine of radiology clinics

Juliana de Carvalho Carmelo¹, Tatielly Karine Costa Alves¹, Micheline Salim Khouri¹,
Rafael Pereira da Mata Santos¹, Lizandra Gonzaga Rodrigues¹, Maria Eugenia Alvarez-Leite¹,
Flávio Ricardo Manzi^{1,*}

¹Department of Dentistry/Oral Radiology, School of Dentistry, Pontifical Catholic University of Minas Gerais, Belo Horizonte, Brazil

To the Editors,

On January 30, 2020, the World Health Organization (WHO) announced a public health emergency of global proportions: the outbreak of coronavirus disease 2019 (COVID-19), which is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). On March 11, 2020, COVID-19 was declared a pandemic by the WHO. Protective measures, such as washing one's hands, using alcohol-based gels, wearing masks, and avoiding crowds were proposed to prevent its dissemination.¹

Preventive measures, including social isolation and other precautions to reduce disease transmission, are the main steps to be taken, since research is continuing to identify a vaccine or effective medication to combat the disease. Consequently, many oral problems have been neglected during this period, since patients avoid social interactions and postpone important diagnostic exams.² Faced with this situation, many public health services, including dental clinics and dental radiology centers, have been required to change their daily routines and augment health care procedures to ensure the protection of both patients and service providers, given that COVID-19 is highly transmissible through contact with saliva droplets. It is essential to assume that every patient is a disease carrier and that any surface that is touched can be potentially infected, unless it has been disinfected.³

Many forms of transmission can occur through saliva droplets simply by speaking, coughing, or sneezing, in addition to aerosols generated during dental procedures. Viral transmission within short distances commonly oc-

curs through larger nasopharyngeal and orofacial droplets; however, there is a risk of viral transmission at longer distances through smaller droplets infected with viral particles that stay suspended in the air. Droplets and aerosols can stay in the air for long periods of time before attaching themselves to surfaces or lodging in the respiratory tract.³⁻⁶ This possibility is especially concerning since SARS-CoV-2 was recently identified in the saliva of infected individuals.⁷ Dental professionals and technicians can potentially become carriers of the disease. Hence, dentists' offices and dental radiology clinics, if the proper precautions are not taken, might expose patients to cross contamination.⁸

The symptoms of COVID-19 are similar to those of the common cold and influenza, can range from mild to severe. The most common symptoms include fever, fatigue, and dry cough. Some patients may present pain, nasal congestion, headaches, conjunctivitis, sore throat, diarrhea, loss of the sense of taste or smell, cutaneous skin eruptions, or a discoloration of the fingers or toes. These symptoms are generally mild and begin gradually. Some people may be infected, but present only very mild symptoms or may even be asymptomatic. One in every 6 people who is infected by COVID-19 becomes severely ill and has difficulty breathing.¹

Saliva can play a crucial role in the transmission of COVID-19. Since dental professionals come into intimate contact with the patient's mouth when obtaining radiography and tomography images, the relevance of care is thus of the utmost importance.^{4,5,8} Biosafety measures must be followed by radiology professionals, ranging from the care provided by technicians, to the scheduling of a procedure by the patient, to the moment that the patient leaves the clinic.

The general procedures for scheduling patients and pro-

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*Correspondence to : Dr. Flávio Ricardo Manzi

Department of Oral Radiology, School of Dentistry, Pontifical Catholic University of Minas Gerais. Av. Dom José Gaspar, 500 - Prédio 45, CEP: 30535-901, Belo Horizonte, Minas Gerais, Brazil
Tel) 55-31-33194341, E-mail) dr.manzi77@gmail.com

cessing them at the reception desk are:

- A daily check of the self-reported health condition of the clinic’s dental professionals, with a focus on symptoms such as dry cough, sore throat, fever, and anosmia, among others.³
- Initial triage by telephone or another communication medium to ensure that the patient has not presented any cold/flu symptoms or respiratory symptoms (e.g., difficulties breathing) in the last few days; that the patient has not taken any international trips or come in contact with people who have taken international trips; and that the patient has not come in contact with any person who has presented any COVID-19 symptoms within the last 14 days.^{5,8,9}
- Patients over 60 years of age who are suspected or confirmed to have contracted COVID-19 should not be treated in the daily routine of a dental practice, nor should radiography or tomography be performed, except in the case of an emergency.^{5,8}
- Each patient’s temperature should be checked as soon as he or she enters the clinic. A contact-free forehead thermometer is strongly recommended for the screening. The temperature should always be below 37.3°C.⁵
- Dental care should be spaced out, with a minimum of 30 minutes between one patient and another in order to allow for sanitization and no contact between patients. If there is more than 1 patient in the waiting room, a minimum distance of 2 meters between each should be respected, with marks on each chair.
- Patients should be advised to use masks and should only bring a companion if absolutely necessary. The mask should only be removed at the moment of the exam, at which time it should be taken off carefully and stored in a plastic bag. An extra mask would be the ideal for the patient to wear after finishing the exam.⁵ It is important to note that newspapers, magazines, and decorative objects should be removed from the waiting room, in addition to the removal of drinking fountains in which the tip of the patient’s mouth comes close to the water spout.

When acquiring radiographic and tomographic images, the following measures should be taken by professionals and patients:

- **Professionals:** Professionals should wash their hands before putting on personal protective equipment (PPE), after the procedure, and after sanitizing and disinfecting the examination room. In the healthcare field, hand-

washing is still the hallmark of infection control, using the proper technique for total disinfection.^{3,5} The entire team should use PPE, including masks, gloves, goggles, face shields, an impermeable protective cap, and/or disposable coats and shoe covers.³

- **Patients:** Patients should wash their hands or use 70% alcohol gel upon entering the clinic for dental care and should avoid touching any objects, their face, or their clothes.⁵
- **Clinical environment:** The entire dental care environment should be sanitized and disinfected after the patient leaves: reflectors, chair, equipment, and surfaces with 70% alcohol, with vigorous rubbing, for 30 seconds, or a 0.5% to 1% sodium hypochlorite solution.⁵ In addition, common areas, such as the floor, door handles, chairs, tables, and bathrooms, should be cleaned 4 times per day to reduce the risk of transmission.⁶
- We recommend using a plastic film (PVC) or plastic bag over the X-ray machine’s cylinder heads, X-ray positioners, bite blocks and chin cups, X-ray film, X-ray imaging plates and sensors, reflectors, head rests, and dental chair controls. These should be changed from patient to patient. The doorknobs and X-ray beam triggers should only be used if the dental professional is wearing protective gloves.
- To disinfect the lead apron and the thyroid protector, it should be sanitized with a wipe of 0.5% to 1% sodium hypochlorite solution or 70% alcohol (with vigorous rubbing) between patients.

The choice of imaging examinations and the examination procedures are also important, as described below:

- Extraoral X-rays or cone-beam computed tomography (CBCT) should be preferred in order to avoid the reflexes of vomiting or coughing that can be caused by intraoral X-rays. When intraoral X-rays are indispensable, a double-protection barrier should be used to avoid perforation and cross contamination.^{8,9} We recommend the use of a 40-gram non-woven disposable surgical gown, worn over an impermeable coat, with both tied in the back. After completing the exam, the impermeable cylinder head should be cleaned with a 0.5% to 1% sodium hypochlorite solution or 70% alcohol. At the end of the shift, the non-woven surgical gown should be discarded. It is important to emphasize that when disinfecting the environment and the impermeable coat, professionals should use rubber gloves for heavy cleaning.

– Before beginning to acquire the images, especially when using intraoral techniques, we recommend administering a hydrogen peroxide solution to the patient for 30 seconds (1 part hydrogen peroxide for 1 part water) and then applying a 0.12% chlorhexidine solution. The patient should use a disposable cup rather than a spittoon.^{9,10}

It is important to note that digital images provide higher-quality resolution than printed images, in addition to being more favorable in terms of environmental sustainability and flexibility in sending and transmitting the images. Moreover, printed images increase the risk of disease transmission. Therefore, radiology clinics should make diagnoses remotely and the patients and dentists who request exams should access them online.¹¹

With its high transmissibility and the possibility of asymptomatic carriers, COVID-19 presents a high risk of infection for dental radiology professionals, who could consequently transmit the disease to others.⁵ Thus, teams must understand the transmission routes and must be aware and informed about the strictest precautions in order to hinder the transmission of COVID-19 to other patients and within the community. New information about COVID-19 is appearing daily, and it is important for everyone to stay informed, especially health professionals. Finally, we must not forget that after the peak of the pandemic passes and, consequently, the period of quarantine throughout the world ends, we will be faced with a new normal or a new reality, and we believe that the recommendations put forth in this letter may well continue to be relevant after this pandemic period, for both urgent and elective cases.

References

1. World Health Organization. Coronavirus Disease (COVID-19) pandemic [Internet]. Geneva: World Health Organization; 2020 [cited 2020 Jun 4]. Available from https://www.paho.org/bra/index.php?option=com_content&view=article&id=6101:covid19&Itemid=875.
2. Edmonds JK, Kneipp SM, Campbell L. A call to action for public health nurses during the COVID-19 pandemic. *Public Health Nurs* 2020; 37: 323-4.
3. Mendel JB. COVID-19 pandemic and radiology: facts, resources, and suggestions for near-term protocols. *J Glob Radiol* 2020; 6: 1-5.
4. Sabino-Silva R, Jardim AC, Siqueira WL. Coronavirus COVID-19 impacts to dentistry and potential salivary diagnosis. *Clin Oral Investig* 2020; 24: 1619-21.
5. Peng X, Xu X, Li Y, Cheng L, Zhou X, Ren B. Transmission routes of 2019-nCoV and controls in dental practice. *Int J Oral Sci* 2020; 12: 9.
6. Chandu PE, Nasir MU, Srinivasan S, Klass D, Nicolaou S, Babu SB. Interventional radiology and COVID-19: evidence-based measures to limit transmission. *Diagn Interv Radiol* 2020; 26: 236-40.
7. To KK, Tsang OT, Yip CC, Chan KH, Wu TC, Chan JM, et al. Consistent detection of 2019 novel Coronavirus in saliva. *Clin Infect Dis* 2020; 71: 841-3.
8. Ather A, Patel B, Ruparel NB, Diogenes A, Hargreaves KM. Coronavirus disease 19 (COVID-19): implications for clinical dental care. *J Endod* 2020; 46: 584-95.
9. Meng L, Hua F, Bian Z. Coronavirus disease 2019 (COVID-19): emerging and future challenges for dental and oral medicine. *J Dent Res* 2020; 99: 481-7.
10. Lin Q, Lim JY, Xue K, Yew PY, Owh C, Chee PL, et al. Sanitizing agents for virus inactivation and disinfection. *View* 2020; 1: e16.
11. Yu J, Ding N, Chen H, Liu XJ, He W, Dai WC, et al. Infection control against COVID-19 in Departments of Radiology. *Acad Radiol* 2020; 27: 614-7.