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Oral radiology practice in dental schools during the COVID-19 pandemic: What will be the new normal?

Rocharles Cavalcante Fontenele[1,*], Amanda Farias Gomes[1], Deborah Queiroz Freitas[1]

[1]*Department of Oral Diagnosis, Piracicaba Dental School, University of Campinas, Piracicaba, SP, Brazil*

Dear Editor,

In the course of the last months, coronavirus disease 2019 (COVID-19) has been affecting populations throughout the world and causing serious public health problems, as the virus (severe acute respiratory syndrome coronavirus 2; SARS-CoV-2) responsible for this disease causes severe respiratory disease and has a high potential for transmission.[1,2] According to data announced on July 28, 2020 by the World Health Organization (WHO), COVID-19 has infected more than 16,341,920 million people and caused about 650,805 deaths worldwide. This exceeds the number of deaths that the WHO estimates annually to be caused by viral influenza (250,000 to 500,000 deaths).

Currently, with the improvement of the COVID-19 situation in countries where the number of cases has stabilized or decreased, such as most European and Western Pacific countries and some Asian countries (e.g., New Zealand and Taiwan), social distancing measures have been relaxed and there has consequently been a gradual return to common activities, such as in-person classes and clinical practice in dental schools. Nonetheless, it is important to highlight that as long as there is no effective treatment or vaccine to fight infection by SARS-CoV-2, new waves of transmission will be possible, regardless of the current situation in different countries.[3,4]

The main form of transmission of COVID-19 is through direct or indirect contact with mucous secretions, respiratory droplets, and aerosols from infected patients.[2,5] Thus, dental schools' clinics represent high-risk environments for the transmission of SARS-CoV-2 among patients, undergraduate and graduate students, staff, and professors, since the production of aerosols by ultrasonic devices and high-speed dental handpieces is inevitable during dental care, and professionals are in close proximity to patients' oral cavity.[2,6] When performing dental procedures with a high-speed handpiece or ultrasonic device, the friction between the tooth and the fast-rotating bur could create excessive heat. Thus, to avoid heat gain, there is a universal consensus that a water coolant should be used while performing dental procedures, such as tooth preparation, oral prophylaxis, and oral surgery. The water coolant, however, has the potential to generate aerosols. When combined with fluids in the oral cavity, such as blood and saliva, bioaerosols are created. These bioaerosols are commonly contaminated with bacteria, fungi, and viruses, and can float in the air for a considerable period of time and be inhaled by dentists and other patients.[7] Therefore, the implementation of more rigid infection control measures is mandatory to significantly reduce these risks.

Most individuals infected by SARS-CoV-2 are asymptomatic or have mild symptoms similar to those of other common viral infections (20-68% of all infections).[5] However, the viral load and transmission rate do not seem to be related to the presence or severity of symptoms. Therefore, asymptomatic patients or those with mild symptoms have the same potential for transmission as symptomatic patients.[8] Hence, the return to clinical activities in dental schools may represent an imminent risk for community transmission if stricter biosafety measures are not adopted, regardless of the dental specialty.

Oral radiology centers at dental schools are less susceptible to aerosol production than centers specializing in other fields of dentistry, such as oral surgery, endodontics, restorative dentistry, and periodontics. However, this does not mean that the procedures performed in radiology clinics are not potential sources of COVID-19 transmission among patients, students, and professors.[5] In addition to

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*Correspondence to : Dr. Rocharles Cavalcante Fontenele
Department of Oral Diagnosis, Piracicaba Dental School, University of Campinas, Av. Limeira, 901, Piracicaba 13414-903, Sao Paulo, Brazil
Tel) 55-19-2106-5327, E-mail) rocharlesf@gmail.com

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the preventive protocols already adopted before the pandemic, such as washing hands before and after clinical encounters, the use of personal protective equipment, and disinfection of clinical rooms, some other issues related to clinical activities in oral radiology in dental schools must be considered.

First, it is important to separate undergraduate students into smaller groups and to decrease the number of patient encounters per shift, in order to reduce the flow of people into the clinical environment and to avoid possible crowding. For dental schools that do not have exclusive clinics for imaging exams, meaning that the imaging rooms are integrated into the operating clinics, a minimum distance of 3 meters between the X-ray room and the operating or treatment room should be considered. The reason for this measure is that patients cannot use face masks during image acquisition, which makes them susceptible to cross-contamination with patients being treated in the operating room.[5] The main factor that poses a risk of cross-contamination is the production of aerosols by high-speed handpieces, as they can spread through the air and reach about 3 meters away from the generating source, while remaining in the air for a considerable period of time.[9]

Regarding the practical education of students in the first years of dental school, training in the acquisition of intraoral radiographs should be carried out with anthropomorphic phantoms, thereby avoiding contact with patients, as operators have a particularly high exposure to patients' oral fluids and secretions during intraoral exams.[10] For intermediate and advanced classes, training on the indications and execution of extraoral imaging techniques (e.g., panoramic radiographs) should be preferred over intraoral radiographs.[5] However, professors and supervisors must describe the most appropriate technique for obtaining an adequate image for diagnosis with the lowest possible radiation dose. When the acquisition of intraoral radiographs is mandatory, it is recommended that before the image is acquired, patients rinse their mouths with oxidizing agents, such as 0.12% chlorhexidine or 0.2%[11] or 0.5%[12] povidone-iodine, as SARS-CoV-2 is susceptible to oxidation.[13,14] Moreover, it is important to reinforce the need for students, professors and staff to wear their regular personal protective equipment (i.e. scrubs, level 3 face masks, disposable gloves and caps) in addition to other protective gear, such as disposable surgical gowns, respirator masks (e.g., N95 and FFP2) or equivalent standard masks, goggles, and face shields, regardless of the type of exam to be performed.[15,16]

In more disadvantaged countries, digital radiology may not be realistically accessible. In such cases, the darkrooms used for image processing may be another environment that poses a risk for infection, as they are closed and generally have limited space. Thus, work in these rooms should be limited to a reduced number of students or staff. In dental schools where radiographs are digital, images should always be visualized and evaluated on computer screens. In some places, however, there is still a demand for printed radiographs, which may also represent another source of transmission of COVID-19, since the use of disinfectant solutions on printed images is not recommended because of their potential to impair image quality.[5] Therefore, online transmission of images can be an alternative to minimize this risk. After image acquisition, the patient can be sent home and the referring dental surgeon can receive the images and the report directly through digital media, such as e-mail or clinical sharing platforms.

To conclude, the return to clinical activities in dental schools will be a challenge for all specialties. Although oral radiology clinics are less subject to the production of aerosols than clinics in other specialties, this fact does not justify failing to adopt new biosafety measures for practical and clinical teaching in this area. During and possibly after the COVID-19 pandemic, clinical training at dental schools will not be the same. The changes currently adopted for the individual protection of professionals and patients should be incorporated into clinical practice in order to reduce the risk of cross-infections, both by SARS-CoV-2 and by other existing infectious agents.

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