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JournalScan

Selections from the current literature

Compiled by, Bruce Lee Pihlstrom, DDS, MS

Dental Practice Personnel Are Likely to Be Exposed to the COVID-19 Virus and Must Use Appropriate Infection Control to Prevent Transmission

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(1):9. <https://doi.org/10.1038/s41368-020-0075-9>.

Background. Although many people have mild symptoms when infected with SARS-CoV-2 (the virus that causes COVID-19), it can cause serious and fatal pneumonia, particularly among elderly people and those with preexisting medical conditions. This article reviewed the possible ways COVID-19 virus is spread and methods to control its transmission in dental clinics.

Methods. In the context of the COVID-19 pandemic, the authors reviewed the relevant literature about the virus and made recommendations for controlling its transmission in dental offices.

Results. The authors noted that the COVID-19 virus is commonly spread by direct transmission via coughing, sneezing, and droplet inhalation, as well as by contact transmission with mucous membranes of the mouth, nose, and eyes. The authors also noted that early evidence indicates that the COVID-19 virus might be transmitted directly or indirectly through prolonged high viral loads in the sputum of convalescent patients and by contact with asymptomatic patients.¹ They also indicated that there are reports suggesting that the COVID-19 virus can be transmitted by aerosols produced during medical procedures.² In light of these reports, the authors noted that dental patients and personnel can be exposed to this virus owing to face-to-face communication with patients; frequent exposure to saliva, blood, and aerosols; and the handling of sharp instruments. They outlined how the virus may be spread in the dental office by airborne droplets and particles from patient breathing and coughing, as well as by aerosols containing saliva and blood that are generated by high-speed dental handpieces and ultrasonic scalers. They also noted that the virus can be spread by direct or indirect contact with human fluids, patient materials, contaminated dental instruments, and environmental surfaces. This is especially important because it is known that the COVID-19 virus can persist on surfaces such as metal, glass, or plastic for days.^{3,4} Owing to the likelihood of the COVID-19 virus transmission

in the dental office, the authors made several recommendations to help mitigate the spread of the virus in this setting. These recommendations include identifying patients whose acute symptoms suggest they might have COVID-19 by using various screening questions and taking their temperatures. The authors emphasized the need for practicing strict hand hygiene, wearing appropriate personal protective equipment, using a rubber dam to minimize saliva- and blood-contaminated aerosol and spatter, and avoiding the use of high-speed handpieces and ultrasonic instruments when possible. They also recommended the use of 4-handed dentistry to provide high-volume evacuation of aerosols and fluids. The authors recommended periodontal hand scaling and use of handpieces with antiretraction valves because they have been shown to significantly reduce the backflow of oral bacteria and hepatitis B virus into dental units.⁵ The authors also emphasized the need for strict adherence to cleaning and disinfection of the dental office including door handles, chairs, desks, and other areas that may be exposed to the virus, as well as appropriate management of medical and dental waste.

Why is this study important? This is an important article because during the COVID-19 pandemic, it is critical to prevent cross infection of dental patients and personnel in the dental office. As stated by the Centers for Disease Control and Prevention, COVID-19 is thought to spread mainly through close, person-to-person contact via respiratory droplets from someone who is infected.⁶ Moreover, although people who are infected often have symptoms, some people without symptoms may be able to spread the virus.⁶ Therefore, it is critical that all dental personnel follow strict infection control procedures to limit the spread of this virus. It is important to note that as of this writing, the Centers for Disease Control and Prevention has issued infection control guidance for outpatient ambulatory care facilities⁷ and infection control measures including use of eye protection, gowns, N-95 respirators, and face masks.⁸ The American Dental Association has also made available the Return to Work Interim Guidance Toolkit for all dentists available online at the ADA Coronavirus (COVID-19) Center for Dentists.⁹

1. 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(10):970-971.

2. Wax RS, Christian MD. Practical recommendations for critical care and anesthesiology teams caring for novel coronavirus (2019-nCoV) patients. *Can J Anaesth.* [published online ahead of print February 12, 2020]. <https://doi.org/10.1007/S12630-020-01591-X>.

3. 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(3):246-251.

4. Otter JA, Donskey C, Yezi S, Douthwaite S, Goldenberg SD, Weber DJ. Transmission of SARS and MERS coronaviruses and influenza virus in healthcare settings: the possible role of dry surface contamination. *J Hosp Infect.* 2016;92(3):235-250.

5. Hu T, Li G, Zuo Y, Zhou X. Risk of hepatitis B virus transmission via dental handpieces and evaluation of an anti-suction device for prevention of transmission. *Infect Control Hosp Epidemiol.* 2007;28(1):80-82.

6. Centers for Disease Control and Prevention. Coronavirus Disease 2019 (COVID-19): How the Virus Spreads. <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html>. Accessed April 19, 2020.

7. Centers for Disease Control and Prevention. Coronavirus Disease 2019 (COVID-19): Outpatient and Ambulatory Care Settings: Responding to Community Transmission of COVID-19 in the United States. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/ambulatory-care-settings.html>. Accessed April 19, 2020.

8. Centers for Disease Control and Prevention. Coronavirus Disease 2019 (COVID-19): Infection Control. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control.html>. Accessed April 19, 2020.

9. American Dental Association. ADA Coronavirus (COVID-19) Center for Dentists. Available at: <https://success.ada.org/en/practice-management/patients/infectious-diseases-2019-novel-coronavirus>. Accessed May 8, 2020.

The COVID-19 Virus Is Consistently Found in the Saliva of Infected Patients

To KK, Tsang OT, Chik-Yan Yip C, et al. Consistent detection of 2019 novel coronavirus in saliva. *Clin Infect Dis*. [published online ahead of print February 12, 2020]. <https://doi.org/10.1093/cid/ciaa149>.

Background. As the authors of this study noted, rapid and accurate detection of COVID-19 virus is critical in controlling the outbreak of this viral infection. As currently done, nasopharyngeal and oropharyngeal swabbing for specimen collection requires close contact between patients and health care workers. These procedures may expose health care workers to the virus, can be uncomfortable, and may put patients with coagulation disorders at risk for bleeding. The authors noted that because saliva can be easily collected, it may provide a simple and noninvasive specimen for detection of COVID-19 because it has been shown that other respiratory viruses, including coronaviruses, can be detected in saliva.^{1,2} The purpose of this study was to determine whether the COVID-19 virus can be detected in the saliva of infected patients.

Methods. The investigators collected saliva from 12 hospitalized patients in Hong Kong, aged 37 through 75 years, who had confirmed COVID-19 infection. They used laboratory genetic testing to assay the salivary samples for the COVID-19 virus RNA and culture methods to test for live COVID-19 virus. They also tested samples of saliva over time for 6 of the patients.

Results. The investigators reported that the COVID-19 virus was detected in 11 of the 12 patients and that live virus was found in 3 patients. The investigators also reported that the serial samples showed a gradual decline in viral load after patient hospitalization. One patient continued to shed virus 11 days after hospitalization. The authors concluded that saliva has promise as a noninvasive fluid for use in the diagnosis, monitoring, and infection control of patients with COVID-19.

Why is this study important? Although this was a small, preliminary study, it is important because it showed that COVID-19, which is causing a worldwide pandemic, may be consistently detected in saliva that is self-collected by patients. The results of this study need to be confirmed among a wider and more diverse population, but if confirmed, salivary testing for the COVID-19 virus could vastly simplify surveillance and screening for this virus. Because the COVID-19 virus appears to be highly transmissible, rapid testing of saliva for the virus

could be useful for identifying those who are most likely to transmit it to others.

1. To KK, Lu L, Yip CC, et al. Additional molecular testing of saliva specimens improves the detection of respiratory viruses. *Emerg Microbes Infect*. 2017;6(6):e49.

2. To KKW, Yip CCY, Lai CYW, et al. Saliva as a diagnostic specimen for testing respiratory virus by a point-of-care molecular assay: a diagnostic validity study. *Clin Microbiol Infect*. 2019;25(3):372-378.

COVID-19 Has a Hard, Protective Outer Shell, Which Makes It Highly Resilient in Saliva and in Other Body Fluids

Goh GK, Dunker AK, Foster JA, Uversky VN. Shell disorder analysis predicts greater resilience of the SARS-CoV-2 (COVID-19) outside the body and in body fluids. *Microb Pathog*. 2020;144:104177. <https://doi.org/10.1016/j.micpath.2020.104177>.

Background. As the authors of this study noted, the virus that causes the COVID-19 infectious disease is severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). This virus appears to be more contagious but less fatal than the severe acute respiratory virus (SARS-CoV) that caused disease in 2003. The purpose of this study was to characterize the outer shell of SARS-CoV-2 and determine whether there is anything about it that could account for its quick spread throughout the world.

Methods. The investigators used artificial intelligence and statistical analysis to characterize the protein shell of SARS-CoV-2.

Results. The researchers reported that SARS-CoV-2 has one of the hardest outer shells among all coronaviruses and that this is consistent with the concept that a virus must have a hard shell to survive in harsh environments. The researchers noted that because of its hard-shelled structure, SARS-CoV-2 would be more resistant to digestive enzymes in saliva, mucus, and other bodily fluids.

Why is this study important? This is an important study because, as the authors noted, it may explain why this virus appears to persist in the environment and is more transmissible than other coronaviruses. It may also explain why this virus is able to remain active for a long period and why few viral particles are required to infect someone.

Infection Control Is Critical for Dentists Who Treat Children

Mallineni SK, Innes NP, Raggio DP, Araujo MP, Robertson MD, Jayaraman J. Coronavirus disease (COVID-19): characteristics in children and considerations for dentists providing their care. *Int J Paediatr Dent*. [published online ahead of print April 6, 2020]. <https://doi.org/10.1111/ipd.12653>.

Background. As noted by the authors of this study, dental practices may be areas in which cross infection with

coronavirus occurs and care must be taken to minimize the risk of spreading the infection among oral health care professionals and their patients. The purpose of this article is to report current data on the pediatric population affected with COVID-19 and to highlight considerations for dentists providing care for children during this pandemic.

Methods. The authors reviewed the current information about the coronavirus pandemic and recommendations for controlling its spread that were available at the time the article was published.

Results. The authors noted that although the epidemiologic and clinical characteristics of COVID-19 are still being studied, there is evidence that children's symptoms appear to be milder than those of adults. However, the authors also noted that it is unknown if children with various comorbidities might be at higher risk of developing severe illness. The authors explained that because COVID-19 has a fairly long incubation period of up through 14 days and because children can be asymptomatic or have mild, nonspecific symptoms, all children and parents should be considered to be carriers of the virus unless proven otherwise. This is especially important because many dental

procedures generate aerosols and because the virus can persist on surfaces for several days. The authors stated that during this pandemic, treatment should be provided only when local, regional, and national guidelines are followed as much as possible and, in the oral health care professional's opinion, the care is safe for the child, caregiver, and oral health care provider.

Why is this study important? This is an important article because it reinforces the need for additional information about COVID-19 among children of various ages and comorbidities. It is also important because it emphasized the need for the utmost vigilance and strict attention to universal infection control procedures in the dental office setting. ■

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Dr. Pihlstrom is a professor emeritus, Department of Surgical and Developmental Sciences, School of Dentistry, University of Minnesota, Minneapolis. He is also an independent oral health research consultant.

Disclosure. Dr. Bruce Pihlstrom had no potential or direct conflict of interest with any study summarized in this JSCAN.

Information in this JSCAN was current as of its writing. However, health care professionals need to keep apprised of new information about COVID-19 as it becomes available.