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Coronavirus Transmission In the Dental Setting

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Coronavirus Transmission In the Dental Setting

Oral health professionals should remain up-to-date on the coronavirus, and clinical measures to prevent its transmission in the dental setting.

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PURCHASE COURSE

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EDUCATIONAL OBJECTIVES

After reading this course, the participant should be able to:

1. Describe the nature of coronaviruses, the types of illnesses they cause, and routes of transmission.
2. Discuss the estimated incubation period for 2019 novel coronavirus (COVID-19), and risk factors for various patient populations.
3. Explain appropriate clinical responses to the COVID-19 pandemic, and what oral health professionals can do to prevent its spread in the dental setting.

INTRODUCTION

The 2019 novel coronavirus, which manifests as COVID-19, is described as the defining global health crisis of our time. The most recent disease to be classified by the World Health Organization as a pandemic, COVID-19 joins cholera, bubonic plague, smallpox and influenza as among the most brutal killers in history. As researchers work to develop pharmaceutical interventions for COVID-19, valiant efforts are being made worldwide to prevent or reduce transmission. Health care professionals are facing unprecedented circumstances related to patient care and growing concern about this deadly disease; for example, the American Dental Association recommends that dental practices nationwide postpone elective procedures to slow its spread.

This article reviews the emergence, transmission pathways and symptoms of COVID-19, and also provides clinical strategies to help mitigate the pandemic. As a dental professional and educator, I am confident this article will guide dental teams in complying with best practices and providing care in accordance with U.S. Centers for Disease Control and Prevention guidelines, ultimately protecting patients, staff and the community at large.

—Leann Keefer, RDH, BSEd, MSM
Director, Clinical Services
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By providing care in accordance with recommended asepsis guidelines, dental teams can protect patients and staff and help slow the COVID-19 pandemic.

In late 2019, an outbreak of atypical pneumonia of unknown cause presented in Wuhan in China's Hubei Province. Upon investigation, the confirmed cases were linked to a Wuhan market where wild animals, including marmots, birds, rabbits, bats and snakes, were being traded illegally.[1] On December 31, 2019, the World Health Organization (WHO) was notified of this outbreak by authorities in China. Virological testing disclosed a novel coronavirus in these patients, and, within a few weeks, WHO tentatively named it as 2019 novel coronavirus (2019-nCoV).[2]

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On February 11, 2020, the International Committee on Taxonomy of Viruses announced the new name of the virus as severe acute respiratory syndrome coronavirus, or SARS-CoV-2.[3] This was chosen due to the virus being genetically related to the coronavirus responsible for the SARS outbreak in 2003.[3] On the same day, WHO named the new disease COVID-19, following guidelines previously developed with the World Organization for Animal Health and Food and Agricultural Organization of the United Nations.[3] Regardless of the nomenclature, this fast-spreading disease poses a global health risk. Consequently, dental teams should remain up-to-date on its presentation, and clinical measures to prevent its transmission in the dental setting.

Coronaviruses (CoV) are a large family of viruses that cause illness ranging from respiratory infections (including the common cold to flu-like or pneumonia symptoms), as well as gastrointestinal symptoms — all which may or may not appear and range in severity.[4] Middle East respiratory syndrome (MERS-CoV) and SARS-CoV outbreaks continue to occur globally.[4] A novel coronavirus (nCoV) is a new strain that has not been previously identified in humans, and is considered a zoonotic disease that spreads from animals to humans. Further investigations determined the source of SARS-CoV transmission was from civet cats to humans and MERS-CoV from dromedary camels to humans.[4] Although the specific source of COVID-19 has not been identified, bats and pangolins are currently implicated. As a novel coronavirus, the information scientists have gathered about it may change as researchers and the medical community continue to learn how the virus behaves.[5]

The U.S. Centers for Disease Control and Prevention (CDC) reinforced the need for clinicians to be watchful for exposure to COVID-19, not only with patients who are returning travelers from areas with high incidence of the disease, but also with individuals who have come in contact with those infected.[6] Given the nature of oral health care and disease transmission, dental teams need to stay abreast of this rapidly evolving public health threat.

TRANSMISSION

Cases of COVID-19 continue to spread globally. As of April 9, 2020, more than 1.5 million cases had been reported worldwide, with 89,877 deaths.[7,8] The disease has spread via travel from China to at least 177 countries, with evidence of sustained transmission on six continents.[8] As of April 9, 2020, the United States had more than 395,000 confirmed cases across all 50 states, with 12,754 deaths.[7,9,10]

Chinese officials confirmed the COVID-19 outbreak was associated with the Huanan Seafood Market, a "wet market" in Wuhan.[11] Wet markets sell live fish and animals, and have a history of transmitting viruses. Typically, purchases are immediately slaughtered on site, which can cause particles of infectious bacteria or viruses to become aerosolized and transmit from animals to people.[11] Investigators suspect that someone purchased contaminated meat, became sick before or after consuming it, and spread the infection to others.[12] Though the virus can spread by consuming infected animals, it can also spread through coughing, sneezing and close contact with an infected person or an object carrying the virus.[12]

According to CDC officials, it may be possible to contract COVID-19 by touching a surface or object that has the virus on it and then touching the mouth, nose or possibly eyes, but this is not a confirmed primary mode of transmission.[12] With most respiratory viruses, people are typically considered most contagious when they present with acute symptoms.[12] Presently, it is not clear how contagious those infected with the virus are during the incubation period; however, there have been reports of transmission in individuals who show no signs or symptoms of the disease.[13]

SIGNS, SYMPTOMS AND PREVENTION

Signs and symptoms of COVID-19 are similar to other respiratory illnesses, and can include runny nose, sore throat, fever, cough, shortness of breath, and breathing difficulties. In more advanced cases, infections can lead to pneumonia, severe acute respiratory syndrome, kidney failure and death.[4,14] Because the symptoms of the coronavirus are similar to that of other common respiratory infections (such as a cold or flu), a definitive diagnosis can only be made with a laboratory test.[4,14]

The severity of symptoms in confirmed cases has ranged from no or mild symptoms to severe.[15] The incubation period — as reported by the CDC at presstime — is between two to 14 days from exposure to the occurrence of disease signs and symptoms.[15] By comparison, WHO estimates that incubation ranges between one and 12.5 days, with a median of five to six days.[14] The estimates for the incubation period for COVID-19 are based on previous observations with other coronavirus diseases, such as SARS and MERS.[14,15]

The elderly and individuals who present with preexisting medical conditions, such as heart disease, high blood pressure, cancer, diabetes or lung conditions, seem to experience more serious complications.[15] At this time, there is no research regarding the susceptibility of pregnant women to the virus, and no evidence to suggest children are at increased risk.[16]

On January 30, 2020, WHO classified the rapidly spreading outbreak as a Public Health Emergency of International Concern,[5,17] and on March 11 WHO declared it a pandemic. In response to the outbreak, the CDC has partnered with health officials and health care systems to reduce the impact of the virus and reinforce infection prevention principles. The CDC is using a 2017 Morbidity and Mortality Weekly Report as a blueprint for community interventions and adapting it to COVID-19.[18,19] With no vaccine available to prevent coronavirus disease, the CDC recommends everyday preventive actions to halt the spread of respiratory diseases, including COVID-19 (Table 1).[20]

TABLE 1. Everyday Actions to Prevent the Spread of Respiratory Diseases[20]

- Wash your hands often with soap and water for at least 20 seconds, especially after going to the bathroom, before eating, and after blowing your nose, coughing or sneezing.
- If soap and water are not readily available, use an alcohol-based hand sanitizer with at least 60% alcohol. Always wash hands with soap and water if hands are visibly dirty.
- Avoid close contact with people who are sick.
- Avoid touching your eyes, nose and mouth.
- Stay home when you are sick.
- Cover your mouth with a tissue when you sneeze and throw the tissue in the trash.
- Clean and disinfect frequently touched objects and surfaces using regular household cleaning sprays or wipes.
- In response to COVID-19, the U.S. Centers for Disease Control and Prevention suggests that all individuals should wear cloth face coverings when out in public.
- People who show symptoms of COVID-19 should use face masks to help prevent the spread of the disease.
- The use of face masks is crucial for health care workers and individuals who are taking care of someone in close settings (at home or in a health care facility).

RESOURCES FOR CLINICIANS

The CDC maintains a comprehensive site for health care professionals that includes preparedness resources to assist providers, clinics and hospitals when managing patients with potential or confirmed cases of COVID-19. These assets include a flowchart to help identify and assess patients who may be ill with, or who may have been exposed to the disease.[21]

The CDC also offers a clinical criteria form to guide evaluation for individuals under investigation for COVID-19 based on what is known about MERS-CoV and SARS-CoV.[22] In the event a person under investigation for COVID-19 presents in dental practice, clinicians should immediately notify the appropriate infection prevention personnel at their health care facility, as well as local and state health departments.[22]

The American Dental Association (ADA) and American Dental Hygienists' Association have issued statements and provided resources related to COVID-19.[23,24] As of presstime, each organization also recommends that oral health professionals postpone elective and nonemergency procedures, but remain available for dental emergencies that are considered "potentially life threatening," according to the ADA.[23,24] Once active practice resumes, it will be more important than ever for dental settings to follow standard precautions and infection control, as outlined in the CDC's Guidelines for Infection Control in Dental Health-Care Settings — 2003.[25]

TABLE 2. Recommendations for Minimizing Exposure to COVID-19 in Dental Settings[20]

Medical History Interview	Questions to Ask Patient	Recommendations
Prior to Appointment	• Have you traveled outside of the country or within a geographical area that has a high incidence of COVID-19 in the last 14 days? • Have you been in close contact with anyone who has traveled outside the country or within a geographical area that has high incidences of COVID-19 in the last 14 days? • Do you have a cold or any respiratory issues? • Do you have a fever or have you had a fever within the last 14 days? • Do you have a sore throat?	• If "yes" to any one of these questions, postpone patient care • Advise patient to seek medical attention (if he/she has not already done so) • Instruct patient to reschedule when free from signs/symptoms of ailment
Upon Arrival	• Same questions as above if not able to interview patient prior to the dental visit	• Same as above
During Appointment	• If the patient exhibits signs and symptoms during care (e.g., respiratory symptoms, cough, runny nose or feverish), clinicians should:	• Stop patient care • Advise patient to seek medical attention • Instruct patient to reschedule when free from signs/ symptoms of ailment

Dental health care personnel (DHCP) who are in contact with patients, and whose responsibilities include cleaning and disinfecting, handling contaminated supplies or equipment, and who work in proximity to potentially contaminated surfaces, should diligently follow all infection prevention procedures.[20] To prevent infections from spreading during health care delivery, an effective asepsis protocol — including administrative rules, engineering controls, environmental hygiene, correct work practices, and appropriate use of personal protective equipment (PPE) — is essential. The CDC provides infection control guidance for health care settings.[20] These are basic rationale and techniques familiar to DHCP for exposure control, including hand hygiene. Recommendations for minimizing exposure to COVID-19 in the dental setting (Table 2) include taking a comprehensive medical history, and implementing a facility compliance and prevention plan (Table 3). A recent literature review on coronaviruses,

including SARS, MERS and endemic human coronaviruses, revealed that each can remain on surfaces — such as metal, glass or plastic — for up to nine days. Surface disinfectant protocols with 62% to 71% ethanol (rubbing) alcohol, 0.5% hydrogen peroxide, or 0.1% sodium hypochlorite (bleach) can inactivate the viruses within 60 seconds of contact time.[26]

TABLE 3. Facility Compliance and Prevention Plan

Supplies: Provide supplies for respiratory hygiene and cough etiquette, including 60% to 95% alcohol-based hand sanitizer and tissues, as well as no-touch receptacles for disposal.[20]

Use Caution When Performing Aerosol-Generating Procedures[20]

- Some procedures performed on patients with respiratory infections could generate infectious aerosols.
- Procedures that are likely to induce coughing (e.g., involving use of a handpiece or ultrasonic instrumentation) should be performed cautiously using a Level 3 face mask.[28]

Train and Educate Health Care Personnel[20]

- Provide health care personnel (HCP) with job- or task-specific education and training on preventing transmission of infectious agents, including refresher training.
- Ensure that HCP are educated, trained, and have practiced the appropriate use of personal protective equipment (PPE) before providing care.
- Confirm correct use of PPE and prevention of contamination of clothing, skin and environment during the process of removing such equipment.

PERSONAL PROTECTIVE EQUIPMENT

The CDC's Guidelines for Infection Control in Dental Health-Care Settings — 2003 discuss the use of PPE to prevent potentially infectious splash, spatter and aerosols generated during rinsing, or when using handpieces and other devices (such as ultrasonic units).[25] Employers should select appropriate PPE and provide it to DHCP in accordance with the Occupational Safety and Health Administration's PPE standards (29 CFR 1910 Subpart 1).[27] Dental teams must receive training and demonstrate an understanding of when to use PPE; what PPE is necessary; how to properly don, use and doff PPE to prevent self-contamination; how to properly dispose of or disinfect and maintain PPE; and the limitations of protective equipment (Table 4).[28,29]

Dental face masks are an important physical barrier to fluids and particulate matter and are worn during procedures that involve possible aerosols, splash or spatter.[28] According to the U.S. Food and Drug Administration, a surgical face mask covers the user's nose and mouth, and is

labeled as a surgical, laser, isolation, dental or medical procedure mask (with or without a face shield).[30] There are multiple levels of mask protection for DHCP, each identified according to bacterial filtration and particulate filtration efficiency levels that correspond to the demands of a given dental procedure.[28] Health care and institutional settings use respirators that are at least as protective as an N95 respirator before entry into the patient care area. Oral health professionals working in facilities with high infectious disease transmission potential, such as hospitals, long-term care facilities, and dental care units located in these type of settings, may warrant use of an N95 respirator.

TABLE 4. Personal Protective Equipment

Gloves

- Perform hand hygiene, then put on clean, non-sterile gloves prior to patient care. Change gloves if they become torn or heavily contaminated.
- Remove and discard gloves when patient care is completed, and immediately perform hand hygiene.

Face Mask Protection[28]

Level 1 masks provide a protection value of ≥ 95% bacterial filtration efficiency (BFE) and particulate filtration efficiency (PFE); these are suitable for brief examinations, exposing radiographs and cleaning tasks.

Level 2 masks offer a moderate protection of ≥ 98% BFE and PFE, and are preferable for procedures that involve a moderate level of aerosols, such as hand instrumentation or applying sealants.

Level 3 masks offer a high level of protection of ≥ 98% BFE and PFE, and are used for procedures involving high levels of aerosols, such as ultrasonic scaling, surgical procedures and crown preparation.

Maximum filtration masks, such as an N95 particulate respirator, feature 99.9% PFE and are indicated when treating patients with airborne diseases.

Eye Protection

- Wear eye protection (e.g., safety glasses or a disposable face shield that covers the front and sides of the face) upon entry to the patient care area.
- Remove eye protection before leaving the patient care area.
- Reusable eye protection (e.g., safety glasses) must be cleaned and disinfected according to manufacturer's reprocessing instructions prior to reuse.
- Disposable eye protection should be discarded after use.
- Dental loupes must be cleaned and disinfected between each patient to avoid cross-contamination risks.[29]

SUMMARY

All health care personnel need to be prepared for, and remain informed about, COVID-19, its ongoing status and updates, and preventive measures to avoid disease transmission. Oral health professionals have a responsibility to be knowledgeable about infectious diseases. Providers should also be prepared to reassure patients their clinic adheres to the highest

standards of infection control. By maintaining a standard of care that is in accordance with CDC guidelines, dental teams can effectively contribute to disease prevention and help slow the coronavirus pandemic.

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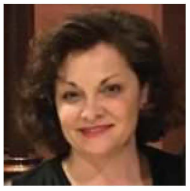

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