

Introduction

In December 2019, China's largest city in the Hubei province, Wuhan, reported several cases of a pneumonia of unknown etiology. The causative agent was determined to be a subtype of the coronavirus family, now labeled SARS-CoV2 or COVID-19. Two other outbreaks have occurred within the last 20 years from the coronavirus family: SARS CoV and MERS CoV. Unlike the current outbreak, these zoonotic infections (infections from non-human animals spreading to humans) were controlled mainly by quarantine. Transmission among people was rare. However, the current COVID-19 virus is extremely contagious and has rapidly spread worldwide. The first reported case in the United States occurred on January 22, 2020. It has now spread to all 50 states in the U.S. On March 19, 2020, Governor Newsom ordered a shelter in place for the entire state of California.

Virulence of COVID-19

The COVID-19 virus is extremely virulent with a reproductive number (R_0) of 2. This means one infected person will infect two additional people. Chinese researchers estimated an R_0 of 3.3 to 5.47. Statistically, any R_0 value > 1 will produce an exponential rise in cases, which has been shown to be the case worldwide. The COVID-19 virus differs from other viral infections such as influenza, for instance, by its infectivity, increased morbidity and mortality, the subclinical spread (ability of clinically asymptomatic individuals to spread the virus) and the longer incubation period. Furthermore, at least two different subtypes, or strains have emerged. This is a respiratory pathogen with transmission occurring from respiratory droplets from coughing

and sneezing. Aerosol transmission is also possible in cases of exposure to elevated aerosol concentrations in closed spaces. The incubation time is generally within 3 to 7 days with reports being as long as 12 days before symptoms appear.

Vulnerable entry points for the virus to invade the body include inhalation of the virus through the nose and mouth as well as via the eyes. A report published in the British Journal of Ophthalmology in March 2020 revealed that one of the healthcare workers, despite being fully gowned with a protective suit and N95 respirator, was still infected by the virus with the first symptom being unilateral conjunctivitis, followed by development of a fever a few hours later.

Oral & Maxillofacial Surgeons/Dentists among highest risk for Health Care

Workers

Oral & Maxillofacial Surgeons, by nature of our specialty, are at particularly high risk for acquisition of this virus. The Centers for Disease Control (CDC) has recognized this in their recent COVID-19 recommendations.

The practice of dentistry involves the use of rotary dental and surgical instruments such as handpieces or ultrasonic scalers and air-water syringes. These instruments create a visible spray that contains large particle droplets of water, saliva, blood, microorganisms, and other debris. This spatter travels only a short distance and settles out quickly, landing on the floor, nearby operatory surfaces, DHCP, or the patient. The spray also might contain certain aerosols. Surgical masks protect mucous membranes of the mouth and nose from droplet spatter, but they do not provide complete protection against inhalation of airborne infectious agents.

Furthermore, our proximity to the nose and mouth of the patient puts us at even higher risk than other health care workers (HCW). Of note, however, the difference between aerosols generated by high-speed dental handpieces for restorative procedures (300,000-450,000 rpm) versus surgical handpieces (up to 45,000 rpm) has not yet been thoroughly investigated. Thus, clinical judgement when utilizing any type of rotary instrument is advised.

Testing

To date, the most accurate test for COVID-19 infection is the RT-PCR test (reverse transcriptase polymerase chain reaction). This is a test for the actual RNA of the virus by conversion to DNA and then looking for parts of the specific viral genome of the SARS-COVID-19. This has reported sensitivity and specificity rates of 90 percent and above. Samples for testing are obtained by a nasopharyngeal swab. While this is considered the “gold standard” and is highly accurate, false negatives can occur if a faulty sample was taken or if the sample was taken too early or too late in the infection cycle. Lack of availability of test kits and long processing times have hindered widespread testing.

Recently, rapid test kits have now come on the market. These test kits usually test for antibodies (IgG and IgM) to the COVID-19 virus and the results are available usually within an hour. A positive test can indicate that the patient has been exposed at some point to the Sars-CoV2 virus. It will not, however, give information if the patient is actively shedding viral particles. Studies have shown shedding of viral RNA from sputum outlasting the end of

symptoms. To date, over 50 manufacturers have applied for and received emergency use authorizations (EUA)'s for serologic testing kits.

Geographic differences in availability of testing vary widely through the state of California. Some locales are able to test asymptomatic patients while other locations are only testing symptomatic suspected COVID-19 patients.

Personal Protective Equipment (PPE)

Because of the nature of the transmission of the virus and the aerosolization in the procedures that are performed, respiratory protection is of utmost importance. The highest degree of respiratory protection is the PAPR (Powered air purifying respirator). This consists of a respirator in the form of a hood or full face mask which takes ambient air that is contaminated and actively removes it (filters) and then delivers clean air to the user's face and mouth. While offering the greatest protection, PAPRs are extremely rare to the Oral & Maxillofacial Surgeon, and generally prohibitive for the scope of work the surgeon encounters. Upon the outbreak of the pandemic, extreme demand for PAPRs have made acquisition of them extremely difficult.

More commonly used are N95 face masks or full or half masks respirators with N95 or P100 filters. The N95 face mask is a disposable face mask made of a polypropylene filter with a polyester shell. The outer surface is a coverweb with electrostatically charged microfiber filter media. The 95 designation indicates it filters 95% of particles greater than 0.3 microns in size.

While the COVID-19 virus is approximately .125 microns, transmission often occurs with viral particles traveling in biologic aerosols (larger particles) ranging in size from 0.5-3 microns.

Half or full facepiece respirators are made of silicone material that fit over the entire face or just the nose and mouth. Two disposable filter cartridges attach to the facepiece. The N, R or P classification is indicative of resistance to oil. The 100 designation indicates filtration capability of 99.97% of airborne particles.

Surgical masks are the most commonly used in the oral and maxillofacial surgery practice. They are used as a physical barrier to protect the user from hazards, such as splashes of large droplets of blood or body fluids as well as protection of the patient and other fellow HCW from the person wearing the mask. They are not designed or certified to prevent the inhalation of small airborne contaminants. As they do not fit tightly against the face, small particles can pass through the gaps between the face and mask. Their ability to filter small particles vary significantly based upon the type of material used to make the mask. Only FDA approved masks can be legally marketed in the United States and have been tested for their ability to resist blood and body fluids.

Other types of PPE already commonly in use are safety goggles, face shields, hair covering, waterproof surgical gown, gloves, and shoe covers.

Latest Centers for Disease Control and Prevention (CDC) Guidelines

The latest CDC Guidelines for dental practitioners were updated April 27, 2020.

CALAOMS agrees with CDC guidelines for known COVID-19 positive or suspected COVID-19 positive patients.

If a patient arrives at your facility and is suspected or confirmed to have COVID-19, take the following actions:

- Defer dental treatment
 - Give the patient a mask to cover his or her nose and mouth.
 - If not acutely sick, send the patient home and instruct the patient to [call a medical provider](#).
 - If acutely sick (for example, has trouble breathing) refer the patient to a medical facility.

If emergency dental care is medically necessary for a patient who has, or is suspected of having COVID-19, [Airborne Precautions](#) (an isolation room with negative pressure relative to the surrounding area and use of an N95 filtering disposable respirator for persons entering the room) should be followed. Dental treatment should be provided in a hospital or other facility that can treat the patient using the appropriate precautions.

Furthermore, current CDC Guidelines for Procedures on Patients who are Not Symptomatic for COVID-19 and Without Known Exposure to COVID-19 are as follows:

- Respirator or surgical mask:
 - **Before entering a patient room or care area**, put on one of the following:
 - An N95 respirator^[5] or a respirator that offers a higher level of protection such as other disposable filtering facepiece respirators, powered air-purifying respirators (PAPRs), or elastomeric respirators.
 - If a respirator is not available, use a combination of a surgical mask and full-face shield. Ensure that the mask is cleared by the [US Food and Drug Administration \(FDA\) as a surgical mask](#).
 - **During aerosol-generating procedures** (e.g. use of dental handpieces, air/water syringe, ultrasonic scalers), put on one of the following:
 - An N95 respirator or a respirator that offers a higher level of protection such as other disposable filtering facepiece respirators, powered air-purifying respirators (PAPRs), or elastomeric respirators.
 - **After exiting the patient's room or care area and closing the door** (if present), take into consideration that most dental procedures generate droplets, spatter, and aerosols:
 - Remove and discard disposable respirators and surgical masks.
 - Perform hand hygiene after removing the respirator or facemask.
- Eye Protection
 - **Before entering the patient room or care area**, put on eye protection (i.e., goggles or a full-face shield that covers the front and sides of the face).

- Personal eyeglasses and contact lenses are NOT considered adequate eye protection.
- If respirators are not available and surgical masks are used, wear a full-face shield.
- **After leaving the patient room or care area:**
 - Remove eye protection.
 - Clean and disinfect reusable eye protection according to manufacturer's reprocessing instructions prior to reuse.
 - Discard disposable eye protection after use.
- **Gloves**
 - **Before entering the patient room or care area**, put on clean, non-sterile gloves.
 - Change gloves if they become torn or heavily contaminated.
 - **Before leaving the patient room or care area:**
 - Remove and discard gloves.
 - Immediately perform hand hygiene.
- **Gowns**
 - Before entering the patient room or area, put on a clean isolation gown.
 - Change gown if it becomes soiled.
 - **Before leaving the patient room or area**, remove and discard the gown in a dedicated container for waste or linen.
 - Discard disposable gowns after use.
 - [Launder](#) cloth gowns after each use.
 - If there are shortages of gowns, they should be prioritized for:
 - Aerosol-generating procedures.
 - Clinical procedures where splashes and sprays are anticipated.

If a surgical mask and a full face shield are not available, do not perform any emergency dental care. Refer the patient to a clinician who has the appropriate PPE.

CALAOMS recommendations following lifting of the shelter in place order

Commensurate with federal, state, county and local guidelines for return to work, CALAOMS recommends the following guidelines to ensure the utmost safety of patients, staff, surgeons and the general public. The California Department of Public Health (CDPH) issued updated guidelines on May 7, 2020. CALAOMS agrees and has incorporated these principles as well.

At the time of this writing, testing is a rapidly evolving and controversial subject, if available to the common practitioner. While there is some evidence that suggests RT-PCR and/or

Immunoglobulin Assay testing may eventually play a role in the Oral & Maxillofacial Surgeon's management, it is not to be a substitute for sound clinical judgment.

Rather, patients should be carefully screened when calling for an appointment. Questioning for symptoms of fever, cough, shaking chills, diarrhea of unknown origin, conjunctivitis, sore throat, body aches, anosmia, or headaches within the last 2 weeks should be done. Inquiry as to recent travel or contact with a known COVID-19 positive patient in the past 14 days should also be done as well. Telehealth platforms can be utilized to confirm the patient's health status. Any positive responses should be referred to a physician. If any of the above factors are positive, COVID-19 testing should occur prior to care as well as a consultation with the patient's medical provider. Deferral of elective procedures should be undertaken for three weeks. Consultation with the medical provider is critical if the patient exhibits symptoms consistent with COVID-19, but has a negative test result. If the procedure is deemed emergent, then appropriate PCR testing should be performed and if positive, the procedure should be performed in the hospital under appropriate conditions which may include a negative pressure room with the surgeon protected by a PAPR. If the procedure can be deferred for the three weeks, a repeat PCR test taken within 24 hours prior to the procedure. may be indicated prior to the office visit. A pre-operative temperature and pulse oximeter reading should be taken at each patient visit.

Symptomatic patients with a positive COVID-19 test should have the oral surgical procedure deferred if possible. If a procedure is deemed emergent, then the surgery should be performed

in a hospital environment, in a negative pressure room with surgeon and staff in PAPR as well as other appropriate PPE outlined above, if feasible.

Additionally, staff should be screened daily for symptoms of COVID-19 with similar inquiries as above. Any patients or staff with suspected or confirmed COVID-19 should not enter the office.

Any staff member that develops the above symptoms while at work should be sent home immediately and asked to self-isolate pending testing confirmation. Local county and state mandates for sick employees should be followed.

For persons (either patients or staff) with suspected or confirmed COVID-19, resolution of symptoms defined as 72 hours since last fever without anti-fever medications, and improved cough or other respiratory symptoms AND 10 days since symptom onset should have elapsed prior to allowing the patient/staff to return to the office.

Until advised otherwise, “physical distancing” measures will continue, including considering seating arrangements in the waiting room. Limiting the number of patients in the office or clinic at any one time to maintain physical distancing of a minimum of six feet between patients is encouraged. Many Oral & Maxillofacial Surgeons will urge patients to wait in their car until a room becomes ready. Furthermore, all patients are masked upon entry to the office. Removal of the mask occurs immediately prior to the procedure. Appropriate signage should be posted instructing patients on standard recommendations for respiratory hygiene/cough etiquette and social distancing. Minimizing surfaces the patient needs to touch should be undertaken as well

as frequent disinfection of such surfaces. A pre procedural rinse of hydrogen peroxide diluted to 1.5% should be done for 60 seconds prior to surgery. Use of a throat pack or sponge, an already standard procedure in most oral and maxillofacial procedures, will also minimize transmission of the virus from the oropharynx.

Treatment of an asymptomatic patient should be undertaken with universal precautions to include goggles/eye protection, N95 mask or equivalent, face shield, gown, and gloves. Use of a handpiece or aerosolization will attempt to be avoided.

Decontamination of the operatory should follow CDC guidelines for Infection Control in Dental Health –Care Settings—2003. Routine cleaning and disinfection procedures should be used with an EPA registered, hospital grade disinfectant (Lisa N on the EPA website for EPA registered disinfectants). Proper orientation of staff to donning and doffing PPE protocols should be undertaken prior to opening with strict adherence to these principles subsequently. An observer is often helpful to maintain compliance. Proper PPE protocols are of the utmost importance and cannot be substituted for other adjunctive measures mentioned in this statement.

In the absence of widespread testing or vaccinations, a more cautious approach is appropriate. A patient may present as asymptomatic and still be communicable. Attempting to minimize the spread of aerosolized particles is encouraged. However, intrinsic to our specialty, the use of a handpiece often cannot be avoided.

A HEPA air filtration unit may be considered, as it may aid in removing contaminants from the air. Consideration of a portable or central HEPA filtration unit is an acceptable adjunctive modality in the process of prevention of disease transmission.

Ultraviolet light has also been used to decontaminate surfaces. Several studies have been conducted to determine its efficacy. The ultraviolet light is absorbed by RNA or DNA by cells or microbes and induces apoptosis which interferes with the organism's ability to replicate. UVC has short wavelength and high intensity but the intensity decreases exponentially with increasing distance from the light source. Additionally, often shadows are created where the surface in the shadow does not get decontaminated. If the surgeon chooses to utilize this technology, ensuring the proper exposure time and intensity levels affects levels of effectivity. The ability to thoroughly decontaminate the operatory, length of time needed for exposure as well as the potential hazards of UV light must all be taken into consideration before implementing its use.

Another potential decontamination aide is electrostatic disinfection. This uses a specialized solution which is atomized by an electrode inside a sprayer which sprays positively charged particles that can adhere to surfaces and objects. The advantage of this method is said to be useful for unevenly or awkwardly shaped objects or hard to reach surfaces in a room. This enhances the appropriate sanitizers to wrap around and evenly coat all types of surfaces for a more complete clean.

The above recommendations are based upon current information about this disease as of the date of this document. This is a very fluid, unprecedented situation and the recommendations and guidelines are subject to change as more information becomes known. Ultimately, it is our responsibility to exercise cautious and sound clinical judgment.

