

Aerosol Management Blog Series

Research has shown COVID-19 is transmitted through aerosols. To combat this the CDC recommends aerosol management practices for dental offices. In the following three-part blog series Dr. McAllister Castelaz, the dental director at Horizon Health Services Ivor Dental Center shares how aerosol management is reshaping dental care.

Part One: Communicating with Patients

Aerosol and aerosol management is top of mind as dentists reopen. While the terminology may make sense to health providers, aerosols can sound dangerous to our patients. In fact, many may only think of aerosols as part of hairspray. It's our job in the health care field to help assuage patient's fears and help them feel comfortable going back to the dentist. In this blog and the following blogs on aerosols I'll share ways dental providers and members of the health care community can help address concerns around aerosols.

Let's begin with an overview of what aerosols are and the role they play in dental care. I like to share the three points below with my patients.

Aerosols are created in more than one way

Aerosols are tiny particles that exist in the air, they are produced in several ways in a dental setting. For instance, when a dentist performs a filling they use a drill that sprays water to prepare the tooth. When the water meets the tooth some of it sprays back into the air, and with it comes any bacteria that might have been in the person's mouth, these microscopic particles can become suspended in the air, i.e. aerosolized. Aerosols can also be produced when a hygienist performs a standard dental cleaning. During a cleaning, the hygienist uses an ultrasonic scaler that sprays water. This water removes plaque from the patient's teeth which creates aerosols or splatter. These procedures are important to good oral health and aerosols are simply a necessary byproduct.

Aerosols are all around us

I try to emphasize to my patients that aerosols are nothing new; they exist in the air all the time no matter where you are. What is changing is how we understand the implications these aerosols have on the health and safety of our dental team and our patients, and dentists are taking steps to address them. The dental community is no stranger to bacteria and viruses and how they relate to our delivery of care. As part of a patient's intake, we collect a complete medical history to understand other health factors that may influence the outcomes of a patient's dental treatment. Aerosol management is just another way we seek to keep our patient's healthy.

Dentists are working hard to keep patients and team members safe

The COVID-19 pandemic is an opportunity for dentistry to re-examine other measures to keep their dental team safe and healthy and prevent transmission of disease from patient-to-patient. There are new recommendations on how to approach this, some a patient will be able to see in the office and other safety changes may not be noticeable for patients. In the next blog in our aerosol series, I'll share some of these changes.

Additional resources

[Aerosols and splatter in dentistry](#): A brief review of the literature and infection control implications

[Dentistry's Aerosols: Giving the Dangerous Bugs the Attention they Deserve](#)

Part Two: Clinical Updates

In part one of the aerosol blog series, I shared how dentists should be prepared to address any concerns patients may have about aerosols. In this second blog, I look at how we as clinicians can use the latest research and guidelines to implement aerosol management practices.

Why dentists are making changes to limit aerosols

Before the COVID-19 pandemic, my choice of suction was dependent on the procedure I was performing and aerosol production was not my first thought. Now, with new CDC recommendations and efforts to provide dental care in the safest possible environment, we are re-examining our practices.

The ADA webinar: "[The Role of Aerosol on the Transmission of Coronavirus and the Impact in Dentistry](#)" shows why dentists are taking aerosols seriously. Petri dishes were placed at various locations along the patient, dentist, and dental assistant as well as in different locations of the dental operatory.

Five different procedures were performed, and the study found that with any of the procedures the petri dish placed on the patient's chest consistently grew significantly more colonies than other petri dishes. Additionally, depending on the area that where work occurred, the dentist or the dental assistant's petri dishes demonstrated more growth of colonies. The growths represent the ability of bacteria, viruses, and other aerosols to travel beyond the patient's mouth and survive on other surfaces, spreading beyond the mouth. Steps to help eliminate potential sources of transmission and possible infection are more important than ever.

The ways dentists are addressing aerosols

Dentistry is a field well in-tuned with infection control and engineering measures, many of the CDC interim COVID-19 recommendations for dental settings take advantage of familiar engineering controls. For example, in the past, we've used high volume evacuation (HVE), which is a type of suction that draws in a large volume of air over a short period of time, during a filling appointment. As I prepare a tooth with my high-speed handpiece (drill) that sprays water, my assistant holds the HVE suction next to the area where I am working to capture all the splatter and aerosols generated as a result. Before COVID-19, sometimes we would opt to use a different type of suction more for the patient's comfort. Occasionally, I would perform dental work without an assistant and maneuver the suction and my handpiece as I did in dental school. However, the HVE is now the standard suction used and I am always assisted during an aerosol-generating procedure.

In addition to increased utilization of an HVE suction and always assisted aerosol-generating procedures, dentists are more frequently placing rubber dams when performing restorative appointments. A rubber dam is a stretchy material that is placed over a patient's mouth to aid in the isolation of a single tooth or multiple teeth in the area where a dentist is working. The rubber dam creates a barrier between the patient's mouth and outside environment and improves isolation of the dentist's working field. There are many styles and techniques of rubber dam placement, but here is a [general tutorial](#). The rubber dam not only creates a barrier between the patient's mouth and environment, but it can also aid in minimizing the spread of aerosols during a dental procedure. Not all dental procedures are suited for rubber dams, nor are all patients able to tolerate rubber dams, however, they can provide a valuable addition to aerosol management.

A few weeks ago, the CDC removed its recommendation for wait time between cleaning and disinfection of rooms for patients who are not suspected to be COVID-19 positive. Initially, the CDC recommending the wait time to allow aerosols to settle on surfaces, then these surfaces could be wiped and disinfected effectively using FDA approved products. However, there was little evidence to support this need to settle and that following infection control protocols with FDA approved cleaning and disinfectants was appropriate. Instead, greater emphasis was placed on optimal ventilation in the dental offices.

Both the CDC and OSHA have emphasized the importance of well-maintained ventilation systems during this time as well. In my clinic before opening again, we consulted with an HVAC professional and updated our HVAC system to the best of our ability to his recommendations to align with CDC and OSHA guidelines.

Along with well-maintained HVAC systems, the CDC's updated guidance also suggests the placement of a portable HEPA filtration device. HEPA, which stands for high-efficiency particulate air, is a device that forces air through a mesh filter that catches pollen, dust, and other particulates in the air. While I am aware of dental colleagues who utilized these devices before the COVID-19 pandemic and others who have installed them since the pandemic, it is important to understand there is still little independent research that demonstrates the efficacy of these devices.

My clinical techniques will change as well as the appearance of our dental offices, but the goal will remain the same, to provide safe, effective dental care. Sharing information with patients on the changes we're making and why will build confidence that going to see the dentist is safe. In the next and final part of our aerosol series, I'll share how minimally invasive techniques can be added to reduce aerosols and improve overall health.

Part Three: Minimally Invasive Dentistry and Aerosols

In parts one and two of the aerosol series I shared how to communicate with patients about what aerosols are, and some of the changes I am taking in my dental office. In this last blog, I'll share techniques that I am using that are less aerosol-generating and less invasive. These are techniques I used before COVID-19 and continue to utilize when they are clinically appropriate. I emphasize with these patients that the success of these techniques can be enhanced by following good home care including brushing at least twice a day with a fluoridated toothpaste, flossing once a day, consuming a low-sugar, low-acid diet, and other traditional at home preventive measures. You can learn more about the principles of minimally invasive dentistry in [this blog](#).

Silver Diamine Fluoride

Silver diamine fluoride, or SDF, is a topical treatment that can be used on both children and adult teeth to halt decay. Traditional fluoride varnish is a well-established primary, preventive measure to guard teeth against decay. When fluoride comes in contact with our teeth, such as through varnish application by the dentist, it becomes incorporated in the structure of our teeth which makes our teeth more resistant to the bacteria that cause decay. SDF has an additional benefit that if the tooth has already begun to decay, it can halt that process, making it significantly stronger than traditional fluoride varnish. Applying SDF is a short process, requires minimal materials, and can easily be incorporated into another appointment. It is important to understand that the SDF application does not indicate that the tooth may never need a filling, however it can slow the process until that time occurs. Additionally, SDF has a side effect that any area of the teeth where there is active decay will become discolored and permanently stained black. For this reason, some patients may opt to have a traditional filling placed over the SDF at a later date if esthetics are a concern.

Atraumatic Restorative Techniques

Interim restorative technique (IRT), atraumatic restorative technique (ART), or the similar silver diamine modified atraumatic technique (SMART) are methods that emphasize the use of hand instruments and fluoride releasing material to restore decaying teeth, rather than removing decay and damaged tooth structure with a handpiece, which requires numbing agents, produces a lot of aerosols, and is relatively invasive. Conversely, approaching a decayed tooth utilizing IRT, ART, or SMART is less invasive and less aerosol producing, and still treats the decay. Each technique has slight differences but all three produce fewer aerosols than a traditional filling. This [article](#) discusses the differences between IRT and ART. Notably, the [SMART technique](#) follows the same methodology as ART with the addition of SDF to the protocol.

Hall Crowns

The [Hall Technique](#) is a method of placing a stainless-steel crown on a primary pediatric tooth that has severe decay. Traditionally, when a pediatric tooth requires a crown, it is numbed, all decay is removed, and the tooth is prepared to accommodate space for the stainless-steel crown. The Hall Technique bypasses most of these steps. No local anesthetic is applied to the tooth and no preparation or removal of decay is performed. Instead, an oversized stainless-steel crown is filled with cement and is placed over a decaying tooth thus sealing the decay in the tooth.

Dentistry is changing in response to the COVID-19 pandemic. I am confident that we can meet these changes head-on with innovation and fresh ideas. While aerosol management is top of mind to reduce the risk of COVID-19 transmission in dental settings, I hope that all of us in the dental community consider other changes that will continue to move our profession forward so that we can provide evidence-based, effective care for our patients.

Video tutorials of techniques

Youtube: [SDF Application](#)

Youtube: [ART technique part 1](#), [ART technique, part 2](#)

Youtube: [SDF SMART Filling Tutorial](#)

Youtube: [SMART Hall Crown Technique](#)

Youtube: [Hall Crown Technique without SMART](#)