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# The inconspicuous nature of COVID-19 and its impact to dentistry



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**To state that the new coronavirus SARS-CoV-2 has broadly and deeply impacted our lives is an understatement. Since it first showed up on our radar in December 2019, the new coronavirus has wreaked havoc on virtually all businesses and industries across the globe. The impact is equally felt in developing, developed, industrialized, rural, rich, and poor countries and communities, irrespective of how well-prepared those countries and communities felt they were 9 months ago. To this day we are still learning to prepare for, respond to, and adapt to the broad and deep impact of this virus. This essay presents different perspectives on the impact of the novel coronavirus to dentistry, through the lenses of a private practice-based general dentist, a nursing home-based public health dentist, and a school of dentistry clinical director. The goal of the essay is to share our experiences and challenges, as well as highlight our capacity to respond to a crisis with resilience, determination, creativity, inventivity, and, most importantly, humility and altruism. (Semin Orthod 2020; 26:176–182) © 2020 Published by Elsevier Inc.**

## Introduction

**A**s we strive to cope with the universal impact COVID-19 has had on all of our lives, we are all trying to reach the same destination: arresting a global pandemic. However, though that goal is shared, the path to get there may be quite varied depending on the unique situation or environment. There is no question that the COVID-19 pandemic presents unique opportunities to take disruptive innovation to levels never imagined (or desired).<sup>1,2</sup> In this essay, the authors present

different perspectives based on their experiences in various dental health care settings, following their journey and the responses they orchestrated to adapt to a new reality. We know of the basic concerns of personal protective equipment (PPE) and social distancing, however the impact often reached into areas that we previously had taken for granted. Ones that were not so obvious. Their decisions were unique to the environment they presided over. In some instances, they were highly personal and enlightening and in others they were to affect the culture and the teaching model of an entire department at a large College of Dentistry. Reopening for dental care took on an entirely different meaning for patients in a solo practice, group care facility and the predoctoral dental clinic.

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## *A private practice perspective*

There were signs. I am sure that they were as sure as hindsight is 20/20. A change to how all dentistry was being delivered was evident. I was a dental student in the early 1980's and the devastating progression of AIDS was evident throughout the country and the world. At that time, the pervasive use of PPE that we take for granted today seemed to be more of a suggestion rather than a

requirement. I remember being mentored by an oral surgeon who insisted on not wearing gloves so he could better feel what was happening during a procedure. Almost overnight, a paradigm shift took place that affected not only dentists but every healthcare provider. The use of PPE became the norm as we strove to protect ourselves and our patients against infection. Needle sticks took on an increased level of scrutiny that reverberates to this very day.

Dentistry is an evolving and ever-changing art and profession. As educators we have seen that throughout our tenure. Adhesives, composites, digital radiographs and digital impressions are commonplace today – but they were a result of research and innovation leveraged by a desire (a need?) to improve outcomes. These shifts in processes, materials, and workflows happen over years, sometimes decades. It is rare to see an immediate and universal change such as what we lived with the AIDS epidemic. Forty years later, we are at the crossroads of another paradigm shift. The SARS-CoV-2 virus which causes COVID-19 has affected all of us, and created a need to once again reframe how we care for our patients. That response is universal in principle but can be unique depending on the provider and the locale. Solo practitioners, group practices, community clinics and dental schools are all moving toward the same destination along slightly differing paths. Essentially, we have an ever-increasing obligation to the health of our patients and all those around us.

I am a solo practitioner of general dentistry for the past 36 years. For almost all of that time I have had the good fortune to be in the same location and neighborhood. The health of my practice is intimately tied to the stability of my patient base. In other words, I am starting to see the grandchildren of my long-time patients. This intimate relationship with a patient base is not a unique phenomenon for many solo practitioners. Patients who come year after year notice the changes, even the small ones. Many more patients than I would have thought have asked about the physical changes they saw in the reception and treatment areas as a result of the new healthcare protocols required to operate safely in the COVID-19 era.<sup>3,4</sup> With all the sources of information patients now have available to them, they are often well informed about what precautions can be taken to ensure their health and

safety. They can see the obvious changes but it is what we do, or how we plan behind the scenes, that often makes the biggest difference. It is here where I feel that the impact of COVID-19 may actually turn out to be a positive driving force for the future of dentistry.

The tangible effects are well documented; however, it will be the intangible positive results that will reverberate for years to come, just like they did those 40 years ago. Yes, having to deal with a forced closure was economically paralyzing, but for most of us it was not insurmountable. Restrictions for reopening created new challenges for infrastructure, air filtration, scheduling, social distancing and PPE. Hunting for the appropriate mask became an endurance event. However, as restrictions are eased and the risk of infection falls with the advent of a vaccine, these will not be the lasting legacy of COVID-19. We have traditionally always been very effective in our response to prevent cross contamination. What has changed for the better, seemingly overnight, is **the quality of our patient interactions and the scrutiny we give to our patients' overall health.**

We questioned how we were going to communicate our office precautions to our patients. An email or letter would easily provide the information, but its effectiveness was suspect. We elected to personally reach out to each family. If the patients that came into the office valued the changes we were making, then surely speaking with them would be beneficial. This proved to be one of the keys to successfully reopening. Our conversations not only reassured our patients, they often re-established rapport and a connection that might have waned over time. Those interactions built value in their return as each call was specific to that patient's particular concerns. It gave us a chance to know what was paramount in their mind so we were able to address it immediately. With so many of our patients working from home, their availability and flexibility to schedule appointments was a plus. They often were close by at home rather than commuting from work. When they did come in, they found that more time was exclusively devoted to them. Waiting in a reception area became a thing of the past as we became very aware of our time commitment to each patient. I had originally designed my office with what was a common theme 25 years ago, more open and

unobstructed treatment areas. Now, we could only seat one patient at a time. It was imperative that we used those areas efficiently and effectively. Admittedly, though effective communication and proactive scheduling is the mantra of many a practice management seminar, it is an art that we often overlooked. As educators, we cannot stress the importance of effective communication enough to our students. My personal experience has not only benefitted the reopening of my office, it has also reaffirmed all that I hope to impart to my students.

The most important impact of the virus is one that I hope will endure. Our concern for our patient's overall health has never been so vigilant. It too is another lesson that none of our dental students should forget. I am not talking about being aware of the implications of a medical history, nor taking a patient's blood pressure, nor asking for appropriate lab values or a medical consult. What has changed for all of us is that we should be vigilant in asking how a person actually feels and we should be adept at interpreting that answer. We can no longer be complacent when it comes to even a mild illness. If there is one thing we have learned over the past many months, it is that the signs of a disease state are often not consistent with having the disease. Any inconsistency should awaken our curiosity regarding our patient's health. Each person that enters our office is not only screened with questions before their appointment; they also have their temperature checked. It is not uncommon for a dentist to be the first one to tell a patient about their high blood pressure as they routinely screen their patients. We should continue to take on the responsibility to screen for COVID-19 or whatever the next outbreak will be. We are all vested in our patient's overall health. There are many systemic diseases that can be manifested or linked to our patient's oral health. We are well versed in those. Now, more than ever, is the time for us to reaffirm our commitment to go beyond our patient's oral health and be especially cognizant of their overall health and wellbeing.

### *A nursing home perspective*

In late winter/early spring 2020, when COVID-19 crippled the world, like most health care practitioners, we were not ready for it. Over the past 5 years, as the director of a nursing home based

dental service in the state of Connecticut, I have come to expect the occasional quarantining of a specific floor of any long-term care facility due to the flu from time to time. Usually when this happens, routine oral treatment is still able to continue for the other residents in the facility. Occasionally, patients may have to be admitted to the hospital for treatment and observation. The flu season can be tough in the nursing home because of the vulnerability of its residents with weakened immunities. Consequently, taking the annual flu vaccine is very important. Residents and staff of long-term care facilities are required to take the flu vaccine (CT DPH); those that are exempt are required to wear a mask. Only 69.3% of workers in long term care settings reported getting the flu vaccine during 2019–2020.<sup>5</sup>

Nursing homes are tasked with maintaining a patient in a comfortable state and ensuring that the patient is thriving. General maintenance, pain, swelling, broken dentures are the primary reasons patients are seen by a dentist. For the oral care team, that means maintaining a stable oral environment through routine oral care, consulting on pain, swelling, making recommendations and the fabrication and repair of dentures. During the pandemic, these objectives were in conflict. Several nursing homes had patients with dentures that were in progress or broken, and they demanded that the procedures be completed. If a patient is edentulous, dentures are of critical need, because a missing denture can interfere with the ability to thrive.

As it became evident that this would not be just another regular flu season, changes had to be made to our infrastructure to address the needs of the facilities and our staff. During the early months of the pandemic, the Northeast was the epicenter of the US cases. Connecticut did not have a specific plan regarding the care of patients. Facilities and administrators followed the existing flu protocol and continued to request appointments for routine patient care. On several occasions, it was necessary to clarify to administrators, that denture fabrication/ repair as well as routine care, could not be performed. Based on the information that was distributed at NYU College of Dentistry, the decision was made to consult by phone and refer patients to a local hospital, if emergency treatment was needed. The facilities were informed of these adjustments in treatment.

This year, we were in the process of contracting with several new nursing homes. As we were expanding, we identified a new doctor and hygienist to join our team. All dental providers were well educated to understand the severity of the global impact of COVID-19. Several of them resigned because they either had a compromised immunity or had a family member with a compromised immunity. All payments from the nursing homes were suspended; however, all contracts remained on hold and intact. Due to the resulting lack of income, the company was forced to lay off all remaining employees. The office manager was paid minimally to take calls from facilities that needed consultations.

Beginning in August, the State of Connecticut began to allow consultants to re-enter the facilities or to address broken dentures and consultations in person. Several facilities were decimated, losing 25% of their patient population to COVID-19. Some patients had been without their dentures for so long, that they had to be put on a soft diet and had grown comfortable eating without them. At present, approximately 8 months since the beginning of the pandemic, nursing homes are slowly re-opening. Several facilities have been designated as COVID-19 facilities. These facilities care for all the COVID-19 patients in their county in order to mitigate the spread of the virus throughout the entire population.

The administrative staff has been rehired, and we are now in the process of interviewing new clinical providers. During the pandemic pause, we were able to identify vendors of the needed PPE. In preparation to return to the facilities, we established new COVID-19 business and clinical protocols. As the facilities begin to re-open, the general consensus is that all individuals entering are required to have had a negative COVID-19 test within 7-days prior to their visit. This has been challenging; the turn-around time for test results is usually listed as 2–5 days for the PCR test. However, in reality, the results may take between 2 and 10 days, depending on the volume of tests to be completed by the lab. Several drugstore chains, such as Walgreen's and CVS have limited locations that advertise a rapid test. This is better alternative, since test results are promised within an hour. As an increasing number of employers require testing, even this testing platform is becoming overwhelmed. In one

week, the turn-around time at one Walgreen's location was extended from 30 min to three hours.

While the situation is not ideal, there are fewer cases of COVID-19 in all nursing homes than a few months ago. The State of Connecticut continues to isolate infected patients in designated homes, in order to keep the larger population of nursing home residents safe. As we move towards returning to servicing all our nursing homes, we have to remain flexible with our employees and facilities as well as they, with us. We are constantly looking for new locations with the hope of getting our test results in a predictable and timely manner. Most importantly, we have to remember that we are "practicing oral health professionals", which means that we have to keep evolving as the situation evolves in order to provide the best treatment for our patients.

#### *A dental school perspective*

As a result of COVID-19, both the education of dental students and the clinical practice of dentistry have changed in ways that may never return to the "old normal." Dental students are learning this new norm and will carry this forward into private/group practice when they graduate. Just as things drastically changed after the 1981 AIDS/HIV crisis, these new changes will be fast and definitive. In 1991, the Third Edition of the JADA supplement, *Facts About Aids for the Dental Team*, stated, "The American Dental Association and the Centers for Disease Control have published infection control recommendations for the dental office and dental laboratory. Adherence to these recommendations will further reduce the possibility of transmission of HIV in dental settings."<sup>6</sup> Following this pattern, the changes we made and will continue to make to control the spread of COVID-19 will be widespread.

A significant challenge facing a practicing dentist is how to keep abreast of changes in dentistry, and now must consider how to transition from hands-on continuing education classes to the virtual or modified virtual session. Schools of dentistry across the globe had to adapt to new educational methodologies. The didactic education can occur remotely, via a number of different video conferencing platforms, but the educational experience should be personalized.

The students can be in small group seminars or large format classes; in both, during the video lecture they may get a ‘polling’ question directed at the entire group. The results are displayed on the shared screen allowing the lecturer to customize their presentation and redirect the discussion to make sure that the students understand the concepts presented. The shared screen experience itself is enhanced. Using screen mirroring and 3-D software, the lecturer can draw and annotate virtual models so that multiple options and variations for treatment can be considered.

Similarly, many clinical experiences and examinations are now done virtually. Communication skills, formerly taught in person using Standardized Patients, are now taught via zoom. The ‘patient’ is at home but still assumes the role of the patient that are playing that day, e.g. the angry patient, the abused patient, etc. The major difference is that feedback to the dental student, or dentist if this was a CE program, is now limited to a written report with a follow up phone call or in person zoom, if needed.

The use of PPE and other administrative and engineering controls has changed with COVID-19. Back in 1993, one author reported that, “Perhaps patients understand the reasons for PPE but still do not like their use.”<sup>7</sup> Again, there are similarities in the education and private practice settings. The experienced dentist and the novice dental student both need frequent reminders about the proper protocols to don and doff PPE. This is in addition to understanding the requirements as presented by organized dentistry, the various state licensing boards, and the Centers for Disease Control (CDC).

The challenging presented by controlling aerosols in a dental office has led to the purchase of HEPA filtered air exchange units. As per the CDC guidelines, “Consider the use of a portable high-efficiency particulate air (HEPA) air filtration unit while the patient is undergoing, and immediately following, an aerosol generating procedure. Select a HEPA air filtration unit based on its Clean Air Delivery Rate (CADR). The CADR is an established performance standard defined by the Association of Home Appliance Manufacturers and reports the system’s cubic feet per minute (CFM) rating under as-used conditions. The higher the CADR, the faster the air cleaner will work to remove aerosols from the air.”<sup>8</sup> Working in conjunction with air

filtration is the use of extraoral suction units. These portable devices are placed close to the handpiece and control the spread of the aerosol.

The COVID-19 pandemic has impacted dental schools in a number of different ways, from human resources and staffing to building occupancy restrictions. Dental schools’ curricula had to be completely restructured in the Spring of 2020, and those radical changes continue to this day. We share here our perspective on how our clinical programs in the DDS program were impacted by the pandemic. Planning for a Return to Clinical Operations (RCO) in a University based setting presents ongoing challenges that share some commonality with the challenges of reopening privately or corporately owned dental practices but present with its own unique set of challenges as well.

Ensuring the ongoing safety and health of our community including, students, patients, faculty, and staff was throughout the process the primary consideration in planning our RCO. That principle was carefully integrated into planning and modifying our other two primary *raison d’être*, patient care and student education. In order to prepare properly for the functioning of our Pre-Doctoral Comprehensive Care Clinics, a team was assembled during our period of exclusively remote learning that was led by the Senior Director of Comprehensive Care Clinics and incorporated representatives from all groups responsible for the proper functioning of the clinical operation. The team was comprised of members of the Department of Cariology and Comprehensive Care including its Chair and Vice Chair, two Group Practice Directors, an Academic Coordinator, a Clinic Manager, and the Senior Director of Clinic Operations.

The challenges faced in the reopening of our Care Centers in a Dental School setting included:

- State and University mandated limitations on building and room occupancies
- Reclassification of dental procedures by risk of infection by SARS-CoV-2, and the alteration of clinical protocols to minimize the risk of spreading the novel virus.
- Physical plant evaluations regarding airflow and quality
- Faculty shortages
- Choosing appropriate PPE

Our pre COVID-19 clinical program had students treating patients in one of our fourteen group practices. With some students training in internal and external rotations, our seven 32-chairs clinics were available to approximately forty students. When we were able to resume patient care for the DDS program in early September 2020, State and University occupancy regulations limited our clinic occupancy to ten patients at a time (10 chairs) and twenty students. In order to maximize hands on student learning and efficiency in patient care, the following modifications were made:

- The twenty students treated patients in pairs to maximize the patient care experience and student education.
- Rather than four half days and one full day, students were assigned to clinic two full days one week and three full days the next in alternate fashion. This minimized traffic in the building, elevator usage, and student turnover
- Throughout the day, lunch was staggered so patient care could continue throughout the day.

Historically, the risk levels of dental treatment have been classified either by medical or dental risk to the patient or difficulty of the procedure for the practitioner. The COVID-19 era brought with it a unique need to stratify dental therapies by risk of spreading the virus. Since COVID-19 is an airborne disease and aerosol production has been known to be complicit in facilitating its spread, the ability to control generation of aerosol within our clinical areas became paramount. A risk stratification of dental procedures developed by the University of Alabama Birmingham was adapted that defined dental procedures from high aerosol to low aerosol generating procedures (AGP) and was based on the ability to mitigate the spread of aerosol or eliminate it altogether. Engineering studies were performed that indicated our air filtration systems were of Medical Operating Room quality and that air exchange was relatively immediate. With that in mind, each predoctoral clinical care center was divided into high risk, medium risk, low risk, and simulation areas. Patients were separated at six feet minimum distances. Since there is no social distancing between providers of patient care, all clinical personnel, faculty and students are

protected with fitted N95 respirators, face shields, eyewear, back tie gowns, shoe coverings and bonnets. Administrative staff is equipped with grade 3 surgical masks and face shields. All students, faculty, staff, and administration are required to be tested for SARS-CoV-2 weekly (saliva test). High AGP patients are tested and overhead high speed evacuation systems are employed when treating these patients to minimize aerosols travelling in the clinic. All operative dentistry procedures are performed in isolation (dental dam) to the point where if a tooth could not be isolated and air water spray was required, the tooth may have been considered non restorable in this era.

Treatment protocols and paradigms along with dental materials were revisited and altered in some situations. Silver diamine fluoride was introduced into the Comprehensive Care Clinics for the first time to treat teeth with extensive decay that could not be isolated or in cases where more conventional treatment carried the risk of a resultant extraction involving the use of aerosols. Selective caries removal was reinforced so as to avoid a similar resultant issue. The use of hand excavation of caries and restoration of teeth with resin modified glass ionomer has been encouraged in deep carious lesions to reduce the use of aerosol producing instrumentation. In order to minimize the traffic of students and patients migrating to specific radiographic imaging centers in the clinics, a handheld X-Ray system was introduced. To reduce the incidence of patient gagging (aerosol production) our transition to digital imaging was significantly accelerated. We have increased our capability of imaging and manufacturing indirect restorations in house by fivefold and will soon add additional technology that will significantly increase the number of scanners and provide us with the capability of securely storing and transmitting obtained images to commercial laboratories for increased manufacturing capability.

The University Office of Equal Opportunity offered faculty of particular age groups and of significant medical risk the option of seeking an accommodation to teach remotely. The significant number of faculty in those categories, combined with the number of students unassigned to clinical activities due to building occupancy limits presented us with the opportunity to establish a program of "remote preparation" whereby

students could work with remote faculty to establish frameworks for treatment plans and arrive in clinic completely prepared to treat their patients with excellence. This program's intent is to ensure that the students' time in clinic is dedicated to maximizing direct patient care unencumbered by record keeping and procedure preparation.

The pandemic has impacted every aspect of human life across the globe. The RCO for the DDS program at NYU Dentistry is no exception. The leadership of the Department of Cariology and Comprehensive Care understand that the key to our success moving forward will lie in our ability to be aware of the emergent data, our ability to recognize its impact, our flexibility, and our deep desire to enhance patient care for the community we serve and excellence in education for our students.

## Conclusions

The impact of COVID-19 is universally felt yet the response to the pandemic varies with the setting and goals of the organization or community. The common destination – creating an environment where everyone can live and work safely - can be arrived at through many paths depending on the situation or the environment. The quality of patient interactions and the scrutiny given to a patient's overall health has been paramount to the solo practitioner during the COVID-19 pandemic. In nursing homes, the key to providing dental care is to remain flexible with employees and facilities. Returning to clinic operations in a

university-based setting presents challenges that are similar to the private sector and at the same time, exceptionally unique. Patients, student providers, faculty and staff have to be considered. Educational models needed to adapt. Simulation, remote, virtual and hands on instruction have to mesh seamlessly and yet still maintain a personalized experience. All of these responses and strategies may not be obvious to our patients, but ultimately, they have been a positive driving force in dentistry.

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