



The XXI-century coronavirus pandemic effects on dental health care

Today the World is facing an unprecedented health crisis. The World Health Organization (WHO) reported that as of May 17, 2020, global coronavirus pandemic data were 4,534,731 confirmed cases and 307,537 deaths worldwide¹. Thousands of coalitions of professionals have been organized from all kinds of professions and people in general to educate, support and create strategies to overcome and face this pandemic situation. The etiologic factor of the current pandemic is coronavirus 2 (SARS-CoV-2)². Its size ranges from 60 to 140 nm and the coronavirus half-life is about 96 hours after getting into the human airway epithelial cells³. Health professionals inherently have a higher risk of contracting the virus due to the nature of their work. Importantly, some reports have mentioned that about 48%⁴ of people reported as infected with SARS-CoV-2 develop symptoms. Several dental instruments and clinical methods currently used in the dental profession generate aerosols pose potential risk for the patients seeking for dental services as well as professionals working in the clinical dental settings. For that reason, use of high-speed rotary instruments to remove caries lesions or to prepare teeth for prosthetic procedures it is not recommended at this time⁵.

Dental professionals have created a global coalition of health-care providers and scientists called COVID-Fighters⁶; in order to voluntarily share evidenced-based knowledge and current understanding of SARS-CoV 2 and COVID-19 consequences in the general health of symptomatic and asymptomatic patients. Dentists, like all health-care providers, should follow the Hippocratic oath to “First, do no harm.” It is our responsibility as health providers and scientists to understand and learn about this current emerging global health pandemic. We should use this knowledge to educate our families, friends, students, mentees, colleagues, and patients.

Dental caries is a disease caused by bacterial infection, with patients at different degrees of risk, rather than just a lesion. Most dental schools have taught the surgical method on how to restore the damage from caries in the past decades. Contemporary caries-management philosophy has changed from the traditional approach to a minimally invasive therapy, which includes the use of fluoride and antimicrobial agents⁷. Instead of just focusing on restorative

treatment, dentists should also focus on bacterial infection to develop an individual strategy to treat the bacterial component of caries, so that it can prevent further infectivity. Amelioration of oral hygiene and change of diet decrease the risk for dental caries. In addition, dentists should aim to remineralize rather than remove caries (demineralized tissue). Remineralization can be facilitated with the use of fluoride agents⁸. Fluoride can be used in various forms to prevent and arrest caries. However, the combined effects of silver and fluorides are more efficient in arresting caries progression and preventing the development of new caries. It has been concluded that silver diamine fluoride (SDF) is an effective, efficient, equitable, and safe caries-preventive agent that seems to meet the standards of the U.S. Institute of Medicine and the Millennium Goals of the World Health Organization⁹.

WHO has recommended the use of the minimally invasive/atraumatic restorative techniques (ART) (hand instruments only) and the use of caries removal agents such as silver diamine fluoride to restore caries-affected teeth¹⁰. Traditionally, treatment of tooth decay consists of not too-conservative therapies, which often results in greater destruction of healthy dental tissue in order to increase the restorative material's mechanical retention. Minimally invasive treatment has been proposed as an alternative therapy that has evolved with the development of new biomaterials. Minimally invasive treatment is being used in permanent and primary teeth with cavitated lesions in order to maintain pulp vitality, enable space conservation, and allow the natural process of exfoliation and tooth replacement without the administration of local anesthesia¹¹⁻¹³. Among these minimally invasive strategies are the use of atraumatic restorative treatment (ART), 25% silver nitrate (SN) + 5% fluoride varnish, and silver diamine fluoride (SDF) for caries management in dentistry.

In order to better manage the infection and propagation of SARS-CoV-2, we should rely on the ability of dental offices to perform the rapid SARS-CoV-2 tests. Testing depends on the health infrastructure of each nation and global solidarity. It is also important to focus on appropriate personal protective equipment (PPE), social distancing, and general cleaning habits (washing hands, use of sanitizer, use of masks). The development of new technologies will allow dentists to feel safer to come back to normal living conditions and perhaps improve or correct habits that were not very healthy. Since most of our nation's health-care systems are debilitated, dental offices across the world are restricted to emergency care affecting many professionals economically. Importantly, patients might lose their teeth and develop health complications.

Dental professionals need to get back to providing services to their patients. In the current situation, that will require use of personal protective equipment to protect providers and patients. A solution to this difficult situation lies in rapid testing, setting up protocols and obtaining appropriate equipment for dental professionals. Furthermore, the ability to test patients will solve some safety issues and provide valuable information. Incorporation of tele-screening two weeks before the appointments would be helpful. Non-emergency dental procedures must be restricted to asymptomatic people.

In conclusion, during this unprecedented global health crisis, the smartest way to face this situation is through responsible, ethical and professional actions in our profession. We must follow evidence-based recommendations to decrease the propagation of SARS-CoV-2. We

need global solidarity in order to overcome the losses of lives and this economic global crisis in order to restore our global health structures. My deepest condolences to all the families of victims of this horrible pandemic.

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REFERENCES

1. WHO Coronavirus Disease (COVID-19) Dashboard [sede Web]. Switzerland: World Health Organization – WHO; 2020 [last update 2020/5/18]. Available in https://covid19.who.int/?gclid=CjwKCAjwwYP2BRBGiEiwAkoBpAufJltCHEoMQupAooGZmSFoUbGn-ayCmjiS1norLCSgBiaWa2ZdzyBoC5ZoQAvD_BwE
2. Coronavirus disease 2019 (COVID-2019): situation report—32. World Health Organization – OMS; 2020. Available in: <https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200221-sitrep-32-covid-19.pdf>
3. Zhu N, Zhang D, Wang W, Li X, Yang B, Song J. A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med.* 2020; 382(8): 727-33. DOI: <https://doi.org/10.1056/NEJMoa2001017>
4. Mizumoto K, Kagaya K, Zarebski Alexander, Chowell G, Zarebski A. Estimating the asymptomatic proportion of coronavirus disease 2019 (COVID-19) cases on board the Diamond Princess cruise ship, Yokohama, Japan, 2020. *Euro Surveill.* 2020; 25(10). DOI: <https://doi.org/10.2807/1560-7917.ES.2020.25.10.2000180>
5. Zi-yu GE, Lu-ming YANG, Jia-jia XIA, Xiao-hui FU, Yan-zhen Zhang. Possible aerosol transmission of COVID-19 and special precautions in dentistry. *Biomed & Biotechnol.* 2020: 1-8. <https://doi.org/10.1631/jzus.B2010010>
6. COVID Fighters [Internet]. Materials of Innovation in Dentistry; 2020. Available in <https://www.youtube.com/channel/UCwSfGdgN1bcP3AhywiugYpg>
7. Chu CH, Mei ML, Lo ECM. Use of fluorides in dental caries management. *Gen Dent.* 2010; 58(1), 37–43.
8. Gao SS, Zhao IS, Duffin S, Duangthip D, Lo ECM, Chu CH. Revitalising silver nitrate for caries management. *Int J Environ Res Public Health.* 2018; 15(1): 80. DOI: <https://doi.org/10.3390/ijerph15010080>
9. Zhao IS, Gao SS, Hiraishi N, Burrow MF, Duangthip D, Mei ML et al. Mechanisms of silver diamine fluoride on arresting caries: a literature review. *Inter Dent Jour.* 2018; 68(2): 67–76. DOI: <https://doi.org/10.1111/idj.12320>
10. Interim Infection Prevention and Control Guidance for Dental Settings During the COVID-19 Response [Internet]. United States: Centers for Disease Control and Prevention; 2020. Available in <https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html>
11. American Academy of Pediatric Dentistry. Policy on the use of silver diamine fluoride for pediatric dental patients. *Pediatr Dent.* 2017; 39(6): 51-3.
12. Rojas-Sánchez F. Algunas consideraciones sobre caries dental, fluoruros, su metabolismo y mecanismos de acción. *Act Odont Ven.* 2008; 46(4): 1-11.
13. Arrow P, Klobas E. Minimum intervention dentistry approach to managing early childhood caries: a randomized control trial. *Community Dent Oral Epidemiol.* 2015; 43(6): 511-20. DOI: <https://doi.org/10.1111/cdoe.12176>