

## Coronavirus/Aerosol Resources

Disclaimer: This information is not a comprehensive directory but a listing of suggested information/articles/studies based on the limited available resources. Please make sure to follow the legal requirements in your state/country by the government and relevant institutions. Information in this document may also be superseded as new studies to the novel Covid-19 pandemic emerge.

### Organizations/Information

- **Centers for Disease Control (CDC)**
  - Guidance for Dental Settings:
    - <https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html>
  - Using Personal Protective Equipment (PPE):
    - <https://www.cdc.gov/coronavirus/2019-ncov/hcp/using-ppe.html>
  - Infection Prevention and Control in Dental Settings:
    - <https://www.cdc.gov/oralhealth/infectioncontrol/index.html>
- **Organization for Safety Asepsis and Prevention (OSAP)**
  - Coronavirus Toolkit
    - <https://www.osap.org/page/COVID-19>
  - Best Practices for Infection Control in Dental Clinics During COVID-19 Pandemic
    - <https://www.osap.org/> (pdf download)
- **Occupational Safety and Health Administration (OSHA)**
  - Dentistry Workers and Employers
    - <https://www.osha.gov/SLTC/covid-19/dentistry.html>
- **American Dental Association (ADA)**
  - ADA Coronavirus (COVID-19) Center for Dentists
    - [www.ada.org/virus](http://www.ada.org/virus)
- **American Dental Hygienists Association (ADHA)**
  - Interim Guidance on Returning to Work
    - <https://www.adha.org/adha-interim-guidance-on-returning-to-work>

### SARS-CoV-2 Characteristics and Transmission

- **World Health Organization.**
  - Q and A on Coronavirus disease (COVID-2019).
    - <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/q-a-coronaviruses>
- **Centers for Disease Control.**
  - How COVID-19 Spreads.
    - <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html>
- **Johns Hopkins Coronavirus Resource Center.**
  - Understanding the COVID-19 Pandemic, Insights from Johns Hopkins University Experts.
    - <https://coronavirus.jhu.edu/covid-19-basics/understanding-covid-19>

## SARS-CoV-2 Characteristics and Transmission (continued)

- JF Chan, S. Yuan, K.H. Kok, et al. **A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster.** *Lancet* 2020;395:514-523.
  - [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)30154-9/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30154-9/fulltext)
  - Study of early coronavirus person to person transmission in the hospital, family and intercity settings and recommendation for implementation of vigilant controls at the incipient phase of an epidemic.
- H. Guo, Y/ Zhou, X. Liu, J. Tan, **The Impact of the COVID-19 Epidemic on the Utilization of Emergency Dental Services.** *Journal of Dental Sciences*, February 2020.
  - <https://pubmed.ncbi.nlm.nih.gov/32296495/>
  - An assessment of COVID-19's affect on the use of dental services in Beijing, China at the beginning of the pandemic. Fewer patients visited the clinic however the distribution of oral/dental issues changed significantly with infections increasing and trauma decreasing.
- M.L. Holshue, C. DeBolt, S. Lindquist, et al. **First case of 2019 novel coronavirus in the United States.** *N Engl J Med* 2020;382:929-936.
  - <https://www.nejm.org/doi/full/10.1056/NEJMoa2001191>
  - A report and review of the clinical features, symptoms, treatment and recovery of the first case of COVID-19 in the US. The patient had returned from Wuhan, China, but had not visited the seafood markets. Recommendations focus on the importance of obtaining a current medical history with particular attention to travel history and exposure to sick individuals.
- Lakshman P. Samaranayake, Malik Peiris., **Severe Acute Respiratory Syndrome and Dentistry: A Retrospective View.** *J Am Dent Assoc.* 2004 Sep;135(9):1292-302.
  - [https://jada.ada.org/article/S0002-8177\(14\)62542-3/fulltext](https://jada.ada.org/article/S0002-8177(14)62542-3/fulltext)
  - A review of the SARS virus including history, clinical features, etiology, treatment, and implications for infection control in dentistry.
- Xian Peng, Xin Xu, Yuqing Li., et al. **Transmission Routes of 2019-nCoV and Controls in Dental Practice.** *International Journal of Oral Science.* (May 2020) 12:9.
  - [https://www.nature.com/articles/s41368-020-0075-9.](https://www.nature.com/articles/s41368-020-0075-9)
  - Characteristics of SARS-CoV-2, a discussion of possible transmission routes in the dental clinic and suggested strategies for infection control during dental procedures.
- Jianjian Wei. Yuguo Li. **Airborne Spread of Infectious Agents in the Indoor Environment.** *American Journal of Infection Control.* 44(2016) 5120-5108.
  - <https://pubmed.ncbi.nlm.nih.gov/27590694/>
  - A review of the airborne spread of pathogens from mucous to mucous in indoor environments, how droplets and droplet nuclei are transported on human and room airflows and opportunities for infection control at various stages including face masks and personalized ventilation.

## Aerosols and the Dental Practice

- Stephen K. Harrel. **Dental Aerosols and Spatter Amidst COVID-19.** *Decisions in Dentistry.* May 2020;6(5):8–11.
  - <https://decisionsindentistry.com/article/dental-aerosols-spatter-amidst-covid-19/>
  - An overview coronavirus as of May 2020; a review of the composition of aerosols produced when using a handpiece or ultrasonic scaler; general recommendations to reduce disease transmission when using aerosol generating devices. Information is based on the author's experience and expertise in epidemiology, infection control and the private practice of dentistry.

## Aerosols and the Dental Practice (continued)

- K.B. Gross, P.R. Overman, C. Cobb, S. Brockmann. **Aerosol Generation by Two Ultrasonic Scalers and One Sonic Scaler. A Comparative Study.** *Journal of Dental Hygiene* 1992 Sept; 66(7):314-8.
  - <https://pubmed.ncbi.nlm.nih.gov/1291635/>
  - Description and results of a clinical trial comparing the amount of aerosols generated and the potential depth of respiratory penetration for magneto, piezo and sonic scalers. No significant difference was found for either measure.
- Henry Harding, Alex Broom, Jennifer Broom. (2020) **Aerosol generating procedures and infective risk to healthcare workers: SARS-CoV-2 – the limits of the evidence.** *Journal of Hospital Infection*.
  - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7263217/>
  - The authors focus on hospital aerosol hospital procedures in relation to SARS-CoV-2, the scarcity of evidence available regarding disease transmission via aerosols and the challenge of establishing guidelines in the absence of evidence.
- Dominic O’Hooley. **The Aerosol Generating Procedure: How a Phrase lost its Way Within the Maze of COVID-19 and Dentistry.** *IAS Dental Update*. 2020.47:6, 471-475.
  - <https://www.iasortho.com/blog/aerosols-and-dentistry-the-science-and-its-limitations/>
  - Opinion based piece on the paucity of evidence for transmission of SARS-CoV-2 via dental aerosol and how, over the years, dentists have successfully navigated and mitigated disease transmission via proper PPE and infection control protocols.
- Francisco Rivera-Hidalgo, James B. Barnes, Stephen K. Harrel. **Aerosol and Splatter Production by Focused Spray and Standard Ultrasonic Inserts.** *J Periodontol* 1999;70:473-477.
  - <https://aap.onlinelibrary.wiley.com/doi/abs/10.1902/jop.1999.70.5.473>
  - A comparative in vitro study to determine amount of aerosol produced by standard vs. focus spray ultrasonic inserts. Results revealed no significant difference in the amount of aerosol generated by either insert type. An aerosol reduction device attached to the handpiece did significantly reduce the amount of aerosol for both insert types.
- Jolanta Szymanska. **Dental Bioaerosol as an Occupational Hazard in a Dentist’s Workplace.** *Ann Agric Environ Med* 2007, 14, 203-207.
  - <https://pubmed.ncbi.nlm.nih.gov/18247451/>
  - A review of the composition of dental bioaerosols emitted from the handpiece and ultrasonic scalers and possible contamination from microflora in dental unit waterlines. Included is a listing of simple, inexpensive methods to control contamination and reduce disease transmission risk.
- H.R. Veena, S. Mahantesha, et al. **Dissemination of Aerosol and Splatter During Ultrasonic Scaling: A Pilot Study.** *Infect Public Health*. May-Jun 2015;8(3):260-5.
  - <https://pubmed.ncbi.nlm.nih.gov/25564419/>
  - Results of a pilot study showing aerosol contamination amount and location generated via ultrasonic scaling and how contamination can be minimized with simple PPE procedures.
- Jingkun Jiang, Yu Vincent Fu, Li Liu, Markku Kulmala. **Transmission via aerosols: Plausible differences among emerging coronaviruses.** *Aerosol Science and Technology* 2020.54:8, 865-868.
  - <https://www.tandfonline.com/doi/full/10.1080/02786826.2020.1769020>
  - A review of studies showing, to date, no viable (potentially infectious) SARS-CoV-2 has been found in real air samples. The authors note challenges in preserving natural viral states during research and analysis and recommend development of new methods to test viability in air.

## Aerosol Management and Mitigation of Risk

- Amber Ather, Biraj Patel, Nikita B Ruparel, Anibal Diogenes, Kenneth Hargreaves. **Coronavirus Disease 19 (covid-19): Implications for Clinical Dental Care.** *J of Endo.* 46:5, May 2020, 584-595.
  - <https://www.aae.org/specialty/clinical-resources/coronavirus-disease-19-covid-19-implications-for-clinical-dental-care/>
  - A brief overview of coronavirus including symptoms and transmission and recommendations to reduce the risk of disease transmission including patient telescreening and triage, use of HVE, rubber dams, pre-procedural mouth rinses and appropriate PPE.
- Michael A. Cochran, Chris H. Miller, Margie A. Sheldrake. **The Efficacy of the Rubber Dam as a Barrier to the Spread of Microorganisms During Dental Treatment.** *JADA* 119(1), July 1989, 141-144
  - <https://www.sciencedirect.com/science/article/abs/pii/S000281778991012X>
  - This study evaluates the rubber dam as a barrier for infection control during restorative procedures. A significant reduction in microorganisms was found with the rubber dam vs. without. Recommendation that use of the rubber dam along with appropriate PPE is a very effective means of infection control in the dental office.
- Stephen K. Harrell, John Molinari. **Aerosols and Splatter in Dentistry – A Brief Review of the Literature and Infection Control Implications.** *JADA*, Vol. 135, April 2004, 429-437.
  - [https://jada.ada.org/article/S0002-8177\(14\)61227-7/abstract](https://jada.ada.org/article/S0002-8177(14)61227-7/abstract)
  - A review of documentation on airborne disease transmission, the possibility of airborne contamination via dental aerosol generating devices and cost efficient, effective techniques that can be layered to reduce airborne contamination.
- Stephen K. Harrel, J.B. Barnes, F. Rivera-Hildago. **Reduction of Aerosols Produced by Ultrasonic Scalers.** *J Perio.* 1996 Jan;67(1):28-32.
  - <https://pubmed.ncbi.nlm.nih.gov/8676269/>
  - An in vitro comparative study of ultrasonic scaling with and without an HVE attachment. The HVE attachment resulted in a 93% reduction of aerosols (significant) with no concurrent heat transfer to a tooth analogue.
- Lori Gordon Hendrick. **The Use of Respirators in the Dental Office Requires OSHA Compliance.** *RDH.* 2020, May 28.
  - <https://www.rdhmag.com/covid-19/article/14176802/the-use-of-respirators-in-the-dental-office-requires-osh-compliance>
  - A discussion of the use of N95 respirators and the accompanying employer responsibility of OSHA compliance via the establishment and maintenance of a respiratory protection program.
- Vanessa Cost Marui, Maria Luisa Silveira Souto, Emmanuel Silva Rovai, et al. **Efficacy of Preprocedural Mouthrinses in the Reduction of Microorganisms in Aerosol: A Systematic Review.** *JADA.* 2019 Dec; 150(12):1015-1026.
  - <https://pubmed.ncbi.nlm.nih.gov/31761015/>
  - A systematic review of literature to evaluate the effectiveness of pre-procedural rinses in reducing aerosolized microorganisms during dental procedures. None of the studies reviewed included a low risk of bias resulting in moderate evidence that a pre-procedural rinse will reduce the amount of microorganisms in dental aerosols.
- Rafael Ortega, Mauricio Gonzalez, Ala Nozari, Robert Canelli. **Personal Protective Equipment and Covid-19.** *N Engl J Med* 382:26.
  - <https://www.nejm.org/doi/full/10.1056/NEJMvcm2014809>
  - Identification of PPE for Health Care Workers including a video module of proper wearing, donning and doffing.

- Radonovich Jr., Lewis J., Simberkoff, Michael S., Bessesen, Mary T., et al. **N95 Respirators vs. Medical Masks for Preventing Influenza Among Health Care Personnel – A Randomized Clinical Trial.** *JAMA*. 2019;322(9):824-833.
  - <https://jamanetwork.com/journals/jama/fullarticle/2749214>
  - Results of a randomized clinical trial taking place over 4 years at 7 US medical centers (outpatient) to determine if N95 or medical masks were more effective at preventing cases of influenza among health care workers. Results showed no statistically significant difference between the effectiveness of preventing laboratory confirmed influenza between users of either mask type.
- Raymond J. Roberge. **Face Shields for Infection Control: A Review.** *Journal of Occupational and Environmental Hygiene*, 2016, 235-242.
  - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5015006/>
  - A review of face shield types, the limited guidelines and standards governing their use and the research regarding their efficacy. The recommendation is, due to the lack of a good seal with the face, shields should not be used alone but in tandem with other PPE such as masks and goggles.