

Review Study on “Dental Hygiene during COVID-19 Infection”

Sonal Gupta^{1*}, Dr. A. K. Singhai¹, Dr. Sarvesh Sharma²

¹Lakshmi Narain College of Pharmacy, Bhopal

²SMS, DH Vidisha

DOI: [10.36347/sjds.2020.v07i04.002](https://doi.org/10.36347/sjds.2020.v07i04.002)

| Received: 26.03.2020 | Accepted: 03.04.2020 | Published: 15.04.2020

*Corresponding author: Sonal Gupta

Abstract

Review Article

COVID-19 (Coronaviruses) was recently identified in saliva of infected patients. In this article, we discuss the transmission of infection via the saliva of this virus. The members in dental practice expose to huge risk of COVID-19 infection due to the face-to-face communication and the exposure to blood, saliva, and other body fluids, and the handling of sharp instruments. Dental professionals play significant roles in preventing the transmission of COVID-19. Here we suggested the infection control count during dental practice to stop the person-to-person transmission way in dental hospitals and clinics. There is a required to increase investigations to the detection of Coronavirus in oral fluids and its effect on the transmission of this virus, which is critical to improve effective plan for prevention, especially for dentists and healthcare professionals. Saliva can play a important role in the person-to-person transmission, and non-invasive salivary analysis may provide a beneficial and cost-effective care platform for the fast and early detection of Coronavirus infection.

Keywords: COVID-19, Dentistry, SARS, Transmission, infection control.

Copyright @ 2020: This is an open-access article distributed under the terms of the Creative Commons Attribution license which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use (NonCommercial, or CC-BY-NC) provided the original author and source are credited.

INTRODUCTION

Coronaviruses are a large family of viruses which may cause illness in animals or humans. In humans, several coronaviruses are known to cause respiratory infections ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). Due to the characteristics of dental

settings, the risk of cross infection can be high between patients and dental practitioners. For dental practices and hospitals in areas that are (potentially) affected with COVID-19, strict and effective infection control protocols are urgently needed. The most recently discovered coronavirus causes coronavirus disease COVID-19.

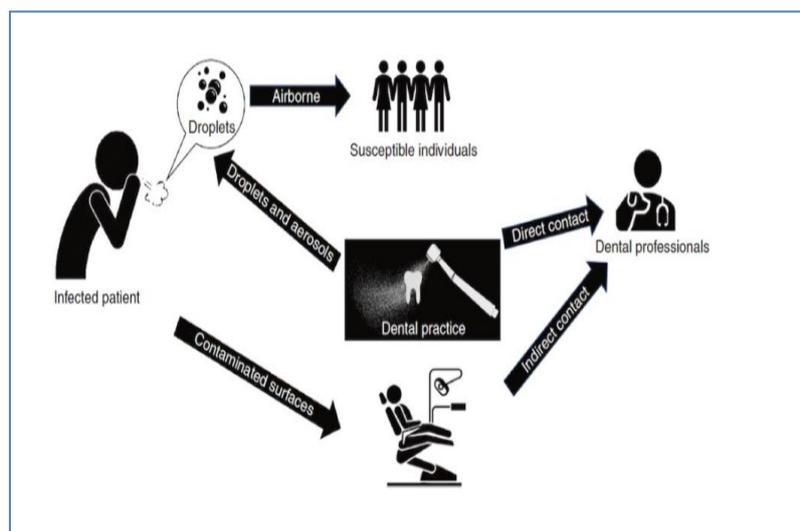


Fig: Transmission routes of COVID-19 and controls in dental practice

The present outbreak of the 2019 coronavirus strain (COVID-19) constitutes a public health emergency of global concern [1]. International centers for disease control and prevention are monitoring this infectious disease outbreak; symptoms of COVID-19 infection include fever, cough, and acute respiratory disease, with severe cases leading to pneumonia, kidney failure, and even death. The severe respiratory illness caused by the COVID-19 was first detected in Wuhan, Hubei, China, and infections have spread worldwide [2].

However, SARS-CoV, the virus which caused the SARS outbreak in 2003, jumped from an animal reservoir (civet cats, a farmed wild animal) to humans and then spread between humans. In a similar way, it is thought that SARS-CoV-2 jumped the species barrier and initially infected humans, but more likely through an intermediate host, that is another animal species more likely to be handled by humans - this could be a domestic animal, a wild animal, or a domesticated wild animal and, as of yet, has not been identified.

Until the source of this virus is identified and controlled, there is a risk of reintroduction of the virus in the human population and the risk of new outbreaks like the ones we are currently experiencing.

Possible transmission route

The common transmission routes of novel coronavirus include direct transmission (cough, sneeze, and droplet inhalation transmission) and contact transmission (contact with oral, nasal, and eye mucous membranes)[3]. Although common clinical manifestations of novel coronavirus infection do not include eye symptoms, the analysis of conjunctival samples from confirmed and suspected cases of 2019-nCoV suggests that the transmission of 2019-nCoV is not limited to the respiratory tract[4], and that eye exposure may provide an effective way for the virus to enter the body[5].

In addition, studies have shown that respiratory viruses can be transmitted from person to person through direct or indirect contact, or through coarse or small droplets, and 2019-nCoV can also be transmitted directly or indirectly through saliva[6]. Notably, a report of one case of 2019-nCoV infection in Germany indicates that transmission of the virus may also occur through contact with asymptomatic patients[7].

Studies have suggested that 2019-nCoV may be airborne through aerosols formed during medical procedures[8]. It is notable that 2019-nCoV RNA could also be detected by rRT-PCR testing in a stool specimen collected on day 7 of the patient's illness[9]. However, the aerosol transmission route and the fecal-oral transmission route concerned by the public still need to be further studied and confirmed.

Incubation period

The incubation period of COVID-19 has been estimated at 5 to 6 days on average, but there is evidence that it could be as long as 14 days, which is now the commonly adopted duration for medical observation and quarantine of (potentially) exposed persons [10-11].

Risk of nosocomial infection in dental settings

Dental patients who cough, sneeze, or receive dental treatment including the use of a high-speed handpiece or ultrasonic instruments make their secretions, saliva, or blood aerosolize to the surroundings. Dental apparatus could be contaminated with various pathogenic microorganisms after use or become exposed to a contaminated clinic environment. Thereafter, infections can occur through the puncture of sharp instruments or direct contact between mucous membranes and contaminated hands [12].

Due to the unique characteristics of dental procedures where a large number of droplets and aerosols could be generated, the standard protective measures in daily clinical work are not effective enough to prevent the spread of COVID-19, especially when patients are in the incubation period, are unaware they are infected, or choose to conceal their infection.

Effective infection control protocols

Hand hygiene has been considered the most critical measure for reducing the risk of transmitting microorganism to patients [13]. SARS-CoV-2 can persist on surfaces for a few hours or up to several days, depending on the type of surface, the temperature, or the humidity of the environment [14]. This reinforces the need for good hand hygiene and the importance of thorough disinfection of all surfaces within the dental clinic. The use of personal protective equipment, including masks, gloves, gowns, and goggles or face shields, is recommended to protect skin and mucosa from (potentially) infected blood or secretion. As respiratory droplets are the main route of SARS-CoV-2 transmission, particulate respirators (e.g., N-95 masks authenticated by the National Institute for Occupational Safety and Health or FFP2-standard masks set by the European Union) are recommended for routine dental practice.

Recommendations for dental education

Education-related challenges for medical and dental schools, as well as their affiliated hospitals, are significant. It was reported that open communication among students, clinical teachers, and administrative staff would enhance mutual trust and facilitate adequate cooperation [15]. On the basis of our experience with SARS and relevant highly pathogenic infectious disease, we provide a few basic recommendations for dental education during an outbreak: First, during the outbreak period, online lectures, case studies, and problem-based learning tutorials should be adopted to

avoid unnecessary aggregation of people and associated risk of infection [16]. Existing smart devices and applications have already made it possible for students to listen to and review lectures whenever and wherever possible. In fact, our students started online learning.

Preventive and management strategies during dentistry practice

This reinforces the need for good hand hygiene and the importance of thorough disinfection of all surfaces within dental clinics. Every surface in the waiting room must be considered at risk; therefore, in addition to providing adequate periodic air exchange, all surfaces, chairs, magazines and doors that come into contact with healthcare professionals and patients must be considered “potentially infected”. It may be useful to make alcoholic disinfectants and masks available to patients in waiting rooms. The entire air conditioning system must be sanitized very frequently.

The use of personal protective equipment (including masks, gloves, gowns and goggles or face shields) is recommended to protect skin and mucosa from (potentially) infected blood or secretions. As respiratory droplets are the main route of SARS-CoV-2 transmission, particulate respirators (e.g., N-95 masks authenticated by the National Institute for Occupational Safety and Health or FFP2-standard masks set by the European Union) are recommended for the routine dental practice.

The management practice of the operating area should be quite similar to what happens with other patients affected by infectious and highly contagious diseases. As often as possible, the staff should work at an adequate distance from patients; furthermore, handpieces must be equipped with anti-reflux devices to avoid contaminations, improving the risk of cross-infections. Dentists should take strict personal protection measures and avoid or minimize operations that can produce droplets or aerosols. The 4-handed technique is beneficial for controlling infection. The use of saliva ejectors with low or high volume can reduce the production of droplets and aerosols [17, 18].

CONCLUSION

At this time, other countries and organizations, including the US Centers for Diseases Control and Prevention and the European Centre for Disease Prevention and Control, recommend airborne precautions for any situation involving the care of COVID-19 patients, and consider the use of medical masks as an acceptable option in case of shortages of respirators (N95, FFP2 or FFP3)[19, 20].

Current WHO recommendations emphasize the importance of rational and appropriate use of all PPE, not only masks, which requires correct and rigorous behaviour from health care workers, particularly in doffing procedures and hand hygiene

practices. WHO also recommends staff training on these recommendations [21], as well as the adequate procurement and availability of the necessary PPE and other supplies and facilities? Finally, WHO continues to emphasize the utmost importance of frequent hand hygiene, respiratory etiquette, and environmental cleaning and disinfection, as well as the importance of maintaining physical distances and avoidance of close, unprotected contact with people with fever or respiratory symptoms?

REFERENCES

1. The Lancet. Emerging understandings of COVID-19. *Lancet*.2020; 395(10221):311. [https://doi.org/10.1016/S0140-6736\(20\)30186-0](https://doi.org/10.1016/S0140-6736(20)30186-0).
2. Zhu N, Zhang D, Wang Wet al. China Novel Coronavirus Investigating and Research Team. A novel coronavirus from patients with pneumonia in China. *N Engl J Med*.2019; 2020. <https://doi.org/10.1056/NEJMoa2001017>.
3. Lu CW, Liu XF and Jia ZF. 2019-nCoV transmission through the ocular surface must not be ignored. 2019; *The Lancet* [https://doi.org/10.1016/S0140-6736\(20\)30313-5](https://doi.org/10.1016/S0140-6736(20)30313-5) (2020).
4. Huang C. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*.2020; 395: 497–506.
5. To KKW. Consistent detection of 2019 novel coronavirus in saliva. *Clin. Infect. Diseases*.2020. <https://doi.org/10.1093/cid/ciaa149>.
6. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, Zhang L, Fan G, Xu J, Gu X, Cheng Z. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet*. 2020 Feb 15;395(10223):497-506.
7. Rothe C, Schunk M, Sothmann P, Bretzel G, Froeschl G, Wallrauch C, Zimmer T, Thiel V, Janke C, Guggemos W, Seilmaier M. Transmission of 2019-nCoV infection from an asymptomatic contact in Germany. *New England Journal of Medicine*. 2020 Mar 5;382(10):970-1.
8. Wax RS, Christian MD. Practical recommendations for critical care and anesthesiology teams caring for novel coronavirus (2019-nCoV) patients. *Canadian Journal of Anesthesia/Journal canadien d'anesthésie*. 2020 Feb 12:1-9.
9. Holshue ML, DeBolt C, Lindquist S, Lofy KH, Wiesman J, Bruce H, Spitters C, Ericson K, Wilkerson S, Tural A, Diaz G. First case of 2019 novel coronavirus in the United States. *New England Journal of Medicine*. 2020 Jan 31.
10. Backer JA, Klinkenberg D, Wallinga J. Incubation period of 2019 novel coronavirus (2019-nCoV) infections among travellers from Wuhan, China, 20–28 January 2020. *Eurosurveillance*. 2020 Feb 6;25(5):2000062.
11. Li ZY, Meng LY. Prevention and control of novel coronavirus infection in department of stomatology. *Zhonghua kou qiang yi xue za zhi*=

- Zhonghua kouqiang yixue zazhi= Chinese journal of stomatology. 2020 Apr 9;55(4):217.
12. Kohn WG, Collins AS, Cleveland JL, Harte JA, Eklund KJ, Malvitz DM. Guidelines for infection control in dental health-care settings-2003.
 13. Larson EL, Early E, Cloonan P, Sugrue S, Parides M. An organizational climate intervention associated with increased handwashing and decreased nosocomial infections. *Behavioral Medicine*. 2000 Jan 1;26(1):14-22.
 14. World Health Organization. 2020c. Questions and answers on coronaviruses [accessed 2020 Feb 26]. <https://www.who.int/news-room/q-a-detail/q-acoronaviruses>.
 15. Park SW, Jang HW, Choe YH, Lee KS, Ahn YC, Chung MJ, Lee KS, Lee K, Han T. Avoiding student infection during a Middle East respiratory syndrome (MERS) outbreak: a single medical school experience. *Korean journal of medical education*. 2016 Jun;28(2):209.
 16. Patil NG, Yan YC. SARS and its effect on medical education in Hong Kong. *Medical education*. 2003 Dec;37(12):1127-8.
 17. Li RW, Leung KW, Sun FC, Samaranayake LP. Severe acute respiratory syndrome (SARS) and the GDP. Part II: Implications for GDPs. *British dental journal*. 2004 Aug;197(3):130-4.
 18. Samaranayake LP, Peiris M. Severe acute respiratory syndrome and dentistry: a retrospective view. *The Journal of the American Dental Association*. 2004 Sep 1;135(9):1292-302.
 19. Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 (COVID- in Healthcare Settings. <https://www.cdc.gov/coronavirus/2019ncov/infectioncontrol/control-recommendations.html>.
 20. Infection prevention and control for COVID-19 in healthcare settings <https://www.ecdc.europa.eu/en/publicationsdata/infection-prevention-and-control-covid-19-healthcare-settings>.
 21. Infection Prevention and Control (IPC) for Novel Coronavirus (COVID-19) Course. <https://openwho.org/courses/COVID-19-IPC-EN>.