World Journal of Medical Microbiology, 2023, 2, 609
www.scipublications.org/journal/index.php/wjmm
DOI: 10.31586/wjmm.2023.609

Brief Review

Relations between Dentistry and COVID-19 Infections

Mahmoud Abdel Hameed Shahin [1], Abdulridha Sarhan [2], Abid Rashid [3], Muhammad Akram [4,*], Umme Laila [4], Muhammad Talha Khalil [4], Rida Zainab [4], Gaweł Sołowski [5]

[1] Mohammed Al-Mana College for Medical Sciences, Dammam, KSA.
[2] Department of Dentistry, Hilla University College, Babylon, Iraq.
[3] Faculty of Medical Sciences, Government College University Faisalabad, Pakistan.
[4] Department of Eastern Medicine, Government College University Faisalabad, Pakistan
[5] Proofart Gdansk 80-216, Poland

*Correspondence: Muhammad Akram (makram_0451@hotmail.com)

Abstract: As a result of the virus's global dissemination, novel COVID-19 infections have emerged as a significant obstacle for all healthcare professionals to overcome. Dental specialist plays an effective role in the prevention of coronavirus. Dental care units and settings face various problems relating to the transmission of disease during treatment and dental operations. Blood, saliva, and mixed water droplets possessing the virus cause contamination of equipment used for dental treatment. Both patients and workers may become transmitters and infectors of COVID-19 through direct contact during dental operations. Both dental workers and patients are likely to become infectors and transmitters of COVID-19. The dental care routine is very effective as we discussed below the prevention steps are very effective. All healthcare workers at the dentistry clinics, including nurses, should collaborate to prevent the spread of the COVID-19 virus among patients.

Keywords: COVID-19 spread, dental health care settings, dental infection prevention, infection

How to cite this paper:
Shahin, M. A. H., Sarhan, A., Rashid, A., Akram, M., Laila, U., Khalil, M. T., Zainab, R., & Solowski, G. (2023). Relations between Dentistry and COVID-19 Infections. *World Journal of Medical Microbiology*, *2*(1), 22–26. Retrieved from https://www.scipublications.com/journal/index.php/wjmm/article/view/609

Received: December 29, 2022
Accepted: February 5, 2023
Published: February 7, 2023

1. Introduction

The spread of COVID-19 started in 2019 December and after that, the prevalence of this disease occurred all around the world in 2020. COVID-19 is a viral infection that affects all ages. The highest risk of serious infections occurred in people with weakened immune systems [1, 2]. An International Committee of viruses and taxonomy gave this viral infection name known as "coronavirus" [3-5]. Mostly the sign and symptoms vary from the kind of coronavirus but usually include fatigue, myalgia, cough, and fever after performing the scan computed tomography of the chest showed abnormality and opacities were reported [6]. Hemoptysis, diarrhea, sputum, and headache less commonly appear in patients [7, 8]. The spread and transmission of the coronavirus are high as compared to short acute respiratory syndrome [9]. The spread of this infection also occurs to each other after contact [10]. The disorder related to gustatory and olfactory is also observed in Europe [11]. So, defect in taste, sense, smell, cutaneous lesions, and oral manifestation show an association with coronavirus [12-15]. The chances of coronavirus increase in various diseases [15-18]. From the related papers and research, it was concluded that first the occurrence of this infection starts from bats and then it has seen in pangolins, dogs, and snakes [19-21]. The purpose of this discussion is to find out the relationship between dental services and their impact on the transmission of COVID-19.

2. Potential routes for COVID-19 transmission:

From previous research, it was confirmed that the spread of this virus usually occurs through inhalation, sneezing, and coughing because this virus transmits with micro-droplets that infect the person by doing its activities [22]. The transmission of this virus also happens through the nasal, oral, and mucous membranes of the eye [23]. The spread of this infection is usually not limited to the respiratory tract, but it affects other organs also [24]. The spread of this virus also occurs through contaminated aerosol. For the confirmation of the virus infection usually perform PCR that confirms whether the patient is affected or not [25].

3. COVID-19and its influence on dentistry:

The conclusion made from all the discussions is usually the prevalence of novel infections seen through the respiratory and droplets [26]. The period of this virus changes from 7 to 24 days usually during this period no proper sign appears [27]. The chances and risk factors increase for the doctor and patient who visit the dentist because usually the spread of this virus orally and through the respiratory tract. The dental teams face more problems and are more prone to develop this infection because of their communication with a face. During the practice of dentistry, the chances of infection increase by using rotary sharp and high-speed instruments, body fluid, blood, and saliva cause frequent contamination. This infection usually spread during long surgery because infection spread through airborne inhalation [28-30]. The world health organization announced in the New York Times Magazine that the infection of the coronavirus is more prone to healthcare professionals [31]. American Dental Association (ADA) announced that the transmission of coronavirus infection increased in the United States, so the society of dentists decided to limit their dental care and use only during the emergency condition [19, 32]. The dental emergency occurs when doctors are allowed to perform dental care for a patient [33, 34] during uncontrolled and severe pain, recurrent infection, permanent tooth avulsed, or trauma. General Dental Council (GDC) in the United Kingdom also recommended many prescriptions and guidelines because the priority and safety of patients are more important than anything [35]. (**Table 1**).

Table 1. Dental Conditions Adapted through American Association.

Emergency for dental cases	Urgent care for dental cases	Other urgent care cases
Bleeding un-controlled	Due to pulp inflammation, severe dental pain associated	Defective restorations
Soft tissue bacterial infection, cellulitis with extra and intra-oral swelling that usually affects the airway of the patient.	3rdmolar pain and	Technique for the management of restorative interim
Facial bones involve due to trauma which affects the airway of a patient.	Post-operative surgical osteitis, socket dry dressing, localized and abscess infection of bacteria, swelling, and pain, fracture of the tooth, dental trauma, irritation gingival.	Removal of suture [36].

4. Role of Dentists to control the COVID-19 infection:

The main role of dental health care professionals to overcome this viral infection is that they screen the patient which visited them after screening they can identify the patients who suffer from this infection. So, after the identification of the virus, the infected patient unnecessarily to do dental care cure during the early infectious stage, by doing

some encouragement can manage this infection. So, when patients visit the dental clinic, first take their temperature. The most common symptoms of coronavirus infections are cough, fever, and breathing problems. They also need proper history and their gathering with participation records if they attend any meeting. Self-isolation is a good preventive step to reduce the chances of coronavirus transmission. Hand hygiene [37], personal protection [38], rinsing of mouth [39, 40], rubber dam isolation [41, 42], safety clothes usage (Personal Protective Equipment), strict disinfecting control, and management of waste are effective and easily controlled methods.

5. Conclusions and recommendations

The management and cure of dental problems are required to understand the spread and prevalence of the coronavirus. Many updating requires for this purpose. Many approaches and techniques require understanding the role of dentistry in the transmission of infection, which is very helpful for this purpose to reduce the chances of infections. The dental health care teams should be vigilant and keep patients and themselves in a safe environment according to the related guidelines. However, all members of the dental team have a professional responsibility on themselves to keep informed of updates as recommendations are changing so quickly.

Nurses who work in dentistry clinics should work as infection control officers and put great effort to minimize the route of transmission of infection of COVID-19 by ensuring strict application of the sterilization policy of equipment in the clinics after each use and between a patient and another, ensuring proper sealing of equipment, cleaning and disinfection of the dental chair after being used by a client, and reminding and ensuring proper use of personal protective equipment and universal precautions by the dentistry to break the chain of COVID-19 transmission and any other infection.

Supplementary Materials: Not applicable.

Author Contributions: MA is the corresponding author of the study, AS conceived and designed the study. AR performed resources gathering, UL and RZ drafted the paper, MTK reviewed the manuscript, GS did statistical analysis, MAS performed editing and submission of the manuscript. All authors provided input regarding the manuscript and approved the final version.

Funding: This research received no external funding.

Data Availability Statement: Not applicable.

Acknowledgments: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest in this review study.

References

[1] Guo Y-R, Cao Q-D, Hong Z-S, Tan Y-Y, Chen S-D, Jin H-J, et al. The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak–an update on the status. *Military Medical Research*. **2020**;*7*(1):1-10.

[2] Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus–infected pneumonia. *New England journal of medicine*. **2020**.

[3] Gorbalenya AE, Baker SC, Baric R, Groot RJd, Drosten C, Gulyaeva AA, et al. Severe acute respiratory syndrome-related coronavirus: The species and its viruses–a statement of the Coronavirus Study Group. *bioRxiv preprint*. **2020** DOI: https://doi.org/10.1101/2020.02.07.937862.

[4] Mahase E. China coronavirus: WHO declares international emergency as death toll exceeds 200. *BMJ: British Medical Journal (Online)*. **2020**;*368*.

[5] Lancet T. Emerging understandings of 2019-nCoV. *Lancet (London, England)*. **2020**;*395*(10221):311.

[6] Ye Z, Zhang Y, Wang Y, Huang Z, Song B. Chest CT manifestations of new coronavirus disease 2019 (COVID-19): a pictorial review. *European radiology*. **2020**;*30*(8):4381-9 DOI: https://doi.org/10.1007/s00330-020-06801-0.

[7] Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. **2020**;*395*(10223):497-506 DOI: https://doi.org/10.1016/S0140-6736(20)30183-5.

[8] Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus–infected pneumonia in Wuhan, China. *Jama*. **2020**;*323*(11):1061-9.

[9] Liu Y, Gayle AA, Wilder-Smith A, Rocklöv J. The reproductive number of COVID-19 is higher compared to SARS coronavirus. *Journal of travel medicine*. **2020**.

[10] Chan JF, Yuan S, Kok KH, To KK, Chu H, Yang J, 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*(10223):514-23 DOI: https://doi.org/10.1016/S0140-6736(20)30154-9.

[11] Lechien JR, Chiesa-Estomba CM, De Siati DR, Horoi M, Le Bon SD, Rodriguez A, et al. Olfactory and gustatory dysfunctions as a clinical presentation of mild-to-moderate forms of the coronavirus disease (COVID-19): a multicenter European study. *European Archives of Oto-rhino-laryngology*. **2020**;*277*(8):2251-61.

[12] Baig AM, Khaleeq A, Ali U, Syeda H. Evidence of the COVID-19 virus targeting the CNS: tissue distribution, host–virus interaction, and proposed neurotropic mechanisms. *ACS chemical neuroscience*. **2020**;*11*(7):995-8.

[13] Chaux-Bodard A-G, Deneuve S, Desoutter A. Oral manifestation of Covid-19 as an inaugural symptom? *Journal of Oral Medicine and Oral Surgery*. **2020**;*26*(2):18.

[14] Sachdeva M, Gianotti R, Shah M, Bradanini L, Tosi D, Veraldi S, et al. Cutaneous manifestations of COVID-19: Report of three cases and a review of literature. *Journal of dermatological science*. **2020**;*98*(2):75-81 DOI: https://doi.org/10.1016/j.jdermsci.2020.04.011.

[15] Viner RM, Whittaker E. Kawasaki-like disease: emerging complication during the COVID-19 pandemic. *Lancet*. **2020**;*395*(10239):1741-3 DOI: https://doi.org/10.1016/S0140-6736(20)31129-6.

[16] Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet*. **2020**;*395*(10229):1054-62 DOI: https://doi.org/10.1016/S0140-6736(20)30566-3.

[17] Li B, Yang J, Zhao F, Zhi L, Wang X, Liu L, et al. Prevalence and impact of cardiovascular metabolic diseases on COVID-19 in China. *Clinical research in cardiology*. **2020**;*109*(5):531-8 DOI: https://doi.org/10.1007/s00392-020-01626-9.

[18] McIntosh K. Coronaviruses: a comparative review. *Current topics in microbiology and immunology/Ergebnisse der Mikrobiologie und Immunitätsforschung*. **1974**:85-129.

[19] Barabari P, Moharamzadeh K. Novel coronavirus (COVID-19) and dentistry–A comprehensive review of literature. *Dentistry journal*. **2020**;*8*(2):53.

[20] Zhang T, Wu Q, Zhang Z. Pangolin homology associated with 2019-nCoV. *BioRxiv*. **2020**.

[21] Zhou P, Yang X-L, Wang X-G, Hu B, Zhang L, Zhang W, et al. A pneumonia outbreak associated with a new coronavirus of probable bat origin. *nature*. **2020**;*579*(7798):270-3.

[22] Sarhan AT. Dental Care Procedures During COVID-19's Spread. *Wasit Journal for Science & Medicine*. **2020**;*13*(1):27-38.

[23] To KK, Tsang OT, Yip CC, Chan KH, Wu TC, Chan JM, et al. Consistent Detection of 2019 Novel Coronavirus in Saliva. *Clinical Infectious Diseases*. **2020**;*71*(15):841-3 DOI: https://doi.org/10.1093/cid/ciaa149.

[24] 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**;*67*(5):568-76 DOI: https://doi.org/10.1007/s12630-020-01591-x.

[25] Holshue ML, DeBolt C, Lindquist S, Lofy KH, Wiesman J, Bruce H, et al. First Case of 2019 Novel Coronavirus in the United States. *New England Journal of Medicine*. **2020**;*382*(10):929-36 DOI: https://doi.org/10.1056/NEJMoa2001191.

[26] Rodríguez-Morales AJ, MacGregor K, Kanagarajah S, Patel D, Schlagenhauf P. Going global–Travel and the 2019 novel coronavirus. *Travel medicine and infectious disease*. **2020**; *33:101578*.

[27] 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**;*25*(5):2000062.

[28] Kampf G, Todt D, Pfaender S, Steinmann E. Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *Journal of hospital infection*. **2020**;*104*(3):246-51.

[29] Wei J, Li Y. Airborne spread of infectious agents in the indoor environment. *American journal of infection control*. **2016**;*44*(9 Suppl):S102-8 DOI: https://doi.org/10.1016/j.ajic.2016.06.003.

[30] Cleveland JL, Gray SK, Harte JA, Robison VA, Moorman AC, Gooch BF. Transmission of blood-borne pathogens in US dental health care settings: 2016 update. *The Journal of the American Dental Association*. **2016**;*147*(9):729-38 DOI: https://doi.org/10.1016/j.adaj.2016.03.020.

[31] Gamio L. The workers who face the greatest coronavirus risk. *New York Times*. **2020**; *15*:2020.

[32] Patton LL, Villa A, Bedran-Russo AK, Frazier K, Khajotia S, Lawson NC, et al. Human Papillomavirus Vaccine: An American Dental Association Clinical Evaluators Panel survey. *The Journal of the American Dental Association*. **2020**;*151*(4):303-4. e2.

[33] Coulthard P, Thomson P, Dave M, Coulthard FP, Seoudi N, Hill M. The COVID-19 pandemic and dentistry: the clinical, legal and economic consequences-part 2: consequences of withholding dental care. *British Dental Journal*. **2020**;*229*(12):801-5.

[34] FDI World Dental Federation. Management of acute dental problems during COVID-19 pandemic: Scottish Dental Clinical Effectiveness Programme; 2020. Available from: https://www.fdiworlddental.org/management-acute-dental-problems-during-covid-19-pandemic

[35] Council GD. High level principles for good practice in remote consultations and prescribing. 2020.

[36] Bhanushali P, Katge F, Deshpande S, Chimata VK, Shetty S, Pradhan D. COVID-19: Changing trends and its impact on future of dentistry. *International journal of dentistry*. **2020**; *2020*:8817424 DOI: https://doi.org/10.1155/2020/8817424.

[37] Lotfinejad N, Peters A, Pittet D. Hand hygiene and the novel coronavirus pandemic: the role of healthcare workers. *The Journal of hospital infection*. **2020**;*105*(4):776-7 DOI: https://doi.org/10.1016/j.jhin.2020.03.017.
[38] Seto WH, Tsang D, Yung RW, Ching TY, Ng TK, Ho M, et al. Effectiveness of precautions against droplets and contact in prevention of nosocomial transmission of severe acute respiratory syndrome (SARS). *Lancet*. **2003**;*361*(9368):1519-20 DOI: https://doi.org/10.1016/s0140-6736(03)13168-6.
[39] Eggers M. Infectious disease management and control with povidone iodine. *Infectious diseases and therapy*. **2019**;*8*(4):581-93.
[40] Kirk-Bayley J, Sunkaraneni S, Challacombe S. The use of povidone iodine nasal spray and mouthwash during the current COVID-19 pandemic may reduce cross infection and protect healthcare workers. *Available at SSRN 3563092*. **2020**
[41] Müller L, Heider J, Frankenberger R, Graetz C, Jatzwauk L, Nagaba J, et al. Guideline: Dealing with aerosol-borne pathogens in dental practices. *Dtsch Zahnärztl Z Int*. **2020**:240-5.
[42] Samaranayake LP, Peiris M. Severe acute respiratory syndrome and dentistry: a retrospective view. *The Journal of the American Dental Association*. **2004**;*135*(9):1292-302 DOI: https://doi.org/10.14219/jada.archive.2004.0405.