Guidelines on the Prevention and Control of Disease in Dental Practice during the Coronavirus Outbreak

Xiao Huan ZHANG[1], Jun Qi LING[1], Stomatological Healthcare Service Branch of the Chinese Stomatological Association

Coronavirus disease 2019 has become a worldwide pandemic that is seriously jeopardising people's health. The National Health Commission and regional health administrations have issued regulations on the prevention and control of coronavirus disease 2019. Dentistry involves many invasive treatments, which differentiates it from other forms of medical practice. The following guidelines were produced by experts from the Stomatological Healthcare Service branch of the Chinese Stomatological Association to prevent the spread of coronavirus disease 2019 in dental clinics. The guidelines are in accordance with the relevant laws and documents from the health administration and range from technical guidelines to advice on how dental treatment should be conducted. Dental institutions can take these suggestions as a reference, based on the current local epidemic situation. It is anticipated that the guidelines will help dental institutions of different sizes to prevent the spread of the epidemic.

Key words: *coronavirus disease 2019 (COVID-19), nosocomial infection prevention and control*

Chin J Dent Res 2020;23(2):89–94; doi: 10.3290/j.cjdr.a44743

In December 2019, some cases of unexplained pneumonia were found in Wuhan, Hubei province, which later became known as coronavirus disease 2019 (COVID-19). The epidemic spread rapidly throughout China and on an unprecedented scale. The National Health Commission of the People's Republic of China has classified COVID-19 as a class B infectious disease under the Law of the People's Republic of China on the Prevention and Treatment of Infectious Diseases, and as a class A infectious disease in terms of the necessary control measures. To effectively reduce the risk of disease transmission in dental institutions during the outbreak and protect the safety of both dentists and patients, in line with the documents issued by the National Health Commission, National Health Commission of People's Republic of China, Diagnosis and Treatment Protocol for COVID-19 (Seventh Version)[1], Technical Guidelines of Prevention and Control of the Pneumonia Caused by COVID-19 in Medical Institutions (First Version)[2] and Guidelines of the Common Medical Protective Equipment Usage for Prevention and Control of Pneumonia Caused by COVID-19 (Trial)[3] and the characteristics of dental treatment, the following recommendations have been made for the prevention and control of the disease according to the local epidemic situation and the regulations released by local health administrations.

1 Guanghua School and Hospital of Stomatology, Sun Yat-sen University, Guangzhou, P.R. China.

Corresponding authors: Prof Jun Qi LING and Dr Xiao Huan ZHANG, Guanghua School and Hospital of Stomatology, Sun Yat-sen University, 56# Lingyuan West Road, Guangzhou 510055, P.R. China. Tel: 86-20-83863002; Fax: 86-20-83822807. Email: lingjunqi@163.com; zhxhuan@mail.sysu.edu.cn

This manuscript was first published in Zhongguo Kou Qiang Ji Xu Jiao Yu Za Zhi (Chinese Journal of Stomatological Continuing Education) 2020;23(2):65–68 (in Chinese), and this is the second publication with the same contents as the original publication.

Basic principles

- Dental institutions should pay close attention to announcements issued by the government and the health administration about the current epidemic situation and provide dental services according to the disease prevention and control measures.

- It is necessary to strengthen the management and prevention of COVID-19 and formulate plans, regimes and process guidelines to achieve this, provide all staff with training on how to prevent and control the spread of the disease, and promote awareness of the disease, particularly amongst health care, security and cleaning personnel and delivery drivers, etc. People should also be encouraged to avoid gatherings in public places and to reduce the number and length of meetings held, or hold meetings and training via video or online instead.
- A precheck triage system should be strictly implemented to ensure early detection, reporting, isolation and treatment, and sufficient protective equipment and disinfectant must be prepared in compliance with national standards.
- It is also necessary to implement a rota system for health care personnel, manage any personnel with symptoms or epidemiological history according to the Diagnosis and Treatment Protocol for COVID-19 (Seventh Version)[1], organise their work in a reasonable way to avoid overworking and generally monitor the health status and epidemiological history of personnel.
- Health care personnel are required to strictly follow prevention guidelines and to adhere to infection control protocol such as wearing personal protective equipment, performing hand hygiene, managing the treatment room, ensuring adequate ventilation, cleaning and disinfecting surfaces, reprocessing instruments and disposing of clinical waste during dental practice, so as to avoid nosocomial infection.
- While the COVID-19 epidemic is severe and in areas affected by the outbreak, dental practice procedure should be determined in accordance with the requirements of the local health administration and the Chinese Center for Disease Control and Prevention (CDC). All outpatient appointments should be cancelled, and only emergency treatments (such as oral and maxillofacial trauma, oral space infection, acute pulpitis, temporomandibular joint dislocation and acute pericoronitis) should be carried out. It is advisable to use the Internet and social media to communicate with and inform patients. Patients are advised to arrange any essential dental appointments carefully and postpone all non-emergency treatment. Meanwhile, consultations and appointment scheduling services can also be provided online.
- During clinical practice, large quantities of droplets and aerosols consisting of patients' saliva, blood and secretions[4,5] can be produced when using powered dental instruments, which pose a high risk of disease transmission between dentists and patients. Use of spray equipment such as high-speed turbines and ultrasonic tooth cleaning machines[6] should be avoided or minimised during the epidemic. It is better to use auxiliary equipment such as rubber dam[6] and high volume suction[7,8] to reduce droplets and potential bioaerosol pollution.

Precheck triage of patients

Dental institutions should establish a precheck triage system, set up a suitable area for precheck triage to take place and train enough personnel for this purpose. All patients entering health care institutions should receive precheck triage. It is necessary to monitor patients' temperature, collect their epidemiological history, identify suspected cases at an early stage and provide correct treatment and guidance in order to achieve "early detection, early isolation and early treatment"[1].

Personal protective equipment for precheck triage personnel

During the COVID-19 epidemic, specific personnel shall be designated and trained for precheck triage. The designated personnel should wear disposable caps, surgical masks, dental gowns, isolation gowns and goggles. First, patients should be instructed to perform hand hygiene. Patients and their companion should be provided with masks and instructed on how to wear them properly[9]. If the patient's general health condition permits, reduce or prohibit the number of accompanying persons to limit the number of people entering the hospital. An appropriate distance (> 1 m) should be maintained during consultation to reduce the risk of transmission[10]. Hand hygiene should be performed immediately after each contact with the patient[11].

Set-up requirements for precheck triage areas

The precheck triage area must be clearly marked as such and set up in a well ventilated location that is sufficiently distanced from other areas to ensure that the precheck is carried out as a matter of priority for emergency outpatients and their companion. Enough surgical masks, forehead thermometers and 75% alcohol hand sanitiser must be available.

Responsibilities of precheck triage personnel

Patients and their companion are required to wear masks when entering medical facilities. In accordance with

the Diagnosis and Treatment Protocol for COVID-19 (Seventh Version)[1], patients and their companion should have their body temperature monitored and be asked about their epidemiological history, and an individual investigation form should be completed. The investigation form includes:

- whether the individual displays any symptoms of fever, cough or other respiratory infections;
- whether the individual has a travel history to or residence history in Wuhan and its surrounding areas, or other communities with cases reported, in the last 14 days;
- whether the individual has a contact history with a person infected with COVID-19 (having received a positive result after nucleic acid testing) in the last 14 days;
- whether the individual has a contact history with patients with a fever or respiratory symptoms from Wuhan and its surrounding areas, or from communities with cases reported, in the last 14 days;
- whether there are confirmed clusters of COVID-19 cases in the individual's living and working areas.

Disposal of precheck triage screening

Based on the results of precheck screening, the patients should be disposed in triage.

- Asymptomatic patients with a travel history to the epidemic area, contact history with suspected COVID-19 patients or epidemiological history should be advised to self-isolate at home and reschedule any appointments for non-critical dental treatment. In the event of a dental emergency, treatment should be arranged immediately by registering and recording the personal details of dentists, assistants and patients, and prevention and protection guidelines should be followed.
- Patients with symptoms such as an abnormal body temperature but no contact history with suspected COVID-19 patients or epidemiological history and who need non-critical dental treatment should be advised to go to the fever clinic at their local general hospital and schedule their dental treatment for a later date. In the event of a dental emergency, treatment should be arranged immediately by registering and recording the personal details of dentists, assistants and patients, and prevention and protection guidelines should be followed.
- If a patient displays symptoms such as an abnormal body temperature and has a travel history to the epidemic area or contact history with suspected COVID-19 patients, measures must be taken to protect other patients and health care personnel. The patient should be taken to the designated quarantine point, and the personnel responsible for disease prevention and control as well as the hospital infection control department must be informed immediately, and carry out quarantine and referral procedures according to the local authority requirements.

Cleaning and disinfection of the precheck triage area

The triage table and forehead thermometers should be kept clean. They must be cleaned and disinfected at least every two hours, or more frequently in the event of contamination, using 75% alcohol or disinfectant wipes (containing effective ingredients against COVID-19) or chlorine disinfectant (with a chlorine concentration of 500 mg/l). If there is a suspected patient, after the patient is transferred to the designated hospital for treatment, the isolated area should be cleaned and disinfected in time to clean the polluted environment, and a record of cleaning and disinfection should be made for traceability.

Outpatient treatment

Set-up of the treatment room

In principle, a dedicated treatment room should be used, especially if spatter is likely to occur during treatment[10]. All items that are not required during treatment should be removed or stored away in a cabinet and surfaces should be kept tidy to facilitate disinfection[12]. During practice, a constant supply of fresh air should be maintained by opening a window or using an air purification device[10].

Principles of diagnosis and treatment

As well as strictly following standard prevention guidelines, further preventive measures should be taken, such as wearing goggles, two pairs of gloves and isolation gowns. Four-handed dentistry should be implemented. Low-speed handpieces or manual devices can be used instead of high-speed handpieces in view of the transmission route of COVID-19 "with the possibility of aerosol transmission under the condition of prolonged exposure to high concentrations of aerosols in a relatively closed environment"[1]. In areas severely affected by the epidemic, use of high-speed handpieces, ultrasonic tooth cleaners and air-water syringes and other equipment that may produce spatter should be avoided. In the event of a spillage, the affected patient and room should be disinfected.

Protection requirements during dental practice

Patient management

Health care personnel should monitor the patient's temperature, symptoms and relevant epidemiological history before treatment. At the beginning of treatment, the patient should be asked to gargle with mouthrinse. Use of the spittoon should be avoided; instead, the patient should be instructed to cover their mouth with the disposable mouthrinse cup and then spit the mouthrinse into the cup. Immediately after this, the nurse should use strong suction to reduce the generation of droplets and aerosols.

Personal protective equipment for health care personnel

During the COVID-19 epidemic, health care personnel should strictly follow standard prevention guidelines. In order to further reduce the risk of transmission through droplets and contact during dental treatment and to ensure the safety of dentists and patients, they should take further preventive measures during treatment, such as wearing goggles, isolation gowns and two pairs of gloves.

1. When performing non-invasive general treatments with no risk of spatter, disposable caps and latex gloves, surgical masks, goggles and dental gowns should be worn, and isolation gowns can be added.
2. When performing treatments during which spatter will be produced, disposable caps and latex gloves, surgical masks or surgical respirators (N95, N99, etc.), goggles and/or protective face shields, dental gowns and disposable isolation gowns should be worn. Health care personnel should pay attention to the sequence in which they put on and remove personal protective equipment, and practise strict hand hygiene in the process[10]. At the same time, dentists', assistants' and patients' personal details should be recorded for two-way traceability.
3. Medical protective masks should be tested for tightness after wearing. Each mask should be worn for no longer than 4 hours, and a replacement is needed immediately in the event of pollution or humidity. After treating a patient, the mask should be disposed of[11], and goggles and protective face shields should be cleaned, disinfected and dried. They can be disinfected with 75% alcohol, disinfectant with a chlorine concentration of 500 mg/l-1000 mg/l or disinfectant wipes which are effective against COVID-19.
4. Protective equipment such as goggles, face shields, isolation gowns and protective clothing should be used in the dental unit (beside the dental chair) and removed when leaving the treatment room. When removing the protective equipment, personnel should touch the inside only, as the outer surface may be contaminated, and then perform hand hygiene in a timely manner. Disposable items must not be reused.
5. Medical technological departments (radiology, laboratory, pathology, etc.) should use protective equipment in a correct way, including surgical masks, disposable caps, goggles, isolation gowns and gloves. The radiology department should take a panoramic radiograph to capture the entire mouth in one image. When doing this, technicians and patients should wear a mask at all times.
6. Health care personnel must strictly adhere to the Hand Hygiene Code for Medical Personnel (WST313-2019), and must not touch their mouth, nose, eyes, etc., with contaminated hands.
7. Occupational exposure shall be strictly treated in accordance with the Guideline for prevention and control for occupational exposure to bloodborne pathogen (GBZ/T213-2008)[13].

Cleaning and disinfection after treatment

- After treatment, the medical personnel should remove all protective equipment in sequence and perform hand hygiene throughout the process[14]. Those who are able to shower are advised to do so and change their clothes, while those who are not are advised to wash their hands and face before leaving the dental institute. As soon as the personnel arrive at home, they must perform hand hygiene and then change their clothes and store them in a ventilated place.
- The reprocessing of dental instruments should be done in strict accordance with the Regulation for disinfection and sterilisation technique of dental instruments (WS 506-2016).
- After each treatment, all high-frequency contact surfaces, such as chairs, door handles, sinks, taps and computers, must be disinfected. The best option is to wipe with disinfectant with a chlorine concentration of 500–1000 mg/l. For non–corrosion-resistant surfaces, 75% ethanol can be used for wiping, and disposable disinfectant wipes (containing effective ingredients against COVID-19) can also be used for one-step cleaning and disinfection; high-frequency contact surfaces should be disinfected at least every 2 hours, and dental unit waterlines can be rinsed for 30 seconds when needed[15].
- Air disinfection

1. Turn on the air disinfection machine or open windows properly for ventilation during treatment[10].
2. During lunch and after the full day's work, strengthen disinfection through irradiation using an ultraviolet lamp for 30–60 minutes, then open the window for ventilation for at least 30 minutes.
   - Requirements for clinic room floor
     The floor of the clinic room should be kept clean and dry and disinfected every 2 hours. In the event of obvious pollution, decontamination, cleaning and disinfection should be performed using disinfectant with a chlorine concentration of 500–1000 mg/l[12]. All anti-slip mats on the floor should be removed.
   - Medical waste management
     It is essential to improve medical waste management and focus on the training of health care and cleaning personnel. Personal protective equipment such as surgical masks and caps should be treated as medical waste. The medical waste in the treatment room should be transported to the area for temporary storage of medical waste in a timely manner, and collected on a daily basis. After this, the area for temporary storage of medical waste must be cleaned and disinfected using disinfectant with a chlorine concentration of 1000 mg/l. Medical waste disposal personnel must wear personal protective equipment.
   - Terminal disinfection
     Terminal disinfection of the floor and surfaces of all objects must occur after treatment every day. It is advisable to wipe surfaces with disinfectant with a chlorine concentration of 1000 mg/l or disinfectant wipes and rinse the dental unit waterline for 2 minutes, and disinfect it if necessary. Disinfectant with a chlorine concentration of 500 mg/l can be used to disinfect saliva suction pipes, spittoons and sewage pipes; after ultraviolet irradiation for 30–60 minutes, ventilation is necessary. Personnel must wear personal protective equipment and perform hand hygiene[15].

In summary, when enforcing the relevant regulations from the national and local health administration, dental institutions in different regions should pay close attention to disease prevention and control measures according to the epidemic situation. The above suggestions for disease prevention and control on a technical level can be referred to in dental practice. Strict management of emergency dental outpatients is vital to enable prevention and control of disease to occur. When the epidemic situation is under control and enters a routine working state, both dentists and patients will still face the risk of nosocomial transmission and the outbreak of other infectious diseases (such as HBV, HCV, HIV and TB) transmitted by blood or respiratory routes during dental treatment. It is therefore necessary to strengthen awareness amongst all dental medical personnel of how to prevent and control nosocomial transmission of infection in order to achieve this when the workflow reverts to normal. Only in this way will it be possible to minimise the risk of nosocomial transmission of COVID-19 for both dentists and patients. All dental institutions must establish additional prevention systems and measures on the basis of standard prevention guidelines and put them into clinical practice, so that when facing future outbreaks of infectious disease, they will not only be able to protect the safety of health care personnel but also carry out clinical work in a proper manner.

Acknowledgements

The authors wish to acknowledge the members of the expert committee:
Shu Ming SHEN, Peking University School of Stomatology, Beijing, P.R. China.
Jing SU, Capital Medical University School of Stomatology, Beijing, P.R. China.
Guang Yan YU, Peking University School of Stomatology, Beijing, P.R. China.
Chuan Bin GUO, Peking University School of Stomatology, Beijing, P.R. China.
Lin YUE, Peking University School of Stomatology, Beijing, P.R. China.
Zhen YANG, West China Hospital of Stomatology, Sichuan University, Chengdu, P.R. China.
Zheng Yi WU, College of Stomatology, Shanghai Jiao Tong University, Shanghai, P.R. China.
Xin Chen ZHAO, School of Stomatology, Wuhan University, Wuhan, P.R. China.
Wei ZHANG, Peking University School of Stomatology, Beijing, P.R. China.
Jiang CHEN, School of Stomatology, Fujian Medical University, Fuzhou, P.R. China.
Liang KONG, School of Stomatology, Air Force Military Medical University, Xi'an, P.R. China.

References

1. National Health Commission of People's Republic of China. Diagnosis and Treatment Protocol for COVID-19 (7th version) [in Chinese]. http://103.78.124.78:82/2Q2WC8B18677B065DFE1F6D752A9D56AD6DD7CC0ED1E_unknown_68CB51B4B9184D82848E6333F22B02872D994082_5/www.nhc.gov.cn/yzygj/s7653p/202003/46c9294a7dfe4cef80dc7f5912eb1989/files/ce3e6945832a438eaae-415350a8ce964.pdf. Accessed 16 May 2020.
2. National Health Commission of People's Republic of China. Technical Guidelines of Prevention and Control of the Pneumonia Caused by COVID-19 in Medical Institutions (First Version) [in Chinese]. http://www.nhc.gov.cn/yzygj/s7659/202001/b91fdab7c304431eb-082d67847d27e14.shtml. Accessed 16 May 2020.
3. National Health Commission of People's Republic of China. Guidelines of the Common Medical Protective Equipment Usage for Prevention and Control of Pneumonia Caused by COVID-19 (Trial) [in Chinese]. http://www.nhc.gov.cn/yzygj/s7659/202001/e71c5de-925a64eafbe1ce790debab5c6.shtml. Accessed 16 May 2020.
4. Watanabe A, Tamaki N, Yokota K, Matsuyama M, Kokeguchi S. Use of ATP bioluminescence to survey the spread of aerosol and splatter during dental treatments. J Hosp Infect 2018;99:303–305.
5. Polednik B. Aerosol and bioaerosol particles in a dental office. Environ Res 2014;134:405–409.
6. Harrel SK, Molinari J. Aerosols and splatter in dentistry: a brief review of the literature and infection control implications. J Am Dent Assoc 2004;135:429–437.
7. Harrel SK, Barnes JB, Rivera-Hidalgo F. Aerosol reduction during air polishing. Quintessence Int 1999;30:623–628.
8. Jacks ME. A laboratory comparison of evacuation devices on aerosol reduction. J Dent Hyg 2002;76:202–206.
9. Wood ME, Stockwell RE, Johnson GR, et al. Face masks and cough etiquette reduce the cough aerosol concentration of pseudomonas aeruginosa in people with cystic fibrosis. Am J Respir Crit Care Med. 2018;197:348–355.
10. World Health Organisation. Infection prevention and control during health care when novel coronavirus (nCOV) infection is suspected: interim guidance. https://www.who.int/publications-detail/infection-prevention-and-control-during-health-care-when-novel-coronavirus-(ncov)-infection-is-suspected-20200125. Accessed 6 March 2020.
11. World Health Organisation & WHO Patient Safety. WHO guidelines on hand hygiene in health care. https://apps.who.int/iris/handle/10665/44102. Accessed 6 March 2020.
12. Sebastiani FR, Dym H, Kirpalani T. Infection control in the dental office. Dent Clin North Am 2017;61:435–457.
13. National Health Commission of People's Republic of China. Guideline for prevention and control for occupational exposure to bloodborne pathogen (GBZ/T213-2008) [in Chinese]. http://www.zybw.com/upload/file/20180529/636631897237987960260909 8.pdf. Accessed 16 May 2020.
14. World Health Organisation. Infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care. http://apps.who.int/iris/bitstream/10665/112656/1/9789241507134_eng.pdf?ua¼1. Accessed 6 March 2020.
15. Centers for Disease Control and Prevention. Summary of infection prevention practices in dental settings: Basic expectations for safe care [in Chinese]. https://www.cdc.gov/oralhealth/infectioncontrol/pdf/safe-care2.pdf. Accessed 6 March 2020.