

# Review Paper: COVID-19 and Orthodontic Emergencies: A Narrative Review



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## ABSTRACT

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**Introduction:** COVID-19 pandemic has faced orthodontists with challenges. The number of unnecessary orthodontics visits should be decreased to stop the spread of this virus. However, if the patients undergoing orthodontic treatments are not followed for more than two months emergencies can occur. Hopefully these emergencies can mostly be handled at home if the orthodontist guides the patient correctly. This study attempted to gather the available solutions for the management of these emergencies, so that orthodontists can help their patients and to decrease the unnecessary appointments during the COVID-19 pandemic.

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At the end of 2019, the first cases of a pulmonary disease of unknown etiology were detected in Wuhan City, China. In the following months, this new pathogen spread throughout the world; in March 2020, the World Health Organization (WHO) officially declared a pandemic alert. (1)

## Signs and symptoms

This virus, named Sars-CoV-2, Middle East Respiratory Syndrome (MERS-CoV) and the Severe Acute Respiratory Syndrome (SARS-CoV) viruses belongs to the Corono-viridae family. (2) The clinical symptoms of COVID-19 are asthenia, dyspnea, headache and hyperpyrexia. (3) Also, a sudden loss of smell (anosmia) and/or taste (ageusia) has been reported as additional symptoms. (3) Studies have also found fever, continuous dry cough and myalgia or fatigue in patients. (4) Abnormal chest computed tomography (CT) scan revealed bilateral and peripheral ground-glass view in patients with severe stages of the COVID-19. (4) Some other less common clinical symptoms are sputum production, diarrhea and hemoptysis. (5)

## Transmission

Coronavirus can be transmitted through the inhalation of and mucosal contact with droplets released from an infected patient's cough and sneeze. (6) The droplets are either small ( $\leq 5$   $\mu\text{m}$  diameter) or large ( $>5$   $\mu\text{m}$  diameter). The droplets can travel for about 6 feet and may remain in the air if they are small or may deposit on the surface if they are large. The small droplets infect humans through the inhalation of the virus. While, the virus in the large droplets deposits and survives on surfaces and can be transmitted to other humans through hand-contact with the contaminated surfaces. (5)(7) A recent study concluded that not only positive patients can infect healthy individuals with corona virus but also asymptomatic patients can transfer the virus. (8) Although air-transmission of COVID-19 is proven but the fecal-oral route of the transmission is of question. One study assessed the stool samples of infected pa-

tients after a week and stated that the real-time polymerase chain reaction (RT-PCR) tests detected the virus in the stool sample. (9,10)

## Transmission in dentistry

Dental practices have risen the worries of spreading the novel corona-virus. Using a highspeed handpiece is common in dental procedures which can generate aerosols as the water is sprayed over the rotating bur to protect the pulp from excessive heat and prevent the pulpal damage. Bioaerosols which are the combination of aerosols with blood or/and saliva can spread bacteria, fungi, and viruses if the patient is contaminated and can infect the dentists or other patients if inhaled. (11,12)

Dental procedures have a high risk of COVID-19 infection due to face-to-face communication of the dentist and the patients, and also because the use of sharp and high-speed rotary handpieces and ultrasonic instruments generate contaminated and potentially infectious aerosol and droplets. (13) Currently, there is no practical solution to avoid generation of bioaerosols. (14) In order to stop the spread of the COVID-19 through a dental environment, using disinfection and personal protective equipment (PPE) is essential. (1,12) Also, decreasing the number of unnecessary appointments is crucial to control the spread of corona-virus. (13,15)

### *Orthodontics and COVID-19*

At the beginning of the COVID-19 pandemic, orthodontists and other dentists were recommended to close their dental offices which made patients and their clinicians to lose contact. According to a study by Shenoj et al. majority of patients were affected by the lack of access to orthodontic visits during the pandemic. (16) 51.0% of patients have not been in touch with their orthodontist and 55.9% of patients had not been regularly checked by their orthodontist since the pandemic started. (16) Since the COVID-19 pandemic has not officially ended and further pandemics of similar diseases can happen in future, it is import-

ant to emphasize on the tele-orthodontics.(15)

Tele-orthodontics generally refers to any orthodontic care delivered through technologies such as email, phone calls and video calls.(17) During this pandemic, it is better to follow-up patients at a distance using tele-orthodontics as it is an effective tool in situations like COVID-19 pandemic.(18)

According to Shenoi et al., 48% of patients had not visited their orthodontist for much more than two months.(16) Martina et al. stated that if patients under orthodontic treatments are not controlled for over 2 months, different emergencies can occur for the patients.(13) The emergencies based on the type of the appliance are as following:

### **1- Removable appliances**

Removable appliances can be classified into functional, aligner and retainer appliances.(19)

Functional appliances are used by growing patients to guide the correct growth of the dento-alveolar complex and the jaws. When patients are not controlled for a long period of time, the components of the functional appliance could break or the appliance may not fit in patients mouth anymore.(20) According to previous studies, if the appliance was broken, the patient should be encouraged to avoid using the appliance as it can harm the oral soft tissues. (20) It is better, if they keep the broken appliance in water until they visit their orthodontist. (20) And, if the appliance was misfitting, it is recommended to ask the patient to stop using it till the next appointment.(21)

As for aligners, the edge can poke the cheek and lips or it can break when the appliance is in function for over 2 months getting checked by the orthodontist.(21) If the edge of aligner hurts the oral soft tissue, the patient can carefully smooth the edge with a clean nail file. If the aligner is broken, the patient can use the next aligner if available, or can return to the previous aligner till visiting the orthodontist. (21)

Retainers are appliances that maintain teeth in optimal aesthetic and functional position after the treatment.(20) Bonded retainer may break

through time if the patient skips the follow-up sessions.(14) If it is possible to push back the retainer into its original place, it is better to ask the patient to do so. However, if the retainer is too loose, it is better to remove the retainer completely and use the removable retainer. (14)

### **2- Fixed appliances**

Pre-adjusted Fixed appliances, pre-activated fixed appliances and patient-activated fixed appliances can be mentioned in this category.(22)

The pre-adjusted appliance includes bands and brackets and arch-wires. Each of the components may be involved in an emergency if not checked by the orthodontist for a long time. (21)

As for a loose elastic O-ring or elastic chain, the patients should attempt to take out the elastic ring/chain or to put it back to the correct position using a tweezers. As for a tight elastic chain, it is advised to remove or cut the chain using a clean tweezers or nail clipper, respectively.(20)

Brackets can injure lips and cheeks. Based on previous studies, it is recommended to use orthodontic relief wax to prevent the soft tissue from getting injured. Also, the patient can use topical analgesics and topical antibiotics for a week to help the wound heal quicker. Sometimes, brackets can detach. Detached brackets should be removed carefully using a clean nail clipper as it can be swallowed or aspirated. If the bracket was swallowed and the patient had no abdominal pain, then there is nothing to worry. But if the bracket caused abdominal pain or was aspirated, then the patient should go to hospital emergency for further examination and professional care.(20)(21)(14)

Arch-wires, can cause lip and cheek wounds. In this case, patient can bend the wire or use relief wax to prevent from further injuries. Similar to the wounds caused by brackets, the patient is advised to use topical anesthesia and topical antibiotics on the injured site. Sometimes, the arch-wire may slip from one side; it is recommended to either cut the protruding wire with a clean nail clipper or to place back the wire into the right position.(21)

Pre-activated fixed appliances such as trans-palatal arch, lower lingual arch and maxillary expanders may become loose or may break if they are used for a long period of time without getting checked by orthodontist. If the abovementioned appliances are loose, similar to retainers, the patient is suggested to either push the appliance into the correct position or to take it out completely. If the appliance is broken, the patient should remove it. For expanders, the patient should suspend further activation till the future appointment.(20)(19)

Patient-activated fixed appliances refer to face masks, headgears, or lip bumpers. The use of this type of appliances should be stopped to prevent from the occurrence of potential emergencies. (22)

Note that, during the pandemic, orthodontist should insist on patients' oral hygiene to prevent from gingival inflammation and white spot formation.(23) Patients should be suggested to improve their mechanical plaque control by proper tooth brushing and dental flossing.(23) Also, patients should be recommended to use sodium fluoride mouthwash (0.05% or 0.2%) daily, or phosphate fluoride mouthwash (1.2%) weekly, Stannous fluoride gels (0.4%) and 1100 ppm fluoride toothpaste.

## Conclusion

Due to the COVID-19 pandemic, orthodontists are facing challenges. Orthodontists should reduce the number of unnecessary visits. However; the pandemic should not stop them from following up their patients. As the consequences of not checking the orthodontic patients regularly, some emergencies can occur. Hopefully these emergencies can mostly be handled at home if the orthodontist guides the patient correctly. This study attempted to gather the available solutions for the management of these emergencies, so that orthodontists can help their patients and to decrease the unnecessary appointments during the COVID-19 pandemic.

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