



JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

An International Scholarly Open Access, Peer-reviewed, Refereed Journal

USE OF TELE-ORTHODONTICS FOR EMERGENCY ORTHODONTIC MANAGEMENT DURING EMERGING SARS-CoV-2 VARIANTS

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Abstract : The coronavirus disease 2019 (COVID-19) outbreak has expeditiously become a worldwide pandemic, causing a global health and economic catastrophe. Owing to the outburst of new SARS-CoV-2 variants and the characteristics of dental set up, there is a tremendously high risk of cross infection between patients and dental health care personnel (DHCP). Nevertheless, as an orthodontist and a dedicated health care worker, it is our duty to provide the best possible treatment for the success of ongoing orthodontic therapy. The aim of this article was to provide a comprehensive summary on the precautions for orthodontic setting during the covid variant outbreak and short term orthodontic emergencies management at home.

Index Terms - COVID-19, orthodontic management, precautions, orthodontic emergencies.

I. INTRODUCTION

The coronavirus outbreak was first identified in December 2019 in Wuhan, China. After an expeditious upsurge in the number of cases, the World Health Organization, on January 9, 2020, announced the discovery of the novel coronavirus, which was first called 2019-nCoV and then officially renamed as SARS-CoV-2. It was officially renamed as Coronavirus Disease 2019 or COVID-19 on February 11. ¹ Waves of infection spiked with the unfolding of the alpha, beta and delta SARS-CoV-2 variant of concern (VoC). On November 25th 2021, Omicron was reported which was a new SARS-CoV-2 variant of concern (VoC).²

The expeditious transmission of omicron is a concern for all. Dentists, including orthodontists, are in close contact with the patients during orthodontic treatment. This makes them more prone for contracting transmissible diseases due to the exposure to blood, saliva, and aerosol/droplet production during various dental procedures.^{3,4} Additionally, the omicron variant is reported to have carriers who are asymptomatic, which also includes children, who amount to a majority proportion of patients seeking orthodontic treatment.

II. PROBABLE SOURCES OF CONTAMINATION AT THE ORTHODONTIST'S OFFICE⁵

- 1) Saliva: SARS-CoV-2 is present in the saliva of infected patients.⁶ ACE2, which is a receptor for the same are present on the tongue and buccal mucosa, making the mouth an incubator and suitable host for transmission of the virus.^{7,8}
- 2) Aerosol: Meng et al³ advised to minimize procedures that involved the generation of aerosols and droplets. Cleaning procedures in subsequent visits require the use of high-speed handpiece or ultrasonic scalers which produce aerosol in the entire operator.⁹ This aerosol could be contaminated with patient's blood, saliva, containing high concentrations of infectious microbes.^{9,10} Usage of rubber-dams are highly recommended. According to a study that used a fluorescent dye and a high-speed handpiece, the dye was reportedly found as far as 2 feet away from the dental chair, as well as in the noses of the operator and assistant, having penetrated their facial protection gear.¹¹ Aerosols containing germs with a diameter of 0.5-10 m or less can linger in the air for a long period, increasing the likelihood of being inhaled and penetrating deeper parts of the lungs, perhaps causing a serious infectious disease.¹² Altogether, aerosol pose a tremendous risk of contagion of COVID-19.
- 3) Orthodontic equipments: Orthodontic pliers, band seaters, wire cutters etc are possible carriers of lethal microorganisms as they come directly in contact with patients' saliva and blood. ¹³ Despite the fact that the majority of archwires come in individually sealed packets, a few orthodontists recycle and reuse them.¹⁴ If the wires have not been fully disinfected, it

could result in a significant danger of cross-contamination. Furthermore, without adequate sterilization, reusing orthodontic bands, brackets, E-chains, TADS, and photographic mirrors could pose a significant infectious threat.¹⁵ Cross-contamination by SARS-CoV-2 would result from careless handling and incorrect sterilisation of such contaminated devices and supplies, jeopardising infection control efforts inside the orthodontic office.

III. TELE- CONSULTATION, PRE-APPOINTMENT SCREENING AND TRIAGE

The first step towards managing any orthodontic case during the outburst of omicron variant should be tele-consultation via any virtual assistance platform by using photos, videos or video calls as tools. Conducting a triage via any platform is essential to segregate actual emergencies that needs to be managed in the dental office in person from situations that can be remotely managed. Tele-consultation could be useful to determine the urgency/necessity of a patient to visit the orthodontist. It is essential to take proper history to determine the current health status of patients and check for the presence of potential risk factors for COVID-19.^{3,16} Patients should be especially questioned if they have had any contact with infected people or if they have travelled to locations where the disease is spreading rapidly. In asymptomatic individuals who had contact with infected persons and/or travelled to an at-risk area and have a positive history, it is recommended to postpone treatments for up to 14 days following the exposure. Orthodontic treatment can be performed in the absence of contacts and/or symptoms, as long as the protective steps are followed.^{3,16}

IV. MANAGEMENT OF ORTHODONTIC EMERGENCIES DURING THE COVID-19 PANDEMIC

As far as possible, it is recommended that all routine orthodontic appointments be postponed and restrict patient visits to emergency treatment only.^{3,17} An orthodontic emergency can be described as a problem that emerges from an orthodontic appliance, where an unscheduled appointment is required to resolve the issue. Repeated breakages could additionally cause stress, pain and discomfort to the patient.¹⁸ Consequently, this could extend the treatment time which could lead to loss of confidence in the orthodontic therapy and the orthodontist. By providing suitable and timely management to the patient, inconvenience can be prevented whilst maintaining the efficacy of the appliance.¹⁹ Some of the possible orthodontic emergencies that may occur include poking ligature wire, poking distal end of archwire, broken retainer, loose brackets, embedded separator or band material into the gingiva leading to severe pain and or infection. Such situations should be regarded as ‘urgent’ and need to be managed as soon as possible owing to the fact that it could cause severe pain and discomfort to the patient.²⁰

In case that an orthodontic emergency does occur, step-by-step management should be followed:

- 1) Virtual assistance or tele-consultation using photos, videos or video call should be done to confirm the emergency. Main purpose of doing teleconsultation is to see if the problem can be addressed at home.
- 2) Patient must be reassured regarding the successful completion of orthodontic therapy given the pandemic situation.
- 3) Utilization of phone call or video-call or appropriate tele-communication methods must be done to guide patients to resolve the orthodontic emergency at home, if possible. Guidelines for at-home management for the most commonly encountered problems are listed in Table 1.
- 4) If the problem cannot be resolved at home, the patient will have to visit the dental office, after proper history taking, to minimize the risk of transmission. Consequently, the orthodontist must follow all precautionary measures and sterilization and disinfection protocols to manage the orthodontic emergency in the dental office.

Table 1: Guidelines for at-home management

FIXED APPLIANCES	
Poking distal end of archwire	-Sometimes, this can be caused due to sliding of the wire from one side. If so, patient is asked to use any sterile tweezers (eyebrow tweezers can be used) to attempt to slide the wire back into the molar tube on the opposite side, until it is comfortably secured. -If the wire cannot be moved to a comfortable position, patient is asked to very carefully cut the end of the wire using sterile nail clippers. Patient should be specifically told to place some gauze or cotton around the area while cutting the wire to avoid accidental swallowing of the snapped piece of wire.
Loose orthodontic bracket	-Ask patient to place some orthodontic relief wax on bracket and secure it to the tooth. Patient must be specifically told not to use any superglue to fix the bracket.
Broken or loose elastic chain	-Patient is asked to cut the elastic chain with sterile nail clippers or scissors and remove the extra segment using sterile tweezers.
Soft tissue irritation caused by bracket/band/ligature/archwire	-Patient is asked to pinch some orthodontic relief wax over the area causing irritation. -If the patient has developed mouth ulcers, temporary relief can be achieved by doing warm saline rinse followed by application of a topical anesthetic gel like Orabase 2-3 times a day.

Torn or loose ligature	-If the ligature is loose, patient is asked to secure the ligature around the bracket, using a clean pencil eraser or sterile tweezers. -If the above is not feasible or if the ligature is torn, patient is asked to carefully cut the ligature using sterile nail clippers or scissors.
Broken bonded retainer	-Patient is asked to cut the extra segment of the retainer using sterile nail clippers. -Patient is advised to wear their removable retainer (if available) until their next visit to the orthodontist.
Soft tissue swelling and pain	This could happen due to an abscess caused by band material, embedded separator etc. Patient is asked to take antibiotic therapy with pain killers until it is feasible to visit the orthodontist and treat the infection.
REMOVABLE APPLIANCES	
Broken or lose retainers	-Orthodontist can fabricate a new set of retainers from the finished patient cast and send it to the patient. If this is not possible, the patient is asked to visit the orthodontist at the earliest.
Broken or lost aligners	After consulting the orthodontist, switch to next aligner set or go back to the previous aligner.
Functional Appliances	If broken or it does not fit properly, suspend the use

V. CONCLUSION

It is absolutely essential to postpone all regular appointments and elective treatment procedures due to the high risk of cross-contamination by SARS-CoV-2. Only the true emergency cases, which cannot be remotely managed, must be treated in the dental office with the necessary personal protective equipment, following pre appointment screening and triage, whilst following the guidelines dictated by the WHO and local authorities. It is the responsibility of the orthodontic team to ensure safety and minimize the chances of transmitting SARS-CoV-2 in the orthodontic setting. As an orthodontist and a dedicated health care worker, it is our duty to be prepared to play an active role in the fight against COVID-19 or any other infectious disease, whilst providing the best possible treatment for the success of orthodontic therapy during this pandemic situation.

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