

Management of SARS-Cov-2 inflicted orthodontics

¹Dr. Sayeri Hossain, PG, Department of Orthodontics and Dentofacial Orthopedics, K D Dental College and Hospital, Matura,

²Dr. Omkar Singh Yadav, Reader, Department of Orthodontics and Dentofacial Orthopedics, K D Dental College and Hospital, Matura, India

³Prof. Dr. Kuldeep DMello, HOD & Professor, Department of Orthodontics and Dentofacial Orthopedics, K D Dental College and Hospital, Matura, India

⁴Dr. Piyush, PG, Department of Orthodontics and Dentofacial Orthopedics, K D Dental College and Hospital, Matura, India

Corresponding Author: Dr. Sayeri Hossain, PG, Department of Orthodontics and Dentofacial Orthopedics, K D Dental College and Hospital, Matura,

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Abstract

This century witnessed its second pandemic in the form of corona virus towards the end of 2019, barely a decade after Influenza A(H1N1). First symptoms of unknown etiology were reported from western China which soon spread globally like a wildfire. This highly contagious disease has not only affected global health but also sabotaged the economy of the affected nations to a significant level. The WHO has delivered relevant information, related online courses, laid out prevention guidelines as updated from time to time. This article aims at providing an insight to the effect of the global disease on orthodontic offices and means to deal with the same.

Keywords – Corona virus, Contagious disease, Etiology, WHO, Orthodontic office

Introduction

As early as 2007, a paper published in the Clinical Microbiology Reviews on SARS coronavirus infection together *with the culture of eating exotic mammals in southern China, is a time bomb*. [1] By the end of 2019, an outbreak of severe pneumonia of unknown etiology occurred in Wuhan, China which probably originated in the Huanan seafood market in China.[2] Bats are believed to be the natural hosts of the disease that was transmitted to humans through an intermediate host.[3] The new virus was initially referred to as novel coronavirus 2019-nCoV, then as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) by the International Committee on Taxonomy of Viruses.[4] This virus possesses higher transmissibility potential compared with SARS-CoV and

MERS-CoV. [5] Due to the high degree of contamination of this virus, the world came to a halt or at least 1/3 of it. In fact, the world is petrified. So much so that leaders in the world seem to be lost, divided in their roles of great responsibility, between saving lives due to the corona virus or focusing on the consequences of the economic lag that will follow due to social isolation.

The infection is believed to transmit to humans through fomites, person-to-person contact, aerosol, and droplets.[6,7,8] The World Health Organization (WHO) declared this viral outbreak a pandemic affecting 16,812,755 individuals in around 216 countries and territories, with a total of 662,095 confirmed deaths by 29th July, 2020.[9]

In India, from 30th January to 30th July 2020 6:03pm CEST there have been a total of 1,583,792 confirmed cases with 34,968 deaths.

Patients confirmed with coronavirus disease of 2019 (COVID-19) develop symptoms of lower respiratory tract infection, including fever, coughing, sneezing, vomiting, generalized fatigue, and severe pneumonia.[10,11] Symptoms may occur 2 to 14 days after exposure, according to the CDC. The disease onset could be mild, moderate, severe, or critical. Symptoms among infected patients vary from being asymptomatic to Acute Respiratory Distress Syndrome, sepsis, septic shock, and multiple organ failures in critical patients with high reported deaths.[12]

In the dental field, for the purpose of controlling COVID-19 infection, the fundamental preventive measure lies in the filter of patients who come to the ambulatory. Therefore, a questionnaire should be used to screen patients with potential infection of 2019-nCoV before they could be led to the dental chair-side, as recently suggested.[6]

The virus is highly contagious during even during the latency period.[16] This finding rings the alarm bell of a potential hazard: treating asymptomatic patients and spreading infection within the orthodontic clinic. Furthermore, aerosol generation—a routine occurrence in the orthodontic clinic—is a confirmed route of infection transmission.[6,7]

Orthodontists may see dozens of patients in a single day. This fact makes strict infection control measures with the highly transmissible SARS-CoV-2 an area of concern. Children comprise the vast majority of orthodontic patients. Studies have reported asymptomatic children infected with COVID-19.[7,13,14]

An orthodontic emergency might be described as a problem arising from an orthodontic appliance, where an unscheduled appointment is required to resolve the issue. When a patient has such an issue, a timely additional appointment may need to be arranged with a specialist. Patients who present with an orthodontic emergency may be experiencing pain or discomfort. It can also be inconvenient for the patient and parents in attending for an additional, unexpected appointment due to pre-existing school or work commitments. Consequently, repeated breakages prolong treatment time and can lead to decreased patient motivation due to a loss of confidence in the appliance or the operator. By providing appropriate timely management, inconvenience and distress to both the patient and parents may be minimized with the efficacy of the appliance still being maintained.[15]

To face this highly contagious infection, it is important to reevaluate infection control measures within the orthodontic practice. The objective of this review is to put light on possible orthodontic emergency management and also on risk, precautions, and recommendations within the clinical orthodontic practice.

Risk of disease transmission within the orthodontic practice

Orthodontist, requires proximity to patients while performing operatory procedures. Unfortunately, this makes the dental healthcare workers at a high risk of acquiring infectious diseases.[19]The current recommendations for COVID-19 are to avoid person-to-person contact and maintain 1-2 m distance between individuals.[8] This recommendation cannot be optimized in the orthodontic clinic for the nature of the orthodontic operation, which places the orthodontist and the dental assistant at a high risk of acquiring the infection.

In addition, the incubation period of 2019-nCoV infection could reach up to 24 days, while still being contagious during this latency period.[10,16]This is especially important for the orthodontists who tend to see a high volume of patients in a short period daily. Furthermore, several studies reported asymptomatic carriers, including children, who comprise a high percentage of orthodontic patients, which elevates the risk on the orthodontic team even higher.[7,13,20]

Possible sources of contamination

- 1) **Patient's saliva:** Studies reported high loads of SARS-CoV-2 in the saliva of infected patients.[21]Other studies reported large numbers of ACE2 (the receptor for SARS-CoV-2) on the human tongue and buccal mucosa and raised the possibility of oral-fecal transmission.[22,23]
- 2) **Aerosol:** Using a high-speed handpiece or ultrasonic scaler during dental cleaning at bonding, bracket repositioning, and debonding visits produces aerosol and splatter in the operatory vicinity.[24]This aerosol could be contaminated with patient's blood, saliva, or high concentrations of infectious microbes exceeding those produced by coughing or sneezing.[24,25,26]Moreover, aerosol containing

microbes was found to reach as far as 2 m from the patient's mouth, with the highest concentrations reported the furthest away from the patient.[27]This finding means microbes could contaminate surfaces throughout the operatory. The aerosol could contaminate the dental unit waterline, resulting in the spread of infection.[28]Aerosols containing germs of 0.5-10 µm or less can remain airborne longer, increasing the risk of being inhaled and entering deeper areas of the lung, posing a potential infectious hazard.[29]

- 3) **Orthodontic supplies and instruments:** Although most archwires are packaged and sealed individually, some orthodontists have recycled and reused wires.[20,30,31]This is a huge risk of cross-contamination if wires are not thoroughly sterilized. In addition, reusing tried-in orthodontic bands, orthodontic brackets, elastomeric chains, tungsten carbide debonding burs, miniscrews, orthodontic markers, and photographic retractors without proper sterilization and disinfection are tremendous potential hazards.[32-36]Orthodontic instruments that come in direct contact with patients' saliva and blood, including band seaters, band removers, scalers, and ligature directors are considered contamination dangers as well.[37]

Classification and management of orthodontic emergencies

We can classify orthodontic emergencies on the basis of the type of the appliance used by the patient: removable appliance or fixed appliance.[50]

Removable appliances

Removable appliances can be classified into the following:

Functional - If the patient breaks the appliance or if he feels discomfort while wearing it then we ask them to

discontinue the use of that appliance at least for some time, so as to reduce the situation of immediate emergency which is not possible for the patient to manage it by himself.

Aligners – In our daily practice we often come to the situation where an *aligner* has been broken or lost by the patient. If during this time of pandemic if the patient comes with such scenario we ask them to shift to that aligner which are best fitting.

Retainers – If somehow the retainer of the patient gets break and he is on high risk of relapse of orthodontic treatment then we ask them that if somehow they can join them perfectly with the use of any sticking material then do it or also we can ask them to buy contentive appliance like hot customizable preforms.

Fixed appliances

Fixed appliances can be classified into the following:

- Non-removable appliances
- Non-removable appliances that can be activated by the patient
- Pre-activated, non-removable appliances

Any kind of emergencies reported in relation to fixed appliance then we should ask the patient to either send the photographs or short videos of the mishap that occurs before advising them anything to do for emergency.

Different situations in relation to fixed appliance creating emergency:-

- 1) Debonded or loose bracket and molar tube- Ask the patient to leave it as such if it is not creating any problem. If molar tube gets debonded we ask to carefully slide it out and cut the wire with the help of nail cutter or any wire cutter after cleaning it properly with any disinfectant. If loose bracket is creating any unbearable discomfort then we ask them to carefully take it out with the help of any tweezer like appliance.

- 2) Elastic chain coming out of brackets – Ask them to remove the chain carefully.
- 3) Archwire/ligature wire poking on buccal mucosa or on lips/ – Ask them to either cut that portion of wire or carefully fold the wire or push the wire back to its place
- 4) Frequent ulcer – Ask them to apply the medicine prescribed to them and use orthowax over that portion of wire or bracket which is causing continuous irritation.
- 5) Non removable appliance which are activated by patient – If it is going to be a long time duration to see that patient after the schedule time ask the patient to stop activating them and if it comes out then just keep it as such.
- 6) Appliance embedded in gingiva – Ask them to visit clinics for checkup and prescribe some antibiotics. Whether this is not immediately possible, we recommend prescribing a symptomatic therapy with FANS or paracetamol after properly asking for allergies. [17,18]

Preventive measures during orthodontic practice

- A) Patient evaluation and screening: In general, it is recommended during the outbreak to postpone any routine appointments and restrict patients' visits to emergency treatment only.[39,40]Screening patients for COVID-19 symptoms and recording their body temperature is essential.[6,8,41]Updating patient's medical history and asking targeted questions relevant to COVID-19 before initiating any dental work is mandatory.[6]This includes (1) history of fever (37.3°C or higher) or use of antipyretic medication in the past 14 days; (2) symptoms of lower respiratory tract infection, including dyspnea in the past 14 days; (3) history of travel to a COVID-19 epidemic area in

the past 14 days; and (4) history of contact with a confirmed COVID-19 in the past 14 days.

- B) Daily self-evaluation of the dental health care provider is advised. If the orthodontist does not feel well or developed any symptoms, it is prohibited to work and spread infection.[42]
- C) Mouth rinse before any procedure using 0.12%-0.2% chlorhexidine gluconate could help minimize the number of microbes within the oral cavity.[8,43]
- D) Personal protective equipment, including facial mask, face shield, eye protection, gowns, and gloves, are essential protective gear during the outbreak.[8,39,42,44]. COVID-19 was reported to transmit through contact of the virus with ocular mucosa; thus, any contact with mucosal tissue of the eyes, nose, or mouth should be avoided.[39,45]
- E) Aerosol production should be restricted, and if necessary, particulate respirators such as N95, EU FFP2, or equivalent in addition to face shield are required.[8,39,42,44]
- F) Reinforcement of hand hygiene measures according to WHO recommendations (washing hands for 20 seconds minimal) is essential to combat this robust microorganism.[6,46]
- G) Adequate ventilation of the operatory and waiting area with new air, high airflow, or with air filters is advised, with special attention to minimizing the number of patients in the waiting area and allowing adequate space for social distancing.[8,44,47]
- H) Medical wastes during the outbreak should be handled as infectious medical wastes. Double-layer yellow anti leakage medical waste marked with a special tag is recommended.[6,41,48,49]
- I) The following key steps are recommended, based on an accumulation of the recommendations and

suggestions of multiple professional regulatory bodies[38]:

- (1) Provide patients with a broadcast communication describing the changes in access to the orthodontic clinic/office as per recommendations of the local public health and or dental regulatory authority,
- (2) Provide active patients with recommendations on treatment progression either on an as needed individual basis or in a communication provided to all patients (eg, when to stop turning an expander, what to do when the patient has reached their final aligner, etc.). Patients should also be reminded to always wash their hands prior to and after placing and removing appliances or elastics, to clean their appliances regularly by wiping with alcohol, and to store appliances in their cases,
- (3) Provide a means of communication (phone number or email) to patients to allow them to contact the orthodontist or an orthodontic team member with any questions or concerns, and send problem-related intraoral mobile phone digital images,
- (4) Use phone calls or, where possible, video calling or appropriate tele dentistry facilities to assist patients in resolving any emergent orthodontic problem that can be managed at home, or to determine which patients need in-person attendance,
- (5) Provide emergent orthodontic treatment in a safe manner, where necessary, and
- (6) Exercise evidence-based precautions during the provision of any in-office emergency treatment.

Conclusion

Owing to the high contagiousness of COVID-19 orthodontists need to be constantly aware of its continually changing symptomatic patterns and aware themselves of updates in infection control guidelines. Due to high transmissibility of COVID-19, controlling aerosol and human-to-human contact while switching to elective

treatment only is advised during the outbreak. The orthodontist should advise the patient against the use of anything that could lead to an urgency in the office such as appliances that can be activated by the patient at home (rme, elastics, face masks, headgears, lip bumpers, or any other non-removable appliances that can be activated by the patient).

Currently, it is essential to manage in the office with the necessary PPE only the real cases of urgencies that cannot be resolved remotely by the patient, following the guidelines dictated by the WHO and local authorities.

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