



Management of Orthodontic Emergencies during COVID-19: A Pandemic Period

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Abstract

Coronaviruses (CoVs) is a single-stranded RNA genome. It cause disease, like Upper Respiratory Tract Infections (URTIs) and Lower Respiratory Tract Infections (LRTIs) and even Severe Acute Respiratory Syndrome (SARS). In the late December 2019, an emergent pneumonia outbreak originated in Wuhan City, China. On 30th January 2020, WHO declared a public health emergency of international concern over this global pneumonia outbreak. On 11th March 2020, the Director-General of the WHO declared coronavirus disease 2019 (COVID-19) outbreak a pandemic. However, healthcare workers and patients, which pose a risk of transmission of the virus. Dentist are listed top at the high risk of occupational exposure to COVID-19, routine dental procedures usually generate aerosols and droplets. Due to COVID-19 pandemic, on an emergent basis clinics and colleges were restricted to work. This document provides advice and guidance for the triage, assessment and provision of urgent dental care for patients undergoing orthodontic treatment during the COVID-19 pandemic. Orthodontic emergencies (pain or discomfort, repeated breakages) faced by patient during pandemic period described on the basis of type of appliance used by patient. In conclusion, a good method to manage emergencies, reassure, and follow patients remotely, while they are in their home. The orthodontist should not let the patient use anything that could generate an urgency in the office/college.

Keyword: Management; Orthodontic Emergencies; COVID-19 Pandemic

Introduction

Coronavirus (CoV) is an enveloped virus that belongs to the order Nidovirales, Coronaviridae, and Coronavirida and has a plus-strand single-stranded RNA genome. CoV has the largest genome of RNA virus (26-32 kilobases (kb) in length). This virus mainly infects birds and mammals. They also infect humans and include upper respiratory tract infections (URTIs) that resemble common cold lower respiratory tract infections (LRTIs) such as bronchitis, pneumonia, and even severe acute respiratory syndrome (SARS). It can cause illness. Recent studies have increasingly

revealed that human CoV (HCoV) is involved in both URTI and LRTI, confirming the importance of coronavirus research as a causative agent of severe respiratory illness [1].

Pneumonia that occurred in Wuhan, China (late December 2019) spread rapidly from Wuhan to most other states and 24 other countries. On January 8, 2020, the Chinese Center for Disease Control and Prevention (Li, *et al.* 2020) officially announced the new coronavirus as the causative agent of COVID19 [2]. The World Health Organization (WHO) has announced a public health emer-

gency of international concern declared on January 30, 2020, for the outbreak of this global pneumonia [3].

Fever, cough, and myalgia or fatigue with abnormal chest CT are the typical clinical symptoms and the less common symptoms were sputum production, headache, hemoptysis, and diarrhea patients who suffered from the novel viral pneumonia. Some clinical manifestations are different from the severe acute respiratory syndrome (SARS) caused by the SARS coronavirus (SARSCoV), which emerged between 2002 and 2003, and this is a new infectious agent that is transmitted from person to person. It suggests that it caused the outbreak of viral pneumonia. Chinese researchers quickly isolated the new virus from the patient and sequenced its genome (29,903 nucleotides). The infectious agent for this viral pneumonia that emerged in Wuhan was finally identified as the new coronavirus (2019-nCoV), the seventh member of the coronavirus family that infects humans [3].

WHO named the novel viral pneumonia "corona Virus Disease (COVID19)" on 11th February 2020. The International Committee on Taxonomy of viruses (ICTV) has named this new coronavirus "SARSCoV2" based on the phylogenetic and taxonomic analysis of this new coronavirus.

On February 26, 2020, COVID19 was recognized in 34 countries, with a total of 80,239 confirmed cases (laboratory) and 2,700 deaths (WHO2020b) [2].

On March 11, 2020, the WHO was declared coronavirus disease 2019 (COVID19) burst a Pandemic (WHO, 2020a). On March 29, 2020, COVID-19 was recognized in more than 200 countries, regions, with a total of more than 575,000 confirmed cases and more than 26,000 deaths (WHO, 2020b) [4].

The rapid and accurate detection of 2019nCoV is important for controlling the occurrence. Nasopharyngeal and oropharyngeal swabs are the recommended upper airway specimen types for the 2019nCoV diagnostic test. SARS-Co-V-2 was isolated from saliva of patient. However, collecting these types of samples requires close contact between the medical staff and the patient, and the epidemic risks transmitting the virus to the medical staff.

Effects on dental treatment during pandemic

Demand for emergency dental care decreased by only 38% (Guo, *et al.* 2020). This shows that even during this pandemic,

the public need for urgent dental care is always crucial [4].

So far, two weeks had passed since the outbreak of COVID 19 was declared a pandemic. However, some dental institutions, regulators, and advisory bodies do not yet have a clear understanding of the potential global impact of this pandemic on dental services. Responses and actions from dental associations around the world ranged from encouraging practitioners to end their practice in California, USA (CDA, 2020) and to decrease the number of routine inspections in the UK (Scottish Government, 2020). Without advice from multiple dental associations around the world [4].

According to the US Government's COVID-19 response plan announced by the US Department of Health and Human Services (HHS) on March 13, 2020, this COVID-19 pandemic could last for more than 18 months (HS, 2020). Closing the dental office during a pandemic may reduce the number of affected people but increase the distress of those in need of urgent dental care. It also increases the burden on the emergency room of the hospital [4].

The risk of cross infection may be more between dental practitioners and patients [2]. Routine dental techniques usually produce aerosols and droplets, etc. This is usually associated with the utilization of devices and equipment such ultrasonic scalers, airwater syringes and air turbine handpieces [4].

Modifications to dental treatment should be considered to uphold a healthy environment for the patients and the dental team, during the course of this pandemic. Precise guidelines are published and constantly updated by the WHO and, in Italy, by the Italian National Institute of Health [6].

This article provides information and guidance for the triage, assessment and provision of urgent dental care for patients undergoing orthodontic treatment during the COVID19 pandemic [7]. An orthodontic emergency (pain or discomfort, repeated breakages) can be described as a problem arising from an orthodontic appliance, where an spontaneous appointment is required to resolve the issue [6].

The aim of this review was to provide a comprehensive summary of the implications of SARSCoV2 and COVID19 on orthodon-

tic treatment and to discuss the contingency management and provision of emergency orthodontic care, using currently available data and literature [8].

Materials and Methods

Orthodontic emergencies faced by patient during pandemic period

On an emergent basis clinics and colleges were restricted to work, due to COVID19 pandemic. Orthodontists received strict orders from the Quebec Order of Dentists and the Public Health Authorities, on March 16th, 2020: to bound their treatments to only EMERGENCIES due to an infection, severe pain or trauma requiring instant attention [9].

Only emergency patients will be seen for an appointment. Whereas those clinical situations included: Injuries to the cheeks, lips or tongue causing severe pain, swelling or bleeding. Broken or unsealed equipment that causes significant uneasiness, interferes with normal mastication, and/or cannot remove itself [9].

Classification of orthodontic emergencies [6]

On the basis of the type of the appliance used by the patient

Removable appliance

- Functional
- Aligners
- Retainers

Fixed appliance

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

Removable appliance

Functional appliances

Functional appliances (FA) were given to the growing patients to guide the correct growth of the dento-alveolar complex and the jaws [6].

What to do in a pandemic COVID 19 situation?

If FA breaks, the deformed appliance will cause injury (the appliance will not fit properly in the mouth). Stop wearing the

appliance. Contact the orthodontist to update the situation and wait for an appointment after the pandemic [9]. This whole procedure will reduce the emergencies.

Aligners

Aligner is a splint of transparent special material used like braces for orthodontics. They apply a gentle and constant force to move the teeth to the desired position devoid of the hassle of metal wires or brackets. They are created individually for each patient using digital scans.

What to do in a pandemic COVID 19 state?

- **If no longer have new aligner trays:** Continue your treatment with your last active tray but reduce the time to 8 hours a day as prescribed by your orthodontist. It is very important not to stop wearing your previous active tray because it acts as a maintenance appliance and wait for next appointment.
- **If lost a button that is used to attach an elastic:** Stop wearing all elastics until your next appointment after the pandemic [9].
- **If lost an attachment:** Continue to wear your aligner trays till your afterward appointment after the pandemic.

Retainer

Retainer is a custom designed device, usually prepared of wire or clear plastic. It is given at the termination of orthodontic treatment. These instruments ensure the stability of the dental arch. In other words, it reduces the risk of lifelong recurrence (the tendency of teeth to return to their original position).

Example (most commonly used) - Hawley Retainer, Vacuum Formed Retainer (VFR), Fixed Retainer, Bonded Lingual Retainer.

What to do in a pandemic COVID 19 state?

- **Detached lingual wire (partial or complete):** Apply orthodontic wax to the area of wire that is annoying you and try to stabilize your situation. Talk to your orthodontist for major gum and tongue injuries and severe inflammation. The condition is evaluated and the decision regarding the need for an emergency reservation is considered (emergency response).
- **Damaged or lost removable retainer:** Contact your orthodontist to plan an appointment after a pandemic.

Fixed appliance

Non-removable appliances

What to do in Pandemic COVID-19 conditions?

- **A bracket may become loose or lose its metallic or elastic ligature:** because of eating hard or sticky foods can cause the brackets to loosen and the metal or elastic ligatures to be lost. If the bracket remains flush with the teeth, you can leave it there and carefully remove with eyebrow tweezers. If possible, keep the braces and wait for the next post-pandemic appointment. In circumstance of injury, swelling or bleeding, please contact your orthodontist. He assesses the situation and determines the need to make an urgent appointment.
- **If a metal ligature wire causes soft tissue trauma or pain:** the patient should attempt to push it back with a small eraser on the posterior of the pencil. Otherwise, you can apply the orthodontic relief wax. If the patient does not have wax, you can find it in online stores such as pharmacies and Amazon. In the pinch, both are made from microcrystalline paraffin, so you can use food grade wax.
- **Extended poking wires:** can occur early in treatment because the distal end of the arch wire is protruding. If the arch wire is misaligned sideways, you can use eyebrow tweezers to reposition it. If the patient is unable to reposition the wire, it is best to cut the wire. Thin wires can be cut with a nail clipper (nail cutter). Disinfection can be done by boiling in hot water at 100 ° C for 30 minutes [10,11]. If the wire is thick, we recommend cutting it with a safe metal cutter at the e-commerce site. Contact your orthodontist to make an appointment as soon as possible.
- **Separated brace used for elastic wear:** Please stop wearing rubber bands or all elastics until the schedule after the next pandemic.
- **Break or loosen elastic chain:** Cut or take out extra segments that are in the way. After the pandemic, wait for your next scheduled appointment with the orthodontist [9].

Non-removable equipment that can be activated by the patient

It includes equipment such as face masks, Headgears, lip bumpers, etc. These types of appliances and elastics should first

be hung to reduce the risk of an emergency until the patient is referred to an orthodontist.

What to do in a pandemic COVID 19 state?

If the patient feels pain, redness or swelling near a fixed orthodontic appliance, ask patient to take a picture and send it to the dental surgeon. If a periodontal abscess is suspected, it is advisable to visit the patient to eliminate the cause. If under the gums, then treat the infection with antibiotic therapy. If this is not immediately possible, it is advisable to prescribe symptomatic treatment with paracetamol (PCM) after appropriate allergy screening.

Pre-activated non-removable device

Fixed treatment may also include pre-activated devices such as Pendulum, Forsus, Distal jet device, Transpalatal bar, etc. In this case, it is advisable to take photographs every 3 weeks and see the patient in case of emergency (pain, swelling, etc.). It should be remembered that the concern in this case is to prevent the emergency, not to cure it. In addition, it is helpful to have the patient carefully write down what they did and when.

These metal springs work to correct the discrepancy between the upper and lower teeth.

- **Pandemic COVID19 Condition:** The rod (thin part) can be reinserted into the spring (thick part) by splitting the two parts from each other to stabilize the situation and opening the mouth to the maximum to compress the spring. It has been shortened. If this procedure is too tough, stabilize each part. Use dental floss around the wire to attach the top (spring) along the teeth and orthodontic wire. The same applies to the bottom (rod). This technique also applies to One Piece springs. Contact your orthodontist to schedule your appointment as soon as possible afterward the pandemic.
- **Pandemic COVID19 Condition:** If one or both arms are not glued, discontinue wearing both elastics. After the pandemic, wait for your next upcoming appointment with the orthodontist.

A summary of the possible scenarios and how to solve them is presented in table 1.

| | | | |
|---------------------|--|---|--|
| Removable appliance | Functional | If it is broken or does not fit, send photos to the orthodontist and suspend the use, if appliances is lost- inform the orthodontist and wait for the next appointment after the pandemic. This will reduce the emergencies | |
| | Aligners | Remain on the current/go on with treatment following clinician's indications/if broken or lost get back to the previous and ask the clinician | |
| | Retainers | If broken or lost, apply orthodontic wax to the area of the wire that is bothering or contact your orthodontist to schedule an appointment after the pandemic | |
| Fixed appliance | Non-removable appliances (eg. Straight appliance) | Loose bracket | Send a photo to the dentist, eventually remove it with tweezers |
| | | Poking distal wire | Send a photo to the dentist, use wax, eventually cut with disinfected nail clipper/hardware cutter |
| | | Poking ligature | Send a photo to the dentist, use wax, eventually push it back with eraser of a pencil |
| | | Periodontal abscess around molar band | Send a photo to the dentist, symptomatic therapy with paracetamol, eventually prescription of antibiotic |
| | | Non-removable appliances that can be activated by the patient (eg. Face mask, headgears or lip bumpers, palatal expanders) | |
| | Pre-activated, non-removable appliances (e.g. Pendulum, Forsus, Distal Jet appliance, trans palatal bar) | Take a picture every 20-40 days; if the patient feels pain or swelling, see as an emergency in the dental office and eventually remove the appliance | |

Table 1: Showing summary of orthodontic emergencies and their solutions [2].

Conclusion

As of mid-February 2020, numerous infections have been reported among medical staff [12], and further investigation is needed on the specific reasons for the failure of protection. Clinics were closed during the epidemic, but many emergency patients still go to dental offices and hospitals for treatment. A summary of possible transmission routes for 2019nCov, such as air diffusion, contact spread, and diffusion through contaminated surfaces [3].

The main purpose of an emergency visit is primarily to relieve the patient's discomfort and pain but guarantees continued progress of treatment [13]. In medium pandemic, it is imperative that orthodontists think globally and act locally to minimize the risk of SARSCoV2 infection. Selected treatments, including routine orthodontic treatment, should be suspended and resumed only if permitted by federal, state/local, and local health authorities [8].

In conclusion, a worthy method to accomplish emergencies, reassure, and follow patients remotely, while they are in their home.

The orthodontist must not allow the patient to use anything that can cause an emergency in the office. Currently, it is important to follow the guidelines given by WHO and local governments and use the required PPE to actually manage only the actual emergencies that the patient cannot resolve remotely.

Conflict of Interest

No financial interest or any conflict of interest exists.

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