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COVID-19 Orthodontic Healthcare Management: Today and Tomorrow

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Abstract

A compiled summary of the implications of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection and coronavirus disease 2019 (COVID-19) on orthodontic treatment, management, and provision of emergency orthodontic treatment during the critical times of COVID-19 lockdown and for the future to come. The orthodontic practise post lockdown would never be the same as before, but adequate measures to maintain and prevent further transmission can pave a long way in management of such epidemic and safety of healthcare professionals.

Emergency orthodontic treatment can be provided by following a set of guidelines with the observance of strict protection protocols of the patients involved and environmental disinfection becomes crucial in order to minimize the risk of cross infection. It is necessary to re-evaluate the orthodontic activities taking into account the

challenges in terms of contagion containment. The end of the lockdown period will mark the beginning of new approach and management in orthodontic treatment.

Keywords: SARS-CoV-2, COVID-19, Coronavirus, Dental management, Cross-infections, orthodontics.

Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2; first coined as the 2019-novel coronavirus or 2019-nCoV by WHO) is rapidly being spread throughout the world and has led to major health and financial concerns. As a measure to control the spread of the disease, national emergencies and lockdowns have been declared in many countries, providing only essential services to continue.

An adequate management of the oral health of patients becomes of crucial importance precisely during the COVID-19 epidemic period, specific protocols relating both to the pathologies of the oral cavity that normally do not represent an emergency and to those clinical situations that fall within the category of orthodontic dental emergencies should be implemented.

To limit the spread of the epidemic and the onset of cross-infections, is the main objective. Rigorous and highly effective infection control protocols urgently needed in the dental offices of the regions affected by COVID-19, but it is also important to work on proper communication and adequate education aimed at maintaining the oral health of orthodontic patients.

Prevention of oral health in patients represents the primary goal towards which health professionals specialized in dentistry are oriented. This is even more true in critical times of health emergency, in which the WHO first declared the COVID-19 recognized it as a pandemic [1]. Since orthodontic treatment is a long and continuous process, there are millions of patients who were already undergoing orthodontic treatment when scheduled care was abruptly suspended. Information and guidelines for the clinical orthodontic management of patients during the COVID- 19 pandemic are lacking [2].

The Covid-19

COVID-19 was first reported in Wuhan, Hubei province, central China in December 2019, where bats were suspected to be the primary host [3-5]. Currently, COVID-19 can be spread within cities through local transmission from an infected person or community transmission. Human transmission is predominantly through the respiratory tract via droplets, respiratory secretions (cough, sneeze), and or direct contact, where the virus enters the mucous membrane of the mouth, nose, and eyes [6].

Coronavirus virions are spherical and their surface appears crown-like (hence the name corona) due to spiked glycoprotein projections [7].

Coronaviruses (CoVs) are divided into four genera: alpha-, beta-, gamma ,and delta coronavirus. Part of the beta-coronavirus genera, SARS-CoV-2 is a lipid bilayer enveloped non segmented positive-sense RNA virus [8].

Covid-19 Risk Factors Associated With Orthodontic Dental Treatment

The human-to-human transmission of COVID-19 occurs mainly through respiratory droplets in air suspension and aerosol and through direct or indirect contact [9-10]. Oral fluids from the patient or contaminated dental instruments or environmental surfaces in dental settings can possibly create a potential way of spreading the virus to the operators and to other patients. The use of high-speed turbine (used during rebonding procedures, bite adjustments) ultrasonic scaler and spray gun (three way syringe) produce an aerosol of saliva, blood and other fluids that can remain in air suspension for long periods, with an increased risk of transmission. Removable orthodontic appliances or auxiliary elements in fixed

orthodontic therapies, such as the use of intermaxillary elastic bands, entails risks of contamination if handling is not carried out with due precautions.

Management during the Covid-19 Lockdown

A. **General Preventive Measures**

The periodicity of the check-ups and oral hygiene instructions through adequate information of the parent/patients is important to prevent orthodontic emergencies.

Managing regular follow-ups of orthodontic check-ups are difficult in present situation making it essential to focus prevention on oral health education and adequate interventions to guide patients for any discomfort, via social mediums and telecommunication.

Quarantine periods, stimulate more lively activities in the children ,and can increase risk of traumatic events which might affect the orthodontic elements and the consequent need for urgent interventions that increase the risk of contagion from COVID-19. Parents should be instructed on the need for careful supervision of the such activities. Oral health should be combined with a healthy lifestyle, contributing to a good overall health. Physical activity at home, sleeping for an adequate number of hours, and proper nutrition and hydration throughout the day are strongly adviced.

Almost all orthodontic procedures with minor to moderate patient emergencies being taken care by telephonic consultation, prescribing ointments for local application and NSAID's for any required pain control.

B. Orthodontic Management During The COVID-19 Outbreak

1. Prevention against the carious progression must be advocated on adequate and effective home oral hygiene measures, on the use of dental floss, mouth rinses and brushing habits as teeth might be prone to cariogenic effect due to dietery consumptions and orthodontic appliances.
2. Malocclusions associated with crowding and with overjet and overbite alterations do not represent an emergency, but, parents must be adviced to postpone the correction to the end of the epidemic.
3. Increased overjet, associated with the risk of fractures affecting the upper incisors, it is recommended the use of standard mouthguards, available in the pharmacy.
4. If using a removable orthodontic appliance, patients are adviced to follow hand hygiene measures before inserting the appliance into the oral cavity.
5. For fixed orthodontic appliances cemented on the palate, it is adviced to temporarily suspend the activations in order to avoid actions that can facilitate the detachment/distortion of the appliances. And at the same time to prevent undesired movements of teeth.
6. Patients must be informed to avoid eating viscous foods, or hard foods that can cause the detachment of the appliances/brackets, thus an emergency situation can be avoided.
7. In the case of fixed orthodontic therapy, the wire may slide and move distally to the cemented tube on the molars, if the patients reports a feeling of discomfort and pricking sensations, advise the parent to manually reposition the arch by sliding it towards the teeth most mesial to the molar or place orthodontic wax over the bracket/ molor tube.
8. If a bracket de-cements from the tooth surface with respect to the tooth while remaining tied to the arch, the patient can reposition it manually, and fix it using orthodontic wax.
9. In case of exhaustion of elastics, advice the patients to continue as it is, and reassure to be calm until the epidemic.

10. In case, of loosening of TADS, ask patients to disengage the elastics if any, and advice to continue to improve oral hygiene until lockdown. Situations where certain discomfort continues like pain and swelling, advice antiobiotics and analgesics. If the situation persists, and extreme discomfort persists, under strict disinfected and sanitizations protocols, and under personal protection equipments, remove the TADS.
11. Debonding procedures to be delayed until normal conditions prevails, if not after debonding , remanent debris must be removed using airotar without water spray and hand scalers , followed by polishing using slow speed micromotor

Guidelines related to the use of effective protocols for the prevention and control of infections as given by the scientific literature [12-16], should be followed and the management of all orthodontic emergencies during the epidemic must be done by adopting these protective measures.

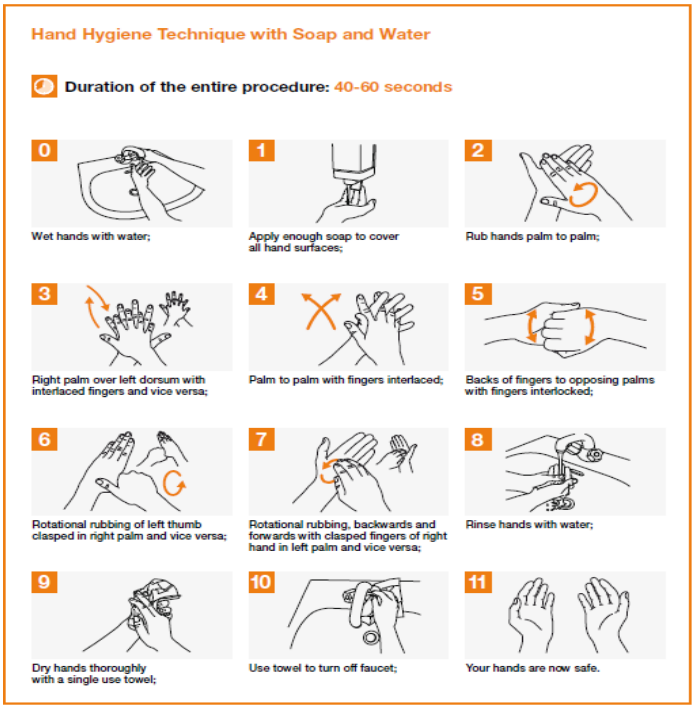

Figure 1: The who guidelines on hand hygiene

It is necessary to make a record of the temperature of the patient and to investigate trips to geographic areas affected by the epidemic of COVID-19 made in the 14 days preceding the dental visit but also if there is a history of contact with COVID-19 patients or suspected such [17]. The patient should be accompanied by a minimum number of people. In addition medical protective masks should be provided to patients.

Peng X et al [11] states that, "two before and three after" technique as a hand hygiene procedure, where oral professionals should wash their hands before examining the patient, before dental procedures, after contact with the patient, after touching the surfaces without previous disinfection, and after contact with the patient's oral mucosa and skin or coming into contact with saliva and oral fluids.

C. **Personal Protective Measures For The Orthodontist**

COVID-19 transmission is through airborne droplets, hence additional protective measures with personal protective equipment (PPE) are recommended for orthodontist and other healthcare professionals associated with aerosols procedures. Standard protocol in a clinical scenario is to wear a disposable head cap, surgical mask, protective goggles or face shields and disposable latex or nitrile gloves and then evaluate patients [18]. The used personal protective equipment and related patient care instruments during the dental procedure should be discarded in a leak proof closed yellow colour medical waste package bags with surface of the package marked and disposed properly[19,20].

Before start of any orthodontic procedure, make a recording of the temperature of the patient and accompanied person. and to take a detailed history of any signs or symptoms.

The reinforcement of good hand hygiene to the reception staff, patient, and of the medical staff is of fundamental importance especially in the period of transmission of the epidemic from COVID-19. Given the transmission characteristics of the SARS-CoV-2 virus, inadequate hand washing in the orthodontic practice can be critical in such situations.

Orthodontic Clinical Management After The Covid-19

The orthodontic practise post lockdown would never be the same as before, but adequate measures to maintain and prevent further transmission can pave a long way in management of such epidemic and safety of healthcare professionals.

The orthodontic treatment should be practised on appointment basis, with minimum people (maximum of 1 attendee) attending with the patient. Hand hygiene protocols to be strictly followed, hand sanitization to be done both by patient and the orthodontist for every entry and exist from orthodontic dental office. Digital payment methods to be practised to avoid direct mode of transmission.

The orthodontic office must be well ventilated and to be regularly disinfected with aldehyde free solutions, especially surfaces of dental chair like the arm rests, light handle, tray handle, diagnostic tray and impression trays. Avoid usage of mobile during clinical hours to combat contact transmission and use Bluetooth /earpiece devices. Air purifiers can be installed to prevent aerosols associated spread. Orthodontic impressions taken should also be disinfected (2% glutaradehyde solution for 10 mins).

Commonly used mouthwash in dental practise, are not effective against the SARS-CoV-2 virus. But, the virus appears to be vulnerable to oxidation, hence patients have to rinse with antiseptic solutions before oral examination to reduce the oral bacterial load [20]. Use proper sterilised (autoclaved/cold sterilization) diagnostic and working instruments (specially mouth mirror, probe, orthodontic pliers and check retractors).

Use high volume suction to minimize aerosols/droplets spread. Clean/flush the suction waterlines after each patient, to minimize bioload. Direct bonding methods must be modified to avoid aerosols generation. It should be modified such that polishing is done with low speed micromotor, followed by etching with usual procedure, wash off in a slow manner to reduce splash of water, and gently air dry the surface. Extreme care to be taken to avoid splatter. Interproximal enamel reduction (IPR) procedures must be done using strips if not then, use water gently in a syringe to wash, following use of high vacuum suction.For adjustments of removable appliances like functional appliances, splints, aligners, and retainers should be cleaned priorly thoroughly by the patient and kept in the box and should be soaked in diluted povidone iodine prior to adjustments.The financial aspect of orthodontic practise might definitely take a toll on mental and social aspect. The economical balance will take time to stabilise after the lockdown. Aerosols and air droplets transmission are more prone in a dental office, hence patients who are willing to go about orthodontic corrections might neglect with fear to visit an orthodontist, the truth which cannot be denied, but might affect the general orthodontic practitioners. Sudden exorbitant charging to patients might not be ideal. Certain necessary additional charges charged to patient must be explained priorly, that the additional charges are charged in account of safety of his/her patient. As a part of healthcare professional, it is our primary responsibility to follow these preventive measures.Modern orthodontic offices must advocate, clear aligners as part of treatment modality since aligner techniques can bring about efficient tooth movement with more spaced out appointments, reduced

chairside time and even minimum intra- oral treatments and almost negligible aerosol generation during the treatment.For private orthodontic practioners, the dental office should be well ventilated. The reception should have hand sanitization and clean tissues with modified seating arrangements of safe distancing. Do not keep any reading materials. Disinfect all surfaces which come in contact such as door handles, door knobs and reception table surfaces. Take a prior consent from the patient/guardian before the treatment proceeds.[21].

Informed Consent Format for Orthodontic Treatment during Covid 19 Outbreak

Name:

Age/sex:

Date:

Address:

Occupation:

Mobile No:

Email Id

Do you have any symptoms like fever, body pain, cough, sneezing, sore throat, difficulty in breathing?
Have you or any of your cohabitants travelled outside state/country in the past one month?
Any of your family members have history of fever, body pain, cough, sneezing, sore throat, Difficulty in breathing?
Have you visited the general physician if your answer is yes for question 1?
Do you have any medical issues (if yes mention the details)?
Do you belong to Covid 19 sensitive area or have visited one such place in past one month?
Have you come into contact with a patient with confirmed 2019-nCoV infection within the past 14 days?
Have you recently participated in any gathering, meetings, or had close contact with many unacquainted people?

I…… have come to the _____Dental Clinic/Hospital for **Orthodontic treatment**. The Orthodontist reserves right to ***TREAT /DEFER /REFER*** me accordingly. If I happen to be an asymptomatic carrier or an undiagnosed patient with covid19 disease, I suspect it may endanger Dentist and clinic staff. It is my Duty and responsibility to take appropriate precautions and follow the protocols prescribed by them. I also know and understand that I may already be an asymptomatic carrier/ undiagnosed COVID-19 positive patient/ may get infected due course of time after my visit to the dental clinic and I will not hold the doctors or the staff of the clinic responsible for any future diagnosis of COVID with me or my accompanying person. The above terms and conditions have been read by me / have been explained to me in my native language to my complete satisfaction. I agree to all terms and conditions mentioned above. I verify, confirm and agree to be held accountable, regarding the details given by me which I state are true to the best of my knowledge.

Patient's signature /Thumb Impression:

Parent/Guardian Signature (if minor)

Patients accompanying person's signature:

Name of the Dentist with Signature:

Conclusion

Epidemiological emergency linked to the COVID-19, it is necessary to re-evaluate the orthodontic activities

taking into account the challenges in terms of contagion containment. The observance of strict protection protocols of the patients involved and environmental disinfection becomes crucial in order to minimize the risk of cross infection. The end of the lockdown period will mark `the beginning of new approach and management in orthodontic treatment.

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