

DENTAL EMERGENCY PROTOCOL DURING **COVID-19 PANDEMIC**

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Introduction

Novel coronavirus (COVID-19) is a new and emerging infectious disease that is rapidly spreading worldwide. The reported clinical signs and symptoms range from non-specific respiratory symptoms such as fever and cough to shortness of breath, symptoms of pneumonia, and severe acute respiratory infection. However, reported cases had grown impressively over time.

According to the world health organization (WHO), on April 13, 2020, there have been 1,773,084 confirmed cases of COVID-19 and 111,652 deaths globally, with up to 20 percent having more severe illness requiring hospitalization (mainly due to pneumonia). The virus has an approximately six percent fatality rate with most of those who have died from the virus to date suffering from pre-existing health problems., In Saudi Arabia, a total of 4462 confirmed cases of COVID-19 reported, of which 59 deaths.

Transmission is likely to occur through direct contact with respiratory mucosa or conjunctivae primarily through respiratory droplets and secretion, either by direct exposure or by transfer on hands from contaminated surfaces. The current evidence does not support airborne transmission, except during aerosol-generating procedures. Those procedures include intubation, suctioning, bronchoscopy, tracheostomy, cardiopulmonary resuscitation, and standard dental procedures.

Due to the proximity of individuals during dental procedures and the generation of aerosols, dentists, staff, and patients are at high risk of transmission of COVID-19 (Figure 1). According to the recommendation of the agency of therapeutic services at the ministry of health, all dental services were limited to emergency/urgent care. Hence, all other dental care specialties postponed during this period of a pandemic until further notice to reduce the risk of spread.

This action helps staff and patients stay safe, preserve personal protective equipment and patient care supplies, and expand available health system capacity.

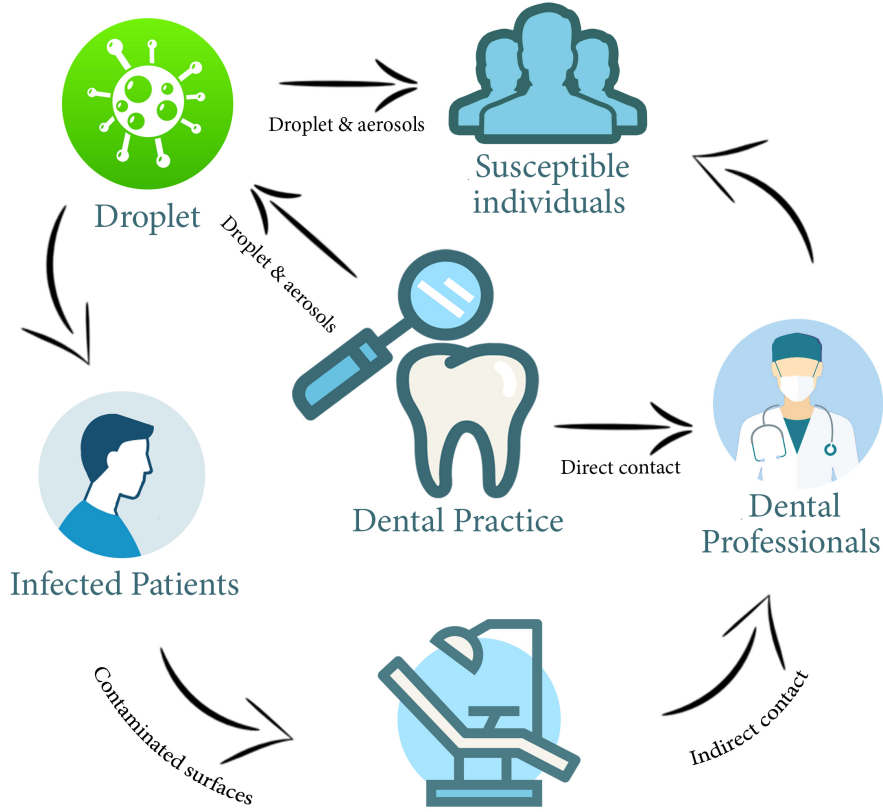


Figure 1 Illustration of transmission routes of COVID-19 in dental clinic

Scope and objectives:

The current clinical practice guidelines guide triage, assessment, and provision of emergency/urgent dental management during the COVID-19 pandemic. The present document targeted all dentists, hygienists, dental assistants, and dental technicians working in primary care, specialized dental centers, and hospitals in MOH, Saudi Arabia. This guidance is based on the best available scientific evidence and broad experiences. As the COVID-19 pandemic progresses, the update is expected to be monthly.

The objectives are:

1. To encourage a consistent approach in the management of emergency/urgent dental conditions during the period of COVID-19 pandemic.
2. To identify the challenges that the COVID-19 epidemic presents for the provision of dental care.
3. To provide and implement Infection Prevention and Control guidance during the management of dental emergency cases in this period.
4. To deliver a quality control/audit tool for dental emergency care during the period of the COVID-19 outbreak.

General considerations

1. Treat patients (children/adults) requiring emergency/urgent dental procedures.
2. Postpone routine/elective dental treatment and procedures.
3. All procedures should consider the risk factors associated with demographics and general health.
4. Assessment of patients should consider the patient and staff safety, prioritization of the most urgent care needs, professional judgment, patient preference, and the availability of urgent dental care centers.
5. Patients with non-urgent conditions should be encouraged to maintain proper oral hygiene by consuming a healthy diet, avoid hard or sticky food, and keep good oral hygiene practices to preserve their current status.

Types of the dental care in emergency situations

1-Emergent dental care

In dentistry, all potentially life-threatening situations need immediate treatment by the medical emergency centers. It includes uncontrolled bleeding, significant infection (e.g. cellulitis), facial swelling and oral-facial trauma potentially compromising the patient's airway.

2-Urgent (essential) dental care

It focuses on the management of severe or uncontrolled symptoms that cannot be managed by the patient and require the patient to see a dentist in a designated urgent dental care center.

3-Non-urgent (non-essential) dental care

It includes all routine and elective dental and /or maxillofacial procedures.

4- Advice and self-care

Mild or moderate symptoms managed remotely by the dentist (by phone) providing advice and help, which may involve analgesics and antimicrobials.

Dental triage protocol:

A- Remote dental triage:

- 1- All emergency/urgent cases should be triaged remotely (Call Center 937 or Dental Center phone), to decrease the overflow in the emergency department. A history of the patient condition and medical status should be assessed.
- 2- All patients should be screened for COVID-19 triage questions (travel history in the last 14 days, exposed to a person who is diagnosed or suspected to COVID-19 in the last 14 days, fever, cough or shortness of breath).
- 3- Suspected cases of COVID-19 should follow the MOH guideline for handling of suspected cases.
- 4- In a special needed situation, a photo of the site where the complaint comes from is sent to the team by the route determined by the dental staff.
- 5- Use the recommended management of the most common presenting symptoms to the emergency dental care as a simple guide for remote triage (Table 1).

- 6- Remote dental triage should focus on the provision of advice, analgesics and/or antibiotics (where appropriate).
- 7- Patients are advised that the dental care is severely restricted at this period and to call back after 48-72 hours if the symptoms have not resolved.
- 8- If needed, referrals are done to the nearby medical emergency center or the designated dental centers, who can provide the required care. The case will be registered under National ID or Iqama number.
- 9- National ID or Iqama number and contact number should be used for registration during the remote triage.

B- Urgent dental triage in the designated dental clinic:

- 1- All patients should be registered in the database with the National ID or Iqama number.
- 2- Body temperature should be measured in the triage room.
- 3- Patients should be asked for COVID-19 and fill the triage questionnaire.
- 4- Identify the suspected cases of COVID-19 and follow the MOH guideline for handling of suspected cases.
- 5- Use the recommended management of the most common presenting symptoms to the emergency dental care as a simple guide for clinical triage (Table 1).
- 6- Adequate staff training and specifically appropriate human behavior

Dental Clinic Considerations:

1. At this stage of the pandemic, all patients (adults/children) are potentially infective.
2. Restrict the presence of unnecessary individuals in the dental clinic.
3. Dentists should exercise professional judgment and carefully consider the risks of the disease transmission and refer those risks against any possible benefit to the patient, the health care workers, and the community.
4. Dentists should follow a strict infection control protocol guide with all emergency dental patients.

5. Decisions on undertaking treatment should be made with an appropriate patient or parents' consent.
6. If the patient follows up needed, the dentist may contact the patient remotely to minimize patients contact (as necessary).
7. The risk of dental practitioners being positive for COVID-19 and potentially infecting patients attending emergency dental services should not be underestimated.
8. All dental staff who had unprotected high-risk exposure or have suggestive symptoms regardless of exposure shall stop performing their duties immediately.

(TABLE 1) The most common urgent dental problems and the recommended management during the COVID-19 pandemic

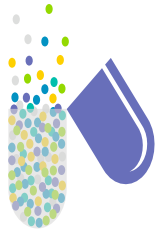
Orofacial problem	Recommended management		
	Advice and self help	Urgent care	Emergency care
Acute apical abscess	-Recommend analgesics(*) -Prescribe antibiotics(**) if there is concern about swelling or if there is sign and symptoms of systemic infection -Advice patient to call again after 2 days if the symptoms not resolve	In case of spreading infection without airway obstruction refer to designated dental clinic in the local area for extraction or drainage	If spreading infection with airway obstruction refer to medical emergency
Acute periodontal abscess			
Perio-endo lesions			
Acute pericoronitis	-Recommend analgesics(*) -Recommend chlorhexidine(***)/ saltwater mouthwash -Prescribe antibiotics(**) if there is concern about swelling or if there is sign and symptoms of systemic infection -Advice patient to call again after 2 days if the symptoms not resolved	In case of spreading infection without airway obstruction refer to designated dental clinic in the local area for possible extraction	If spreading infection with airway obstruction refer to medical emergency





Orofacial problem	Recommended management		
	Advice and self help	Urgent care	Emergency care
Dry socket	-Recommend analgesics(*) -Advice for warm saltwater mouthwash -In case of signs of spread of infection or immunocompromised patient prescribe antibiotics(**)		
Irreversible pulpitis	-Recommend analgesics(*) -Advice for cold water rinse -Advice patient to call again if the symptoms get worse		
Reversible pulpitis	-Recommend analgesics(*) if needed -Avoid stimuli (cold, hot and acidic drinks or food) -Apply desensitizing toothpaste regularly to the sensitive area with finger. -Advice the patient to call back if symptoms get worse		
Dentine hypersensitivity	-Recommend analgesics -Advice for cold water rinse -Advice patient to call again if the symptoms get worse		
Suture removal	-Advice to keep good oral hygiene -Mouth wash with salt water -Dissolvable sutures can stay longer than 2 weeks		
Oral ulcer	If less than 3 weeks: -Advice for chlorhexidine mouthwash(***) (> 7 years old) -Recommend analgesics(*) (topical-systemic) -If due to denture, advice to keep the denture out where possible -In case of herpetic gingivostomatitis or herpes zoster, if the symptoms are severe or immunocompromised, prescribe anti-viral agents(****)		
Post extraction hemorrhage	-Advice the patient not to spit - Advice to place a rolled piece of gauze or cotton over the socket or injured area and press firmly for 20 minutes - Avoid drinking hot drinks or smoking for 24 hrs.		
Uncontrolled bleeding in the orofacial region	If the bleeding fails to stop but is not brisk and persistent refer to designated urgent dental care Centre for management		
Fracture/loose tooth fragments or restorations (Tooth-Crown-Bridge)	For sensitive tooth -Recommend analgesics(*) -Advice to call again if the symptoms are worsened		
	Refer to the designated dental clinic if the symptoms are worse or temporary restoration is lost or broken or causing gingival inflammation for temporary restoration or cementation		
	For inhaled tooth, crown or bridge refer immediately to the medical emergency care		

Orofacial problem	Recommended management		
	Advice and self help	Urgent care	Emergency care
Dento-alveolar trauma Including : (Avulsed, displaced or fractured tooth)	<p>-If patient didn't need emergency care advice to:</p> <p>-Clean the affected area gently with mild antiseptic and remove any foreign object if it is present</p> <p>-Apply ice pack to the soft tissue and swelling</p> <p>-Recommend analgesics(*) if needed</p> <p>- If tooth is knocked out</p> <p><u>Therapeutic protocol of Avulsed tooth in primary and permanent teeth could be followed</u></p>		
Ill-fitting or loose denture	<p>-If painful, recommend analgesic(*)</p> <p>-Advice to remove the denture whenever possible</p>	When function is impeded refer to designated dental care for adjustments	If bleeding is severe and will not stop in 15-30 min, and/or significant facial trauma and/or loss of consciousness and/or tooth inhaled refer immediately to the medical emergency care
Trauma from wire digging in ortho-or prosthodontic appliance	<p>-If thin and possible patient or a family member use scissors or clippers to adjust</p> <p>-Advice to cover the wire with wax/silicone or blue tack</p>	If not possible to manage by patient refer to designated dental care for adjustments	
Broken bonded retainers	<p>-If possible, patient or a family member use tweezer and push wire back towards the tooth, adjust or remove as possible</p> <p>-Advice to cover the wire with wax/silicone or blue tack</p> <p>-Advice use of removable retainer if present</p> <p>For more guide use the protocol for the management of Orthodontic</p>	If not possible to manage by patient refer to designated dental care for adjustments	
Temporomandibular joint arthralgia and/or myalgia	<p>-If mild to moderate pain advice for:</p> <p>-Warm or cold hot-pack</p> <p>-Avoid hard or sticky food</p> <p>- Recommend analgesics(*)</p> <p>- Jaw exercises</p> <p>- Oral parafunction awareness</p> <p>- To call again if the symptoms are worsened</p>	If pain is severe and uncontrollable, preventing sleep refer for designated dental clinic for management	

Note: Patients with substantial swellings can progress to life threatening emergencies, which can increase risks in the setting of reduced health care availability. For that patient's extraction of the causative pathogenic teeth should be prioritized over restorative rescue. Close follow up by telephone is recommended.

Recommended Dosage of Medication



(*) Analgesics 	(**) Antibiotics 	(***) Mouthwash 	(****) Antiviral 
Acetaminophen 325 to 650 mg every 4 to 6 hours as needed. Maximum dose 4 g/day (See MoH online formulary for dose adjustment)	Amoxicillin: 500 mg every 8 hours for 7 – 10 days (See MoH online formulary for dose adjustment) Amoxicillin in combination with clavulanic acid as alternative in case of resistance: 500 mg every 8 hours for 7 – 10 days (See MoH online formulary for dose adjustment)	Chlorhexidine swish for 30 seconds with 15 mL twice daily	Acyclovir: 400 mg 5 times daily for 14 – 21 days (See MoH online formulary for dose adjustment)
Ibuprofen 200 to 800 mg 3 to 4 times as needed. Maximum dose 3,200 mg/day (See MoH online formulary for dose adjustment)	Metronidazole as alternative in case of resistance: 250-500 mg every 8 hours for 7 – 10 days (See MoH online formulary for dose adjustment) Clindamycin is the alternative in patients with penicillin allergy: 300 mg every 8 hours for 7 – 10 days (See MoH online formulary for dose adjustment)		

Infection Prevention and Control protocol in the dental clinic:

The recommended general policies of Infection Prevention & Control in Dental Settings should be followed. However, more emphasis on the recommendations for the infection control measures should be taken by dental professionals, mainly because of aerosols and droplets, which considered as the main spread routes of COVID-19. To reduce the risk of spread, preserve Personal Protective Equipment (PPE) should be maintained. Hence, those recommendations include:

Patient evaluation

In general, pre-screen all the patients for COVID-19, according to MOH Coronavirus Disease 19 (COVID-19) Guidelines. If the patient suspected, the dental practitioner should postpone the dental treatment and report to the infection control department is recommended (follow guidelines). Moreover, encourage family members, caregivers, and visitors with symptoms of respiratory infection not to accompany patients during their visits to the facility.

Hand hygiene

The fecal-oral transmission has been reported for COVID-19, which underlines the importance of hand hygiene for the dental practitioner. Dental professionals should perform hand hygiene using the WHO technique; My five moments for hand hygiene. This way of hand hygiene should be completed before putting on PPE, after removing it, and when changing gloves. Additionally, after any contact with a patient with suspected or confirmed COVID-19 virus, their waste, or respiratory secretions. More caution should be taken for dental professionals to avoid touching their own eyes, mouth, and nose.

Personal protective measures for dental professionals

Since droplet transmission of infection is considered as the main route of spread of infection, particularly in dental clinics, The barrier-protection types of equipment, including protective eyewear, masks, gloves, caps, eye protection (face shields or goggles), and gown, are strongly recommended for all dental professionals, especially during the pandemic period of COVID-19. It is also recommended to wear respiratory protection (N95-or higher respirators for performing aerosol generating procedures, If a respirator is not available, use a combination of a surgical mask and a full-face shield.

If essential PPE, including surgical facemasks, are not available, do not proceed with any dental procedure, regardless of emergency/urgent patients. However, the use of disposable (single use) devices such as mouth mirrors, syringes, and blood pressure cuff to prevent cross-contamination is highly recommended.

Disposable respirators, disposable eye protection, disposable gown and surgical mask should be removed and discarded before leaving the dental clinic/room. Reusable eye protection must be cleaned and disinfected according to manufacturer's reprocessing instructions prior to re-use. Change the gown if it becomes soiled. Remove and discard the gown in a dedicated container for waste or linen before leaving the dental clinic/ room. Cloth gowns should be laundered after each use. Change surgical masks during patient treatment if the mask becomes wet. Clean, disinfect, or discard the surface, supplies, or equipment located within 2 meters of symptomatic patient.

Mouth-rinse before dental procedures

Since COVID-19 is vulnerable to oxidation, pre-procedural mouth rinse containing oxidative agents such as 0.2% povidone is recommended. That will be helpful to reduce the salivary load of oral microbes, including potential COVID-19 carriage.

Dental Radiograph

Extra-oral imaging, such as a panoramic radiograph or CBCT, is recommended to be used to avoid the gag reflex or cough that may occur with intraoral imaging. Intraoral periapical or bite-wings radiographs should be limited, and only where patient's co-operation and ability to breathe through their nose is suitable. Occlusal radiographs may be considered as an alternative to periapical radiographs. When intraoral imaging is mandated, sensors should be a double barrier to prevent perforation and cross-contamination. Disinfect surfaces of dirty zones following completion of the image taken in keeping with local infection control protocol.

Rubber dam isolation

The use of rubber dams can significantly minimize the production of saliva- and blood-contaminated aerosol or spatter, particularly in cases when high-speed hand-pieces and dental ultrasonic devices are used. When a rubber dam is applied, extra high-volume suction for aerosol and spatter should be used during the procedures along with regular suction. If rubber dam isolation is not possible in some cases, manual devices such as hand scalers, are recommended for caries removal and periodontal scaling to minimize the generation of aerosol. All precautions should be taken for the prevention of needle-stick or sharps injury.

Anti-retraction hand-piece

The use of dental hand-pieces without anti-retraction function should be prohibited during the Pandemic period of COVID-19. Anti-retraction dental handpieces with specially designed anti-retraction valves or other anti-reflux designs are strongly recommended to

prevent cross-infection. The use of a 4-handed technique, high-volume saliva ejectors, and a rubber dam is necessary to decrease possible exposure to infectious agents.

Aerosol producing dental procedures

Any dental procedure that has the potential to aerosolized saliva will cause airborne contamination should be prevented. Those procedures might include ultrasonic scaling, conventional restorative procedures, polishing, periodontal surgeries, and maxillofacial surgery procedures. Hence, the possible way for the spread of infection via an almost invisible aerosol must be recognized and eliminated to the greatest extent. This way of precaution can be done by using tertiary PPE, 4-handed technique and high-volume saliva ejectors. When an aerosol-generating procedure performed in a patient with COVID-19, ensure that healthcare workers are implementing aerosol-generating procedures. Additionally, the use of the adequately ventilated single room (negative-pressure room with a minimum of 12 air changes per hour or at least 160 liters/second/patient in facilities with natural ventilation).

Disinfection of the clinic settings

Public areas and appliances should also be frequently cleaned and disinfected, including door handles, chairs, and desks. The elevator should be disinfected regularly. People taking elevators should wear masks correctly and avoid direct contact with buttons and other objects. It is worth noting that patients with suspected or confirmed COVID-19 infection should not be treated in a routine dental practice setting. Instead, these patients should only be treated in negative pressure rooms or negative pressure treatment room/Airborne infection isolation rooms (AIIRs)

Therefore, anticipatory knowledge of health care centers with provision for AIIRs would help dentists to provide emergency dental care if the need arises. Of note, human coronavirus can survive on inanimate surfaces up to 9 days at room temperature with a higher preference for humid conditions. Therefore, clinic staff should make sure to disinfect inanimate surfaces using chemicals and maintain a dry environment to curb the spread of COVID-19

Management of the medical waste

The medical and domestic waste generated by the treatment of patients with suspected or confirmed COVID-19 infection is regarded as infectious medical waste. Double-layer yellow color medical waste package bags and “gooseneck” ligation should be used. The surface of the package bags should be marked and disposed of in the domestic waste.

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Useful websites:

1. <https://www.moh.gov.sa/CCC/healthp/regulations/Documents/Coronavirus%20Disease%202019%20Guidelines%20v1.1..pdf>
2. <https://www.scfhs.org.sa/Gratitude/Pages/COVID19-resources.aspx>
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