

Review Paper: Guidance for Providing Dental Care During Coronavirus Crisis



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ABSTRACT

In the last month of 2019, the world faced a new and mysterious type of coronavirus disease that sometimes caused pneumonia.

In some of the sickened cases, multiple organ damages and Acute respiratory distress syndrome had identified that could arrive to death.

To date, despite multiple studies, no vaccine & definitive cure has been discovered Although there has been some efforts for finding proper drugs and treatment plans such as remdesivir.

Therefore, disease abatement is still the safest and easiest manner for controlling the virus in public society. Accordingly preventing the disease transmission chain in dental settings and dentistry field is deemed one of the first priorities of healthcare systems due to its high transmissibility in dental practice.

This study achieved to review the current knowledge of COVID19 and providing the proper guidelines for all dentistry branches.

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Introduction:

In December 2019, a great deal of mysterious pneumonia cases has been identified in Wuhan, China. Nucleic acid analysis of patients' respiratory secretions illustrated that the world community is facing a novel type of coronavirus which the world health organization called afterward the Coronavirus Disease 2019 (COVID-19). The name coronavirus is derived from the word crown that refers to the thorny surface of virus particles and was initially observed by David Tyrell who studied primarily human coronaviruses(1). Although six subtypes of coronaviruses had previously been reported, this novel virus is considered to be the new seventh one that has not been previously found in mankind(2).

Lack of specificity in both clinical and laboratory findings of this insidious disease is a serious concern. The novel coronavirus may lead to a wide spectrum of mild to moderate symptoms. Although fever, fatigue, and dry cough are the most common symptoms, shortness of breath, conjunctivitis, sore throat, diarrhea, vomiting and muscular pain have rarely been observed. Consequently, in severe cases, it can lead to complications such as respiratory distress syndrome(3), arrhythmia, central nervous system disorders, and multiple organ damages which are more prevalent in patients with older age and other comorbidities(3).

The decreased or normal number of white blood cells, in addition to decreased lymphocyte count and increased C-reactive protein and serum sedimentation rates are the most common laboratory features. CT scan examination, as a diagnostic and screening instrument, can demonstrate various manifestations from ground-glass opacity and patchy shadows to "white lung", with rare pleural effusion and mediastinal lymph node enlargement according to disease stage(4).

The incubation period of COVID-19 is estimated to be 1 to 14, with an average of 5.1 days and more than 97% of symptomatic patients, revealed their symptoms within 11.5 days of infection(5).

The novel coronavirus transmission can occur in different ways of direct contact with the in-

fecting person and indirect contact with surfaces that are contaminated by the patients' respiratory secretions. Droplets are the prime suspect to carry the virus particles(6). To the person to person transmission by droplet, a close contact (within 1 meter) with an infected patient and exposure of individual's mucosae (mouth and nose) or conjunctiva (eyes) to patient's sneezing or coughing droplets is needed(6). It is crucial to mention, that airborne transmission is still controversial. Airborne can remain in the air for longer periods than the droplet, and be transmitted in distances over 1 meter(6).

Dental practitioners are definitely at increased risk of infection, due to their continuous close contact with blood, saliva and other aerosol or droplet productions which are uninterruptedly created during dental procedures. However, contaminated incisive dental instruments should not be ignored. On the other hand, dental procedures cannot be delayed for a long time. Many patients need immediate intervention, due to their moderate to severe pain associated with dento alveolar infections, pulpal or periapical inflammation, and trauma that performing only outpatient management and delaying in treatment may lead to a devastating cycle on the dental condition and make the complete cure difficult more and more. Besides, avoiding dental interventions increases patients' referrals to hospitals and makes the waiting rooms more crowded which itself can increase the transmission more likely(7).

The great possibility of infection in dental practitioners due to their work nature that itself can be a heavy burden for medical staff, and the possibility of disease transmission to a great cluster of patients who refer to dental emergency services, in addition to the need to immediate dental procedures suggests that protection principles in dental practitioners should be seriously considered. As the novel condition of this virus and its unknown behavior, it is agonizing for dentists to triage patients, assess them for COVID-19, and reducing the risk of infection for dental staffs and patients during the procedures. Especially when we consider that many

COVID-19 patients may be asymptomatic(8, 9).

Considering the certain need for dental interventions, rapid changing features of COVID-19, the unknown endpoint of this novel disease, the high transmission possibility of this virus, and many other unanswered questions in the dental career, we aimed to provide a comprehensive and detailed approach concerning different specialties to minimize the risk of infection more and more, although not reach the zero.

Materials and methods

This study was conducted in accordance with the articles indexed in PubMed, Google scholar, Scopus, Science Direct and Google databases, using the keywords “Covid-19”, “Coronavirus”, “SARS.Cov2”, “Pandemic”, “General Dentistry”, “oral and maxillofacial surgery”, “Endodontics” and “Periodontics”, to regain all specific studies about SARS-COV-2 and dentistry practice from 31 December 2019 to 5 June 2020. As inclusion criteria we considered literatures containing keywords and text words describe clinical management of dental patients in the coronavirus pandemic. We notice to exclude Minimal data due to magnitude and importance of the novel coronavirus issue, but also studies that were done in same countries were excluded because of similar epidemiological condition. In addition data were included regarding to focus on the clinical aspects and protection essentials to make a comprehensive and practical guideline to avoid spreading SARS-COV-2 in the dental clinics.

General consideration

1- Patient screening process:

In order to limiting the close contact with the patients, the first step is to triage over a video/voice call and ask about the dental emergencies such as: severe dental pain, facial swelling, dental trauma, unstable maxillofacial fractures that can compromise patient’s airway, falling restoration, ongoing tissue bleeding, severe infection, and abscess. and also ask about screening question and send them electronic prescription if required (advice, analgesia, antimicrobial

(figure)(10) .

2- Managing waiting room:

Waiting room can role as a serious source of infection. The waiting time in dental offices is estimated to be almost 18 minutes that consequently makes the waiting rooms a daunting candidate for transmitting the disease (11). Therefore, it is crucial to apply the fallowing recommendations to minimize the risk of infection in waiting areas:

a) Manage the queues. Try to encourage the staff to adjust the timelines in order to have only 1 patient in the waiting room at any specific time (12).

b) Deep cleaning of all touch surfaces such as furniture, door handle, receptive counters, table, telephone sets, floor, walls (1000 mg/l chlorine-containing disinfectant), chairs, laptop keyboard, card reader, thermometer, and sphygmomanometer using ethanol 70% or sodium hypo chlorite repeatedly (13).

c) Remove toys, magazines and any unnecessary objects.

d) Use appropriate ventilation.

e) The patients’ body temperature should be checked by accurate thermometer on arrival and provide disinfectant gels, surgical masks, and latex or nitrile disposable gloves.

f) Recheck screening questions and medical history.

g) Maintain 6 feet of distance (about 2 arm’s length) between the patients and staff(14).

h) Patient education; Hang posters to inform patients about coronavirus and encourage patients to wash their hand appropriately by alcohol base sanitizer containing at least 70% of ethanol(14).

i) Remind patients to cough or sneeze in disposable tissue and immediately throw it out to the garbage bin. (14).

3- Hand hygiene

hands are highly responsible for majority of both health care workers and patient’s contamination. Therefore, it is of great paramount to wash the hands in the correct way. Following structure is recommended to this aim:

- Washing hands with water and soap (antimicrobial/plain)
- Using alcohol base disinfectant containing at least 70% ethanol for 20-60 seconds (try lotion to avoid dryness and dermatitis).
- Perform the proper washing technique to make sure that the disinfectant materials are covering the hands entirely. (figure cdc)(15).

4- Personal protective equipment

Using personal protective equipment are highly recommended for dental appointment to protect individuals from aerosol, droplets, infected blood, and saliva that are produced in dental procedures (16). The most important equipment are: mask (for routine dental practice N95 mask or FFp2_surgical mask_ are recommended), protective eye wear, face shield, disposable gloves, gown (17).

5- Dental team

We have to be responsible for all members of a dental team and evaluate whether they are infection free or not. Provide efficient equipment for all staff, screen their symptoms in terms of coronavirus. As they are symptomatic, ask them to stay home and quarantine themselves or refer to medical centers if necessary (18).

6- Oral examination

Prior dental treatment, provide antimicrobial mouth rinse such as 1% hydrogen peroxide or 0.2% Povidon iodine

Using a Rubberdam in any dental procedure to keep bacteria and saliva away from treatment area

Due to generation of aerosols by rotary dental instrument, using a rubberdam is highly recommended to reduce droplets and viral contaminated of atmosphere and limit inhalation of infective aerosols(14, 19).

7- Dental operating room

Disinfect all surface including computer keyboards, mouth-working desks, door handles, water taps, dental surgery drawer, handle, oral cameras, portable radiography, washing sink/faucets, wall, floors, dental chair, and dental light handle.

Sterilize all instrument by a class B sterilizer

or floating disinfectant solutions in high level(20).

To avoid cross infection between patients, adequate interval time is needed (20-30 mins) in order to disinfect all instrument and surfaces(20).

For excavation of gross caries and reducing airborne droplets, hand instrument is recommended instead of rotary ones.

Four handed dentistry by dental assistant is also suggested(8).

8- Endodontics:

Vital pulp therapy (VPT) may be one of the most beneficial methods to patients in pandemic crisis, due to providing short term pain reduction and shortening treatment time (21, 22).

As the pulp capping material, MTA is recommended, providing favorable results over 3 years of follow up. In some cases, where tooth has undergone root canal treatment, single file nickel titanium system is suggested, since it can improve quality of root canal and reduce working time(23). Due to airborne particles production during the use of hand piece and air water syringe spraying, rubber dam as a barrier to spread airborne particles around, is highly recommended (5, 10).

Despite psychological health's impact on pain threshold, endodontists must pay attention to patients' mental health (24).

According to lack of comprehensive evidenced based guidelines about use of NSAIDs, paracetamol is recommended to relieve pain(25-27).(Figure1-3)

9- Oral and maxillofacial radiology:

Extra oral radiography is preferred rather than intra oral since it can minimize nausea and eliminate close contact with client at the time of placing film in patient's mouth(8).

10- Pediatrics:

Pandemic crisis has put the dentists in complex dilemma of either preserving deciduous teeth or of doing possible risky dental treatment.

Here we recommend some general advice to solve this challenge relatively:

- a- Parents should pay attention about prop-

er nutrition of their children throughout the day to prevent tooth decay.

b- Parents must be trained to recognize dental emergencies and use home remedies instead of coming into dental office.

c- If temporary dental dressing of carious teeth falls out, encourage the patient to flush the cavity and use a mechanical brush to keep the cavity free of debris.

d- If temporary dressing of previously endodontic treated teeth falls out, train patient to flush endodontic cavity with water and hydrogen peroxide and then apply a cotton pellet during chewing.

e- If tooth eruption is considered to be delayed, encourage the child to chew hard food such as apples that can mechanically cause the deciduous tooth removal (28).

f- As an interim, non-invasive medicament silver diamine fluoride (SDF) is highly recommended since it has high concentration of fluoride and can minimize the procedure time (29).

g- In traumatic avulsion, immediate reimplantation is recommended. If it was not possible, the patient must preserve the tooth in milk or saliva and seek an emergency dental treatment (Figure 4,5) (30, 31).

11- Orthodontics:

General orthodontic problems are not considered as a dental emergency. Therefore, a video call or message contact with the patient is usually an appropriate option.

Some recommendations about removable appliances such as functional, aligner, and retainers must be considered:

- If the patient who wears the functional appliance, break or feel inconvenient it is better to postpone use of the appliance.

- In the patients who wear removable aligner, going on current appliance is recommended. If the appliance is broken or lost the suggestion is going on former aligner.

- In the case of broken retainers, hot customizable perform are recommended that is available on drug stores (32).

- In patients with fixed appliances there is

no concern about extra force loaded due to automatic inactivation of pre adjusted edge wise appliance in 4 weeks(32).

- The bracket may become loosed or broken, on the other hand the metallic ligature can cause soft. Therefore, if bracket flushing is available no more intervention is needed, otherwise, removing it with eyebrow tweezers is recommended. Also, orthodontic relief wax can be applied to solve the tissue soreness.

- For fixed cemented orthodontic device, it is better to avoid the activation to prevent unfortunate events. Parents must be trained to prevent their children from eating hard and sticky food to mitigate emergency situation (Figure 6,7) (32).

12- Restorative:

To eliminate producing chemo-mechanical aerosols, mechanical caries removal (spoon scavator), handpiece with anti-retraction valve and laser systems can be used. Other recommendation to reduce working time are placement of ART and application of SDF to improve oral health. The mouth wash solution containing fluoride play crucial role (33).

13- Prosthodontics:

We can reduce gag reflex in several ways, such as: ask patient not to attempt to swallow his/her saliva, apply a topical anesthetic spray, high saliva ejector, and etc.

Recommend patients use relief wax and avoid too hot/cold food if they had a crown de-cementation (34).

To eliminate possible cross infection of dental laboratory technicians, dentists should disinfect the impression prior to deliver(34).

14- Maxillofacial surgery:

Categorizing the patients according to severity of their symptoms should be considered in such way that tooth removal and its following complications such as bleeding and OAF must be managed by general dentists, and head malignancies, traumatology, and infections should be managed by OMFs.

While tooth extraction at dental office is needed, supine position is suggested.

When every surgery is needed following consideration is recommended:

- a- Operating room should have appropriate ventilation
- b- The number of staff presenting in operating room should be limited
- c- For the patients infected with SARS-cov-2 wearing FFP2 without valve and gown while they are brought to operative room is recommended(35).
- d- Staff transferring infected cases into operating room wear FFP2 masks with valve is recommended
- e- At time of performing surgery if extra oral approaches can be as an alternative option to intra oral it should be preferred.
- f- Self-drilling screw is preferred to drill-

ing screw holes.

- g- Using electric cautery should be avoided
- h- 15 minutes interval after patients has left operating room and before entering staff to clean and disinfecting should be considered(35, 36).

15- Periodontology:

Since both and ultrasonic debridement in treatment of periodontal disease provide comparable results in this era the hand instrument is preferred.

Prescription of chlorhexidine mouth wash as the most effective antiseptic solution to treat gingivitis-induced inflammation and bleeding is recommended.

In periodontal infections the Amoxicillin (500mg) is the choice. Also, using salt water mouth wash is highly recommended (37).

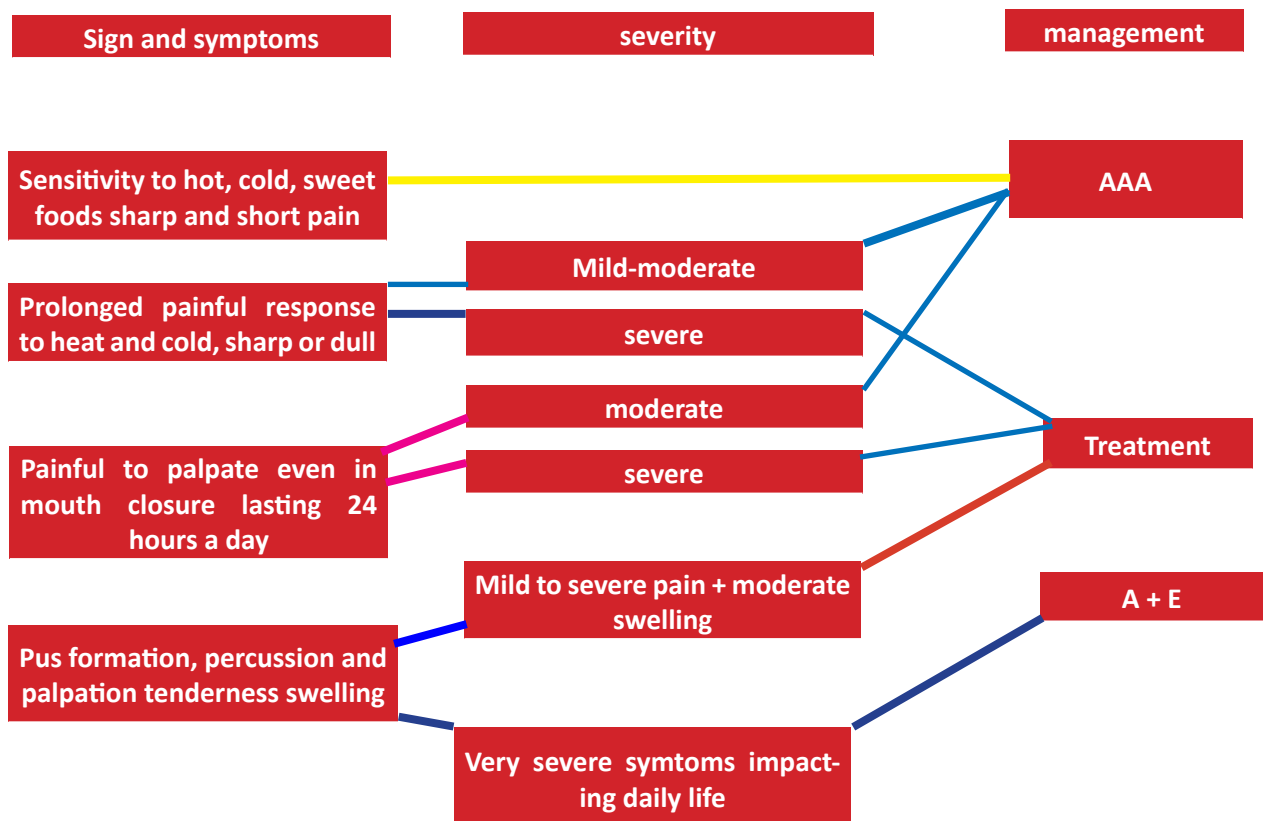


Figure 1



Mild pain		
Moderate pain	Ibuprofen 400-600 mg + Acetaminophen 225 mg	Acetaminophen 650 mg
Severe pain	Ibuprofen 400-600 mg + Hydrocodone 7.5 mg & Acetaminophen 300 mg	Acetaminophen 325 mg & Oxycodone 10 mg

Figure 2

Antibiotics

Amoxicillin	amoxicillin capsul 500mg 5 day / 3 times a day
phenoxymethyl penicillin	phenoxymethyl penicillin tablet 250mg 5day/ 2 times a day
Metronidazol	metronidazol tablet 250mg 5 day/ 3 times a day
clindamycin	clindamycin capsule 150mg 5 day/ 3 times a day
co-amoxiclav	co-amoxiclav tablet 250/125mg 5 day/ 3 times a day
clarithromycin	clarithromycin tablet 250mg 7 day/ 2 times a day

Figure 3

Pediatric Analgesic

mild	paracetamol tablet 500mg / solution 120 or 250mg/ml 4 time daily
moderate	Ibuprofen tablet 400mg / oral suspension 100mg/5 ml 3-4 times daily and then 2 hours later paracetamol
severe	if pain prevent normal life activation consider referral to hospital

Figure 4

Pediatric Antibiotic

Amoxillin	Amoxicillin capsule 250mg / oral suspension 125 or 250mg/5 ml 3 time daily
Metronidazol	Metronidazol tablet 250mg/ oral suspension 250mg/5 ml 3 time daily
Penicillin V	Penicillin tablet 250 mg / oral solution 125 or 250mg/ 5 ml

Figure 5

Orthodontics

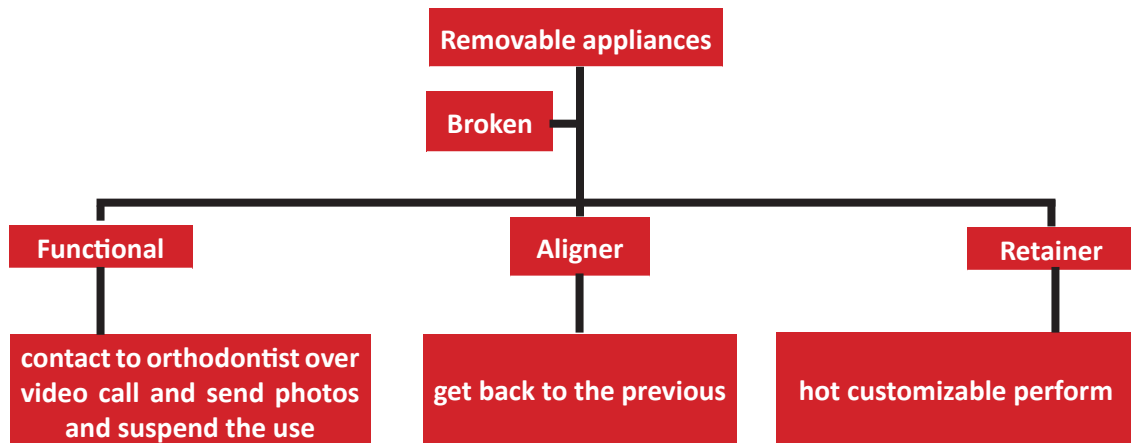


Figure 6

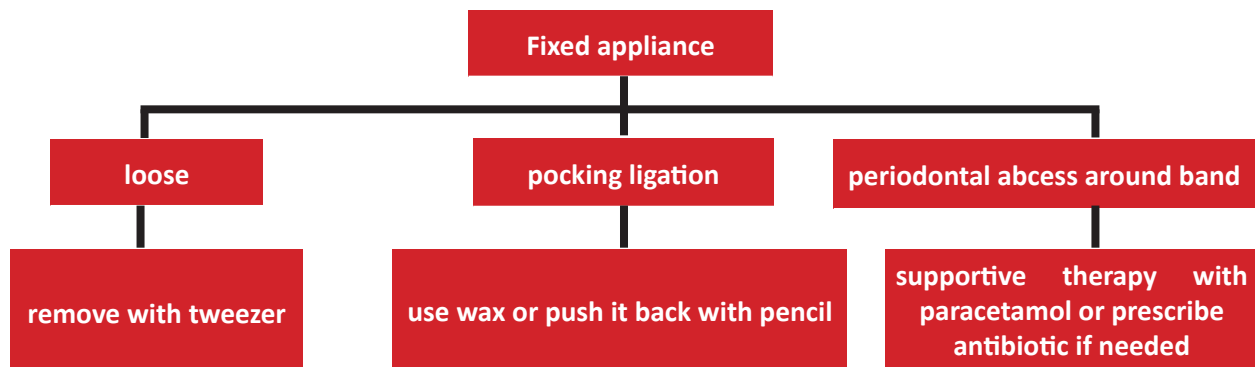


Figure 7

Conclusion

Since the nature of new coronavirus is mysterious and our knowledge is limited and studies about vaccines and drugs are minimal, here we suggested protocols for both general and specific dental practice according to highest possibility of coronavirus transmission.

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