

Research Article

Strategic Measures of Dental Care during a Pandemic Period at the Hospital-University of Dental Clinic of Monastir

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Abstract: Like the majority of countries in the world, Tunisia struggle against the coronavirus pandemic. Since March 22, 2020, Tunisia has passed to stage 3 of the coronavirus pandemic. Consequently, the Tunisian government has declared total containment until May 4, 2020. The hospital-university of dental clinic of Monastir is a Tunisian public hospital-university institution providing basic care (140000 patients last year) and learning for dental students (1546 students). Due to the characteristics of dental settings, the risk of cross infection may be high between dental practitioners and patients. That's why strict and effective infection control protocols were urgently needed. Thereby, we have sought within our faculty to put in place strategic measures in order to provide optimal care for our patients and the smooth learning of our students while preserving the health of all. The aim of this article is to introduce the essential knowledges about COVID-19 and to provide recommended management protocols for dental practitioners and students in (potentially) affected areas based on our experiences, relevant guidelines and research.

Keywords: coronavirus; patients; COVID-19; Tunisia.

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INTRODUCTION

The epidemics of coronavirus disease 2019 (COVID-19) started from Wuhan, China, last December and have become a major challenging public health problem for not only China but also countries around the world (Phelan, A. L. *et al.*, 2020). COVID-19 has as its etiologic agent the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2): the 2019 coronavirus is different from SARS-CoV, but it has the same host receptor: human angiotensin-converting enzyme 2 (ACE2). The infection started in Asia, but it has rapidly spread across the world: according to the World Health Organization, this is the first pandemic caused by a coronavirus. As of April 2, COVID-19 has been recognized in 206 Countries, areas or territories, with a total of 896,450 laboratory-confirmed cases and 45,526 deaths (covid19.who.in). Due to the characteristics of dental settings, the risk of cross infection may be high between dental practitioners and patients. In fact, On 15 March 2020, the New York Times published an article entitled "The Workers Who Face the Greatest Coronavirus Risk", where an impressive schematic figure described that dentists are the workers most exposed to

the risk of being affected by COVID-19, much more than nurses and general physicians (Gamio, L. 2020). That's why strict and effective infection control protocols are urgently needed.

What Is COVID-19?

Based on virus genome sequencing results and evolutionary analysis, bat has been suspected as natural host of virus origin, and SARS-CoV-2 might be transmitted from bats via unknown intermediate hosts to infect humans. It is clear now that SARS-CoV-2 could use angiotensin-converting enzyme 2 (ACE2), the same receptor as SARS-CoV, to infect humans (Zhou, P. *et al.*, 2020). People can catch COVID-19 from others who have the virus. The disease can spread from person to person through small droplets from the nose or mouth which are spread when a person with COVID-19 coughs or exhales. These droplets land on objects and surfaces around the person. Other people then catch COVID-19 by touching these objects or surfaces, then touching their eyes, nose or mouth. People can also catch COVID-19 if they breathe in droplets from a person with COVID-19 who coughs out or exhales droplets (www.who.int)

The incubation period of COVID-19 has been estimated at 5 to 6 d on average, but there is evidence that it could be as long as 14 d, which is now the commonly adopted duration for medical observation and quarantine of (potentially) exposed persons (Backer, J. A. *et al.*, 2020).

The most common symptoms of COVID-19 are fever, tiredness, and dry cough.

Some patients may have aches and pains, nasal congestion, runny nose, sore throat or diarrhea. These symptoms are usually mild and begin gradually. Some people become infected but don't develop any symptoms and don't feel unwell. Most people (about 80%) recover from the disease without needing special treatment. Around 1 out of every 6 people who gets COVID-19 becomes seriously ill and develops difficulty breathing (www.who.int)

Among patients who underwent chest computed tomography (CT), most showed bilateral pneumonia, with ground-glass opacity and bilateral patchy shadows being the most common patterns (Guan, W. J. *et al.*, 2010; Wang, D. *et al.*, 2020) .

Older people, and those with underlying medical problems like high blood pressure, heart problems or diabetes, are more likely to develop serious illness. People with fever, cough and difficulty breathing should seek medical attention (www.who.int).

The Chinese Centre for Disease Control and Prevention isolated the COVID-19. It published the viral genome sequence data immediately in international database banks GenBank and the Global Initiative on Sharing All Influenza Data (GISAID). This action enabled laboratories in several countries to develop unique PCR tests focusing on the diagnosis of COVID-19.

Like the majority of countries in the world, Tunisia has not been spared from the coronavirus. Since March 22, 2020, Tunisia has passed to stage 3 of the coronavirus epidemic.

Consequently, the Tunisian government has declared total containment until April 19, 2020. The hospital-university of dental clinic of Monastir is a Tunisian public hospital-university institution providing basic care (140000 patients last year) and learning for dental students (1546 students)

As stated in the article in "The New York

Times" cited above, the dentist is the health care worker most at risk from coronavirus contamination (Gamio, L. 2020).

Thereby, we have sought within our faculty to put in place strategic measures in order to provide optimal care for our patients and the smooth learning of our students while preserving the health of all.

RECOMMENDED MEASURES DURING THE COVID-19 OUTBREAK

Recommendations for Dental Practice

Due to the unique characteristics of dental procedures where a large number of droplets and aerosols could be generated, the standard protective measures in daily clinical work are not effective enough to prevent the spread of COVID-19, especially when patients are in the incubation period, are unaware they are infected, or choose to conceal their infection.

Precautions for Medical Staff

On the basis of our experience and relevant guidelines and research, dentists should take strict personal protection measures and avoid or minimize operations that can produce droplets or aerosols.

This is why we have taken certain decisions in order to limit as much as possible the risk of contamination by the coronavirus :

- By ensuring a system of rotation by team for the staff of our Clinic thus reducing the risk of contact and therefore the risk of contamination. :
- The patient circuit must be well established and as short as possible
- Provide patients with a space with liquid soap and water or, failing that, a hydro-alcoholic gel dispenser for washing hands as soon as they enter the dental unit.
- The consultation box must be well ventilated and disinfected after the care of each patient
- The dental unit must be equipped with all the protective equipment to ensure the safety of the medical staff (disposable non-sterile gloves, FFP2 mask or visor with surgical mask, cap, protective glasses, over-blouse, over-shoe)(fig 1)
- The dental chair must be equipped with a disinfection circuit and will be fully disinfected after each patient
- Disinfect and ventilate the waiting room: floors, seats and door handles every hour.



Figure 1: Protective equipment to ensure the safety of the medical staff

Treatment of a Patient

A patient who comes to our establishment (fig 2) must first go through the sorting unit (fig 3) where he undergo an interrogation (fig 4) relating to a possible trip to an epidemic region during the last 14 days, contact with an infected person or the presentation of symptoms COVID-19 to screen for contamination there .After, the patient is referred to the consultation box to assess the urgency of his chief complaint .In areas

where COVID-19 spreads, non-urgent dental procedures should be postponed but you can prescribe medication (table 1 and 2) to relieve the pain .It was reported that dental practice should be postponed at least 1 mo for convalescing patients with SARS (Samaranayake, L. P., & Peiris, M. 2004). It is unknown yet whether the same suggestion should be recommended for patients with COVID-19.

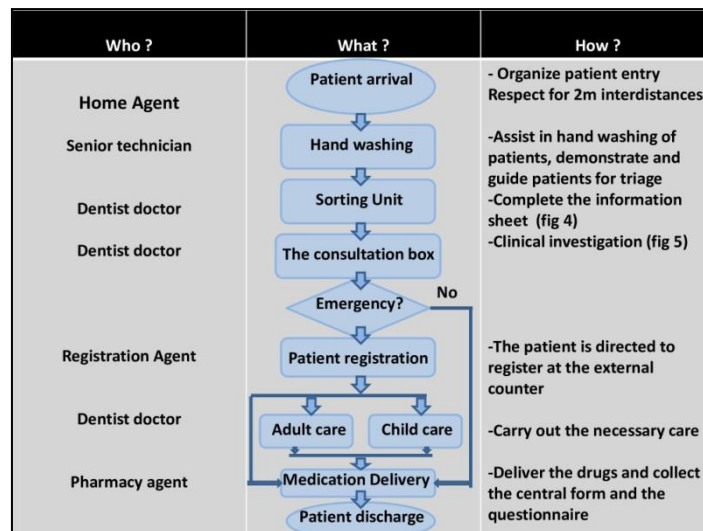


Figure2: Patient journey guide in the Monastir dental clinic during stage 3 of the COVID-19 epidemic



Figure 3: Sorting unit at the hospital-university of dental clinic of Monastir

COVID-19-Stage 3 de l'épidémie		Partie annexes relatives à l'accompagnant	
Annexe : Fiche de traçabilité d'un entretien poururgence dentaire (étape de triage) Personnel Soignant - Clinique Odontologique de Monastir			
Date: <input type="text"/>		Nom professionnel: <input type="text"/>	
NB: Si présence d'accompagnant veuillez remplir la partie annexe			
Identification du patient		Partie annexe relatives à l'accompagnant	
Nom et prénom: <input type="text"/>	Date de naissance: <input type="text"/>	Nom et prénom: <input type="text"/>	No téléphone: <input type="text"/>
Adresse: <input type="text"/>	Localité: <input type="text"/>	Adresse: <input type="text"/>	Localité: <input type="text"/>
Profession: <input type="text"/>	Profession: <input type="text"/>	Profession: <input type="text"/>	Profession: <input type="text"/>
Moyen de transport: <input type="text"/>	Moyen de transport: <input type="text"/>	Moyen de transport: <input type="text"/>	Moyen de transport: <input type="text"/>
Informations cliniques générales		Examens bucco-dentaires	
Le patient a-t-il été infecté par le COVID-19? Non <input type="checkbox"/> Oui <input type="checkbox"/> (depuis quand? <input type="text"/>)		Oculaire <input type="checkbox"/> Interne <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/>	
Le patient a-t-il été hospitalisé pour prise en charge COVID-19? Non <input type="checkbox"/> Oui <input type="checkbox"/>		Conférence d'urgence <input type="checkbox"/> Traumatisme dentaire <input type="checkbox"/> Infection <input type="checkbox"/>	
Si non hospitalisé, a-t-il été en auto-isolant? Dans un centre de traitement? Non <input type="checkbox"/> Oui <input type="checkbox"/>		Blessure (PFA / apparié / GDF) <input type="checkbox"/>	
Niveau de contact: Contact (un membre de famille ou proche suspect ou positif confirmé) Non <input type="checkbox"/> Oui <input type="checkbox"/> ou Voyageur récent à l'étranger? Non <input type="checkbox"/> Oui <input type="checkbox"/>		Autre <input type="checkbox"/>	
Le patient présente-t-il des signes d'infection respiratoire? Non <input type="checkbox"/> Oui <input type="checkbox"/>		Biomarqueurs (sérologie/métabolisme): <input type="text"/>	
Fébrile <input type="checkbox"/> Toux <input type="checkbox"/> Dyspnée <input type="checkbox"/> Rhinite <input type="checkbox"/> Asthène <input type="checkbox"/> Céphalées <input type="checkbox"/> Diarrhées <input type="checkbox"/> Courbatures <input type="checkbox"/>		Le patient a-t-il pris des médicaments pour soulager sa douleur? Non <input type="checkbox"/> Oui <input type="checkbox"/>	
A-t-il une gêne importante (difficulté à parler, essouffement important) ? Non <input type="checkbox"/> Oui <input type="checkbox"/>		- Paracétamol <input type="checkbox"/> AINS <input type="checkbox"/> AINS <input type="checkbox"/> Autre <input type="checkbox"/>	
- Orientation vers l'ISO		Dose et durée: <input type="text"/>	
Présence de comorbidités? (Diabète, HTA, insuffisance rénale, cardiaque ou respiratoire chronique, terrain immunosuppresseur, traitement immunosuppresseur, obésité, grossesse, Age > 65 ans) ... ou un traitement médical quotidien? Non <input type="checkbox"/> Oui <input type="checkbox"/>		- Douleur? Non <input type="checkbox"/> Oui <input type="checkbox"/>	
- Si oui, préciser: Le traitement: <input type="text"/>		Le patient est informé qu'il doit stopper le geste d'ARH (sauf si elle fait partie d'un traitement quotidien) <input type="checkbox"/>	
Présence d'allergies? Non <input type="checkbox"/> Oui <input type="checkbox"/> (préciser: <input type="text"/>)		Le patient est informé qu'il ne doit pas dépasser 3g/jour de paracétamol (500 mg/kg) et moins de 40 kg <input type="checkbox"/>	
		CAT: <input type="text"/>	
		<ul style="list-style-type: none"> • Médication et conseils d'hygiène fournis au patient <input type="checkbox"/> • Le patient est adressé à un autre service d'urgence <input type="checkbox"/> ou ORL, maxillofacial <input type="checkbox"/> • Le patient est orienté vers l'ISO pour séquestration <input type="checkbox"/> • Casier <input type="checkbox"/> • Le patient a-t-il des traitements pouvant interférer avec la prescription? Oui <input type="checkbox"/> Non <input type="checkbox"/> Préciser la prescription: Antibiotique <input type="checkbox"/> Antalgique <input type="checkbox"/> Adjuvants d'hygiène <input type="checkbox"/> Autre <input type="checkbox"/> Le patient est reçu le jour même pour le soin? Non <input type="checkbox"/> Oui <input type="checkbox"/> - Type d'urgence? URG <input type="checkbox"/> AIGU <input type="checkbox"/> Non <input type="checkbox"/> Pré-émerg <input type="checkbox"/> Autre <input type="checkbox"/> 	

Figure 4: Traceability sheet for an interview for dental emergency (triage step)

Oral Examination

Procedures that are likely to induce coughing should be avoided (if possible) or performed cautiously (World Health Organization, 2020a). Intraoral x-ray examination is the most common radiographic technique in dental imaging; however, it can stimulate saliva secretion and coughing (Vandenbergh, B. *et al.*, 2010). Therefore, extraoral dental radiographies, such as panoramic radiography and cone beam CT, are appropriate alternatives during the outbreak of COVID-19.

Treatment of Emergency Cases

Dental emergencies can occur and exacerbate in a short period and therefore need immediate treatment. Rubber dams and high-volume saliva ejectors can help minimize aerosol or spatter in dental procedures. Furthermore, face shields and goggles are

essential with use of high- or low-speed drilling with water spray (Samaranayake, L. P. *et al.*, 1989).

if a carious tooth is diagnosed with symptomatic irreversible pulpitis, pulp exposure could be made with excavator or chemomechanical caries removal under rubber dam isolation and a high-volume saliva ejector after local anesthesia; then, pulp devitalization can be performed to reduce the pain. The use of saliva ejectors with low or high volume can reduce the production of droplets and aerosols (Kohn, W.G. *et al.*, 2003);

Once the diagnosis is made, we are faced with two possibilities (fig 5) :

- Presence of dental emergency: treatment
- Absence of dental emergency: medication (**table 1 and 2**)

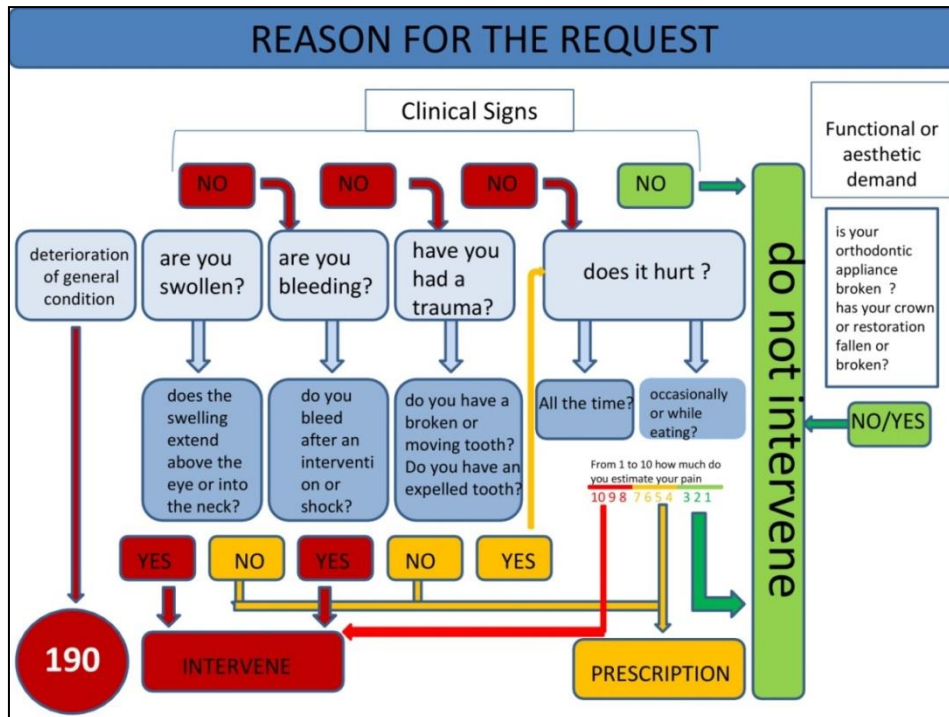


Fig 5: Guide to dental emergencies during a pandemic, inspired by the recommendations of the French dental association

Table 1 : Prescription guide for Analgesic Drugs

Analgesic Drugs			
First intention	Adult	Paracetamol	3g/day max
	Child	Paracetamol	-Less than 50 kg: 60mg/kg/day -More than 50 kg: same dosage as for adults
Second intention	Adult	Tramadol 50 mg in combination with a first-line pain reliever	3 tablets max / day 5 days max
		Codeine 30 mg + Paracetamol 500mg	6 tablets max / day 5 days max
	Child	It is not recommended to prescribe a level 2 for a child	

Table 2 : Antibiotics prescription guide

Antibiotic therapy			
		No allergy beta lactamine	Beta lactamine allergy
First intention	Adult	Amoxicillin 2g/day 7 days	Clindamycin 1200mg/day 7 days
	Child	Amoxicillin 50-80m/kg/day 2g/day max 7 days adult dose if weight > 40 kg	Azithromycin -Less than 25 kg: 20mg/kg/day -More than 25 kg: dose for 25kg (500mg) 3 days
Second intention	Adult	Amoxicillin+clavulanic.ac 3g/ day 7 days	Spiramycin+Metronidazole 9MIU Spiramycin + 1.5g Metronidazole
	Child	Amoxicillin+clavulanic.ac 1 dose-weight 3 times/day 7 days	Clarithromycin+Metronidazole 15mg/kg/day Clarithromycin 20-40mg/kg/day Metronidazole 7 days

And the consultation box is totally disinfected in order to receive the next patient .

Recommendations for Dental Education

It was reported that open communication among students, clinical teachers, and administrative staff would enhance mutual trust and facilitate adequate cooperation (Park, S. W. *et al.*, 2016) During the outbreak period, online lectures, case studies, and problem-based learning tutorials should be adopted to avoid unnecessary aggregation of people and associated risk of infection (Patil, N. G., & Yan, Y. C. H. 2003). Existing smart devices and applications have already made it possible for students to listen to and review lectures whenever and wherever possible. A platform has been made available to students allowing them access to all courses taught at the university.

CONCLUSION:

Research on the coronavirus continues to progress, resulting in the lack of a standardized protocol. Therefore, prevention is our best weapon to limit the risk of mutual infection while allowing the dentist to provide optimal care to his patients until a vaccine or a drug becomes available.

Data Availability:

The data used to support the findings of this study are included within the article.

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Conflicts of Interest: The authors declare no conflict of interest.

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