

## REVIEW

# Dental services during the COVID-19 pandemic: A tertiary care hospital experience

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**Abstract**

The Aga Khan University is the largest tertiary care hospital in the biggest metropolis of Pakistan, in this paper six weeks of experience during the COVID-19 pandemic is shared, we will discuss the measures that were taken to mitigate the spread of COVID-19 amongst dental health care providers (DHCPs) and provide a neoteric workflow for the provision of safe dental care as dental services move towards normalcy. Furthermore topic such as fit testing, contact tracing, employee health and training are discussed and experience of such measures is shared. It is hoped that till the time new evidence based data is generated these communications may help spread awareness to help setup clinical protocols for other tertiary care settings.

**KEYWORDS**

covid-19, dental services, dentistry, SARS-CoV-2, tertiary care hospital

## 1 | INTRODUCTION

The epicenter of the current COVID-19 pandemic was Wuhan, China, which was later classified by WHO as a global health emergency.<sup>1</sup> The number of COVID-19 cases within mainland China was surpassed by reported cases outside of China on February 26, 2020. Coincidentally, the first two cases of Covid-19 in Pakistan were reported on that very date.<sup>2</sup> Moreover, one of the two cases was diagnosed at our hospital.<sup>3</sup> Consequently, being the largest tertiary care hospital in the biggest metropolis of our country, the hospital went on an orange alert, which meant that all of our services and resources were directed toward providing emergent and urgent care. Likewise, in line with the hospital policy and according to the international guidelines, the dental clinic went on an “emergency-services-only” protocol.<sup>4</sup>

During the 6 weeks which followed, the dental clinic at our hospital provided dental services to over 500 patients

and performed more than 100 aerosol and nonaerosol generating procedures. Thankfully, none of the dental healthcare providers (DHCPs) at our hospital suffered from a COVID-19 infection.<sup>5</sup> This was in contrast to the 20% infection rate of our surgery colleagues.<sup>3</sup>

In this paper, we will discuss the measures that were taken to mitigate the spread of COVID-19 among DHCPs and provide a neoteric workflow for the provision of safe dental care as dental services move toward normalcy.

## 2 | THE FIRST 6 WEEKS

As soon as it was decided to move toward emergency only patient management, we consulted international guidelines from Center of Disease Control and Prevention (CDC) (<https://www.cdc.gov/coronavirus/2019-ncov/hcp/dental-settings.html>) and American Dental Association (ADA) ([ADA.org/virus](http://ADA.org/virus)) as well as rapid reviews that were

**TABLE 1** Aerosol and nonaerosol generating procedures (surgical extraction denotes use of high-speed turbine during the procedure)

Procedures		n	
Aerosol generating procedures	Fillings	Simple composite	5
		Compound composite	3
		Simple amalgam	2
		Compound amalgam	6
		IRM/ZOE	2
		GIC	1
	Total fillings	19	
	Endodontics	Anterior	9
		Premolars	11
		Molars	10
Primary pulpotomy/pulpectomy		6	
Total endodontics	36		
Surgical endodontics	Root resection	1	
	Crowns	PFM	1
	Surgical extractions	Surgical	3
Third molar unerupted		3	
Total extractions	6		
Nonaerosol generating procedures	Extractions	Simple	43
		Difficult	8
		Third molar erupted	4
		Primary tooth	10
	Total extractions	65	
	Orthodontic treatment	Comprehensive treatment	2
		Retainer repair	1
		Orthodontic emergency	30
	Splinting	Extracoronary	1
	Splint	Night guard	1
Denture	Relining	1	
Crown	Cementation	1	
	Stainless steel	1	

an invaluable resource that directed our actions.<sup>6</sup> Changes in our practices were made in concordance and comprehensive administrative and engineering controls were undertaken to maintain social distancing and optimizing emergency patient care.<sup>7</sup>

During the 6 weeks, several procedures were performed and details of which are presented in Table 1. We consulted an average of 13 patients in a day which meant that our patient volumes were down to almost 10% of our regular clinics; historically almost 130-150 patients visit our clinic of which almost 30% seek emergent or urgent care, therefore our emergency visits were decreased by 20%. This can be attributed to the fear of the COVID-19 pandemic that influenced the patient's dental care-seeking behavior and similar results have been noted in another study.<sup>8</sup>

Dentoalveolar abscess, acute-pericoronitis, pulpal, and periapical infections were the most common reasons for

patients to seek emergency dental care, which is in concordance to other dental literature. The peculiar finding in our patients was that we had 30 patients who visited our clinic as orthodontic emergencies. This unique finding is because almost 600 patients are registered for orthodontic treatment at our hospital.<sup>8</sup>

The most common procedure performed at our clinic was dental extraction followed by endodontic treatment.

### 3 | INITIATION OF A RESPIRATORY PROGRAM CONSISTING OF FIT TESTING

During this pandemic, the Department of Occupational Safety and Health Administration classified the DHCPs to be at a very high risk and therefore upgraded the personal protective equipment (PPE) requirements for them,

which included an N95 respirator (<https://www.osha.gov/Publications/OSHA3990.pdf>; United States, Department of Labour).

These N95 respirators need to be “fit tested.” This is a process in which the seal of the respirator and the facepiece is tested. This procedure is performed when such type of respirator or facepiece is being worn for the first time and should be repeated annually or whenever the model or type of facepiece is changed.<sup>9</sup> At our clinic, we underwent a comprehensive fit testing program in which one of our dental surgery assistants underwent a comprehensive fit testing training. We have 64 staff members, of which 54 were fit tested. Forty-nine of them passed the fit test (Model # 8210,3M, St. Paul, MN), meaning that more than 90% of staff passed the fit test, which is a very good pass rate. Data show a large variation in pass rates ranging from 10 to 80%.<sup>10-12</sup> Ten staff members were not fit tested as they had beards and are considered an automatic fail due to lack of seal. We are in the process of acquiring powered air-purifying respirators for these staff members.

Our fit testing program was a qualitative fit test (3M Qualitative Fit Test Apparatus FT-30, Bitter 1 EA/Case). It relies on the user’s sense of taste and smell and reaction to an irritant. It includes two steps: the first step exposes the user to the sensitivity solution (3M Sensitivity Solution FT-31) without wearing the respirator; the second step involves exposing the user after 20 minutes to another reagent (3M FT-32 Bitter Fit Test Solution) with the donned respirator. The user fails the fit test if they can smell or taste the reagent while wearing the respirator (Figures 1 and 2).<sup>9,13</sup>

#### 4 | TRAINING AND SURVEILLANCE OF DONNING AND DOFFING OF PPE

It has been shown that improper donning and doffing protocols lead to higher infection rates among health care providers due to self-contamination.<sup>14,15</sup>

We initiated an in-house training program for proper donning and doffing of all PPE including N95 respirators. All faculty and staff members were required to attend a one-on-one training session and later needed to demonstrate proper methodology and sign off from a trained infection control nurse before they were allowed to provide patient care.

Later to reinforce proper PPE protocol, our hospital along with the federal government became a part of the “We Care Campaign.” This initiative aims to train 50 000 health care workers to properly use PPE (<https://www.thenews.com.pk/print/659260-training-programme-launched-for-frontline-health-workers>).



**FIGURE 1** Sensitivity test. Hood and collar assembly placed without wearing N95 respirator. Using a nebulizer, sensitivity test solution is placed through a hole (10 squeezes)

Designated donning and doffing areas have been set up where staff are encouraged to give positive feedback to colleagues during donning and doffing procedures as these methods have proven to be useful in the past.<sup>14</sup>

Finally, a video by our infection control team was launched in our local language and was made available to all staff members (<https://www.youtube.com/watch?v=XtUMXBDDP4o>).

#### 5 | EMPLOYEE HEALTH

All employees at our hospital are required to fill out an online form each day through an app (employee SEHAT App <https://appstore.aku.edu/>). The app uses an interactive chatbot, driven by artificial intelligence, which allows users to understand their symptoms, recognize whether they may have contracted COVID-19, and seek help promptly. Furthermore, a dedicated testing site for employees only has been set up where the employees have access to healthcare professionals for screening as well as testing for COVID-19 related symptoms.



**FIGURE 2** Fit test. The previous procedure is repeated with donning N95 respirator and breathing normally, deeply, turning head side to side, up and down, talking and bending over

## 6 | CONTACT TRACING

To mitigate COVID-19 spread, contact tracing remains to be of utmost importance. Research has shown that almost half of the infections caused by COVID-19 patients spread during the asymptomatic phase of infection.<sup>16</sup> The objective of this exercise is to identify exposed individuals, ascertain the exposure history, classify the risk, and encourage the exposed individuals to self-isolate.<sup>17</sup> Although it is unknown how many days before becoming symptomatic does the asymptomatic carrier shed the virus, CDC recommends contact tracing up to 2 days preceding the onset of the symptoms (<https://www.cdc.gov/coronavirus/2019-ncov/php/open-america/contact-tracing-resources.html>).

One faculty member and two registered nurses were specifically trained for contact tracing at our dental clinic. This was very useful as we had two patients who later turned out to be positive for COVID-19 for which appropriate measures were taken after ascertaining the exposure risks. Finally, a hotline for patients has been set up for them to call and inform the clinic if they develop any symptoms or get tested for COVID-19 following the days postdental

treatment so that appropriate contact tracing measures can be undertaken.

## 7 | TRANSITIONING INTO NORMALCY

On May 28, 2020, we have reopened the dental clinic at our hospital for elective dental care.

This reopening follows a unique evidence-based workflow details, which is well presented in Figure 3.

To maintain social distancing, all patients are required to make an appointment through the call center. During this step, all patients are telescreened through trained call center representatives if they have a history consistent with or suspected of COVID-19 infection. An appointment for in-person screening at the dedicated screening and testing site is made. If patients are classified as safe during the telescreening, an appointment for the dental clinic is given and instructions for respiratory hygiene and new clinic protocol are reinforced. Unless the patient is a minor or has a disability, they are encouraged to come on their own to maintain social distancing.<sup>18</sup>

On the day of the appointment, the patient undergoes a thorough assessment including temperature checks and vitals to determine fitness for a dental consultation.

Respiratory hygiene and hand hygiene are reinforced to all patients followed by mouth rinse with hydrogen peroxide 1% or 0.2% povidone before the oral examination.<sup>18,19</sup>

Later, the clinician determines the nature of the procedure. Nonaerosol generating procedures, for example, orthodontic wire change, are carried out in the same visit using appropriate PPE, while aerosol-generating procedures are carried out under rubber dam isolation and PPE.<sup>20,21</sup>

If the clinician determines that an aerosol-generating procedure is required (e.g., surgical extraction and/or apical surgery) in which isolation with rubber dam is not possible, the patient is required to undergo a pool test.<sup>22</sup>

Pool testing is not a new concept. It is carried out to conserve resources. The test strategy at our hospital involves taking samples for RT-PCR of eight patients who are asymptomatic and classified as low risk to run the sample together. If it turns out negative, all patients tested are classified as negative. However, if the result is positive, it means that at least one patient in that pool is positive so individual RT-PCR is done for those eight patients to determine the positive individuals. This step, along with appropriate PPE, adds another layer of safety for our clinicians before conducting an aerosol-generating procedure in which rubber dam placement is not feasible.<sup>22,23</sup>

If the patient tests positive for COVID-19, and the procedure can differ, the patient is asked to differ treatment until the RT-PCR turns out negative. In the unlikely scenario, in

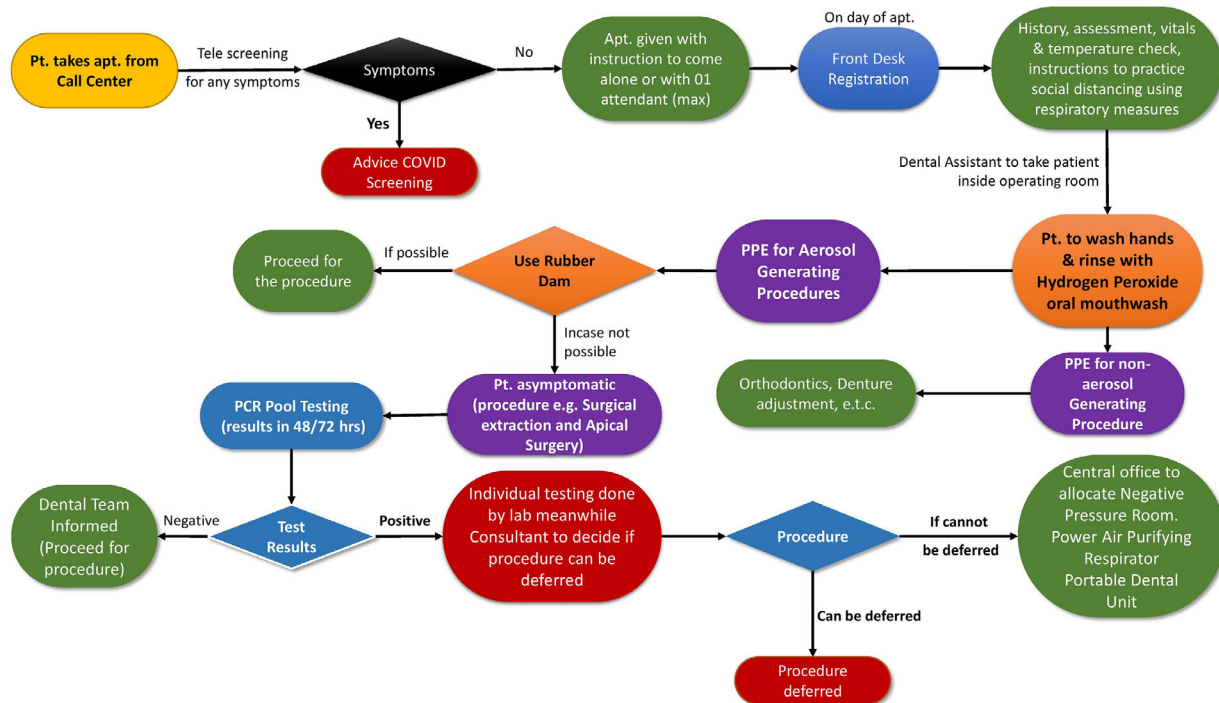


FIGURE 3 Workflow at Aga Khan University Hospital

which a dental procedure is deemed necessary, provision for a portable dental unit and a negative pressure room in the hospital operating room has been made.<sup>24</sup>

Environment safety of all operatories will be maintained in concordance to CDC guidelines in between patients (<https://www.cdc.gov/mmwr/PDF/rr/rr5217.pdf>).

## 8 | CONCLUSION

Through this communication, it is hoped that sharing of experience will help provide a blueprint to set up a standard operating procedure for not only hospital-based dental practices but also private practices so that they can transition into normalcy safely.

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