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A REVOLUTIONARY CHANGE IN THE FUTURE OF DENTISTRY ON ACCOUNT OF COVID-19

Dental Science

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ABSTRACT

Origin of the new coronavirus (Sars-CoV-2), first detected in China at the end of 2019, has caused a worldwide pandemic. The panic is mainly because the virus is responsible for causing an acute respiratory syndrome (COVID-19). Sars-CoV-2 has a high infectivity through airborne contamination. However, there is an increased infection risk in the dental environment as dental procedures involves a close contact with saliva, where the virus is present in greater number. This possesses a serious problem for dental professionals and patients. Therefore, this article highlights various precautionary measures to be taken to prevent the transmission of the virus from one person to another. This article also reviews extensively on the impact of Covid-19 has on the future of dentistry.

KEYWORDS

COVID-19, dental professionals, teledentistry

INTRODUCTION:

The world has suffered from several epidemics (such as H1N1, H5N1, avian influenza, Ebola, SARS, Zika, and Nipah) in the past; however, appropriate and extensive research has helped us successfully tackle the disease.1 Similarly, a recent outbreak of COVID-19, initially referred to as the Wuhan coronavirus (CoV), is responsible for the latest pandemic that has affected human health and the economy across the world at a colossal scale.[2]

The outbreak originated from Wuhan in China, developed into an immediate public health crisis that spread across 175 countries, including India.3 On 30th January 2020, a public health emergency was declared by the world health organization of International Concern as it has a rapid spread and possess a high risk to countries with vulnerable health systems. In January 2020, there was the first Covid-19 patient reported in India.[4]

Covid-19 is labeled as SARS- CoV-2, which causes a severe acute respiratory syndrome. Belongs to coronaviridaae family, it is a SS-RNA virus whose diameter ranges from 60 nm to 140 nm. The spread is mainly by human to human transmission through close contact, direct contact, respiratory droplet, and results in a rapidly emerging respiratory disease. Amongst the human population, the emergence of novel human pathogens and re-emergence of several diseases are of a particular concern.[5]

In routine dental practice, the spread of COVID-19 cannot be limited just by following the standard infection control measures, which are otherwise followed in daily clinical work. High risk is mainly during the incubation period, when the patients are unaware if they are infected or choose not to conceal their infection; therefore the spread of the disease cannot be limited.[6]

During the dental procedure, the use of a high-speed hand-piece or ultrasonic instruments may cause secretions, salivation, blood, and droplets to aerosolize the virus into the surroundings. Furthermore, they can be transmitted through indirect contact, by touching contaminated surfaces and self-delivery to the eyes, nose, or mouth. Therefore, the exposure of close proximity to patients, contaminated aerosol, and saliva makes a dentist prone to infection risk in a routine clinical practice. 6Thus, to reduce interpersonal contact, current guidelines by CDC, ADA, and WHO advised dentists to limit the treatment procedures just to emergency care and postpone all elective and non-emergency courses.7 In addition, Teledentistry has become a useful mode in assisting patients. A detailed history must be obtained from the patients over the telephone about their chief complaint along with follow-up questions such as patient's travel history, health status, or any history of contacting infected persons. With the advancements in technology, the quality of dental patient management has also enhanced. Therefore, in this manner, people from remote locations, who are away from healthcare centers / dental clinics, now can avail dental assistance through Teledentistry.[8]

According to the Centers for Disease Control and Prevention (CDC) guidance, patients with active COVID-19 infection should not be seen in dental settings and should be referred for emergency care where appropriate transmission-based precautions are available.[9]

Unfortunately, till date no vaccine or medicine has been made available to fight Covid-19. Therefore, to mitigate the risk, one must follow the appropriate method of protection and hygiene to prevent contamination. The dentists, dental hygienists, dental assistants, and receptionists must update their awareness and skills on infection control and follow the strict protocols recommended by the relevant authorities to protect themselves and the patients against such deadly virus.

Till now, 7.6 million Covid-19 positive cases and 1,15,000 deaths, as of 20/10/2020, have been reported in India.10 Due to the limitations in the number of published researches on the accuracy of the available protocol for dentists and dental associates, we have undertaken this research to discuss an overview of the uncompromisingly mandatory protocol for current and future dental practitioners in the management of patients amidst the Covid-19 pandemic.

INFECTION PREVENTION AND CONTROL IN DENTAL PRACTICE:

Patient evaluation:

Step -1: It is advisable to discuss patient's chief complaint via telephone triage.7 Most important and relevant questions must be asked, including any history of fever in the past one week, patient travel history, any contact with Covid-19 patient, etc. Elective dental care should be avoided for two weeks if the patient presents a positive response to any of the queries.11 This is because several studies have confirmed the presence of virus in the saliva of an infected individual.[12]

Step-2: Upon arrival, the body temperature of the patient should be evaluated using a contact-free forehead thermometer. If the patient responds negatively to all the questions and is a-pyretic and asymptotic, the patient can be treated by the dental surgeon following the recommended protocols (Figure 1 and Table 1 by Parin Bhanushali et al.). It is of utmost importance to test patients who need dental care for SARS-CoV-2 in order to restart dentistry in a sustainable way. Tests can be a vital tool to mitigate the risks for patients and oral healthcare workers, as no other alternatives are available.[7]

SYMPTOMS OF COVID-19 :

Fever, tiredness, and dry cough are the most common symptom of a covid-19 patient. In addition, sore throat, nasal congestion, pains, runny nose are also reported as mild symptoms, which may gradually lead to respiratory failure or even death.[13]

Covid-19 has an incubation period of 0 to 24 days. During this period it is possible that the patient accidentally transmit the disease.14 It is seen that majority of patients have been reported with mild symptoms which is mostly left undiagnosed.15 Covid-19 is found to have male predilection and people with existing chronic disease such as immunocompromised patients, cardiovascular illness, are at greater risk.[15]

DIAGNOSIS:

The patient reported with fever, sore throat, cough, and a travel history are suspected cases. Therefore, these patients can be asymptomatic carriers. The confirmation of the suspected case can be done by a positive molecular test. Initially in India, the collected samples were transferred to the labs or the National Institute of Virology in Pune. Now there are several commercial centres available in each state. During early disease state, chest X-ray may appear normal, but CT imaging shows subsegmental consolidation and ground-glass opacities. In many suspect cases with the negative molecular test, a CT scan is used to diagnose Covid-19 virus in the infected patient.[16]

Step-3: Waiting Room

Posting signs and posters at the entrance and in strategic places have been recommended by the Indian Dental Association to provide patients with instructions (in appropriate languages) about hand hygiene, respiratory hygiene, and cough etiquette. All appointments should be scheduled such that social distancing can be maintained in the waiting room. While planning a meeting, patients must be communicated to avoid being accompanied by any companion unless patient assistance is absolutely required.17

Step-4: During Treatment

In India, The National Task Force for Covid-19, constituted by the Indian Council of Medical Research, recommended that every dental surgeons and dental assistants must use highest level of personal protective equipment (PPE). PPE includes gloves, gowns, head covers, shoe covers, eye protection including goggles or a disposable/reusable face shields that covers the front and sides of the face, and an N954 or FFP2 mask or higher- level respirator while treating patients. A combination of a surgical mask and a full-face shield must be used in situations where a respirator is not available.[18]

Step-5: Adequate hand hygiene before examining a patient, prior to any dental procedures, after touching the patient, after touching the surroundings and equipment without disinfection, and after touching the oral mucosa, blood, damaged skin, or wound.[18]

Hand hygiene: Washing hands thoroughly prior to and after any procedure with alcohol-based sanitizer or with water and soap is an utmost necessity.19 Alcohol-based hand sanitizer must be rubbed on hands for at least 20-30 seconds in the absence of evident dirt on hands.20 Soap and water must be used for 40-60 seconds when the hands are dirty.21 Hand hygiene is compulsory before putting and after removing PPE.22 In the absence of soap or alcohol-based hand rub, chlorinated water can be an alternative solution but cannot be used ideally because it may cause dermatitis.[23]

Step-6: A mandatory pre-procedural mouth rinse with 0.5–1% hydrogen peroxide for its nonspecific virucidal activity against viruses and other microorganisms, or with 0.2% povidone-iodine, is recommended as it might reduce the load of microbes in saliva.24 Extra-oral dental radiographs, such as panoramic radiography and cone-beam computed tomography (CBCT), are considered as an alternative to intraoral periapical radiographs as these procedures stimulate saliva secretion and cough. Aerosol-generating procedures must be avoided, and the use of hand instruments such as spoon excavators along with chemo-mechanical caries removal agents should be prioritized. If the aerosol-generating method needs to be performed, it must be scheduled as the last appointment of the day. A working position of 10 or 11 o'clock is recommended, and an eight o'clock position should be avoided. Application of rubber dam is mandatory as it can significantly reduce the spread of airborne particles in approximately three-foot diameter of the operational field by 70%. Intraoral and extraoral high volume suction for aerosols should be implemented for every procedure, along with four-handed dentistry. In addition, to prevent cross-infection, several measures such as improving the quality of water available, flushing of water from dental unit waterlines, use of anti-retraction valves, anti-retraction hand-pieces, and retrograde aspiration are mandatory.[7]

At any point of time, if the patient develops signs and symptoms of Covid-19, immediately refer the patient to a medical professional and the dentist should quarantine himself/ herself and initiate self-monitoring for a period of 14 days. If other dental professionals develop signs and symptoms of Covid-19, then they must also self-isolate themselves and coordinate with a medical professional.

Step-7: Post-treatment

Dental clinic disinfection is a vital step. Dental treatment for asymptomatic Covid-19 patients with high-speed hand-piece and ultrasonics which produce aerosol in the dental clinic and which are routinely used in dental procedure, cannot protect dental health professionals from Covid-19. Therefore, use of such equipments must be avoided as much as possible. Heat tolerated critical and semi-critical instruments should be sterilized with heat sterilizing procedures.25 Heat sensitive instruments can be sterilized by using a chemical disinfectant.26 Use of 1% sodium hypochlorite for floor cleaning and 0.01% sodium hypochlorite for disinfecting waterlines can be used to reduce the risk of cross-infection.27 With the aid of an authorized biomedical disposal agency, all biomedical wastes pertaining to patient care should be carefully disposed off time to time.[28]

CONCLUSION:

The explosion of the COVID-19 pandemic has drastically transformed the dental and medical health care system on a global scale. Although health care professionals have a greater probability of contacting the COVID-19 virus, presently there is a high demand from each health care professional to be significantly more responsible while treating patients. A strict guideline must be followed at every clinical practice as recommended by WHO, CDC, and ADA. Present-day restrictions on practising aerosol procedures must be avoided. During emergency treatment, an approach towards less invasive and more preventive dentistry must be implemented. A new form of dentistry, known as Teledentistry, is currently practiced which has proved to be a highly effective. Telehealth provides a pragmatic approach to assess and record the oral health status postoperatively and hence improve the overall delivery of oral care to the patients.7 This facility allows dentists to monitor the treatment outcome of patients using mobile photography, online videography, thereby ensure patient confidentiality, provide educational videos to the patients regarding oral hygiene maintenance. As a result, there is a greater scope of maintaining the oral health and hygiene like never before. With a paradigm shift in dental care practice and its progress during the current pandemic situation, Teledentistry holds a significant prospect to attend patient's treatment needs without confrontation.

Every team of dental workers must be in partnership to tackle and share the risk of oral diseases and other non-communicable diseases in the future. As health care professionals, it is our responsibility to play a vital role in helping every individual in our society to follow the strict health care hygiene and adapt to the new change.We also need to encourage people to reduce contact, maintain a safe distance, and most importantly, follow the recommended health hygiene.

However, further research must be conducted to explore a better COVID-19 diagnostic tool to decrease the transmission of the virus to the doctors and other patients, and find better solutions to keep our profession thriving to remain on the frontline of healthcare and serve our society and country in a more remarkable way.

Figure 1. Patient triaging and dental management during COVID-19 pandemic

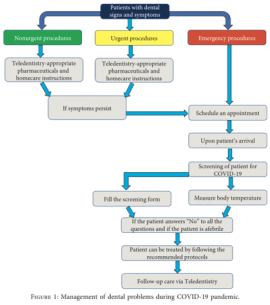

FIGURE 1: Management of dental problems during COVID-19 pandemic.

Table 1: What constitutes a dental emergency? (adapted from American Dental Association [15]).

Dental emergencies	Urgent dental care	Other urgent dental care
(i) Uncontrolled bleeding	(i) Severe dental pain from pulpal inflammation	(i) Extensive dental caries or defective restorations causing pain
(ii) Cellulitis or a diffuse soft tissue bacterial infection with intraoral or extraoral swelling that potentially compromises the patient's airway	(ii) Pericoronitis or third-molar pain	(ii) Manage with interim restorative techniques when possible (silver diamine fluoride, glass ionomers)
(iii) Trauma involving facial bones, potentially compromising the patient's airway	(iii) Surgical postoperative osteitis, dry socket dressing changes	(iii) Suture removal
	(iv) Abscess or localized bacterial infection resulting in localized pain and swelling	(iv) Denture adjustment on radiation/ oncology patients
	(v) Tooth fracture resulting in pain or causing soft tissue trauma	(v) Denture adjustments or repairs when function impeded
	(vi) Dental trauma with avulsion/luxation	(vi) Replacing temporary filling on endo-access openings in patients experiencing pain
	(vii) Dental treatment required prior to critical medical procedures	(vii) Snipping or adjustment of an orthodontic wire or appliances piercing or ulcerating the oral mucosa
	(viii) Final crown/bridge cementation if the temporary restoration is lost, broken, or causes gingival irritation	
	(ix) Biopsy of abnormal tissue	

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