

## COVID-19 as an Emerging Pandemic and its Implications in Dental Practice: A systematic review

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### Abstract

Coronaviruses are named for the solar corona-like appearance (the surface projections) of their virions when viewed with an electron microscope. Coronaviruses are the second most prevalent cause of the common cold (rhinoviruses are the first). Coronavirus disease 2019 (COVID-19) has caused large amounts of damage to various professional fraternities and one of the most affected fraternity was dentistry. Hence this comprehensive review includes the impact of COVID on Dentistry alongside explaining the pathogenesis, clinical features of COVID-19.

**Keywords:** COVID-19, Respiratory syndrome, Dentistry, Pandemic, Vaccine.

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### Introduction

In Wuhan, Hubei province, a new strain of coronaviruses was created. China caused a cluster of acute respiratory conditions known as the 2019 coronavirus illness (COVID-19) in December 2019. According to news sources, over 213 countries and provinces were affected by COVID-19, with significant epidemics occurring on 30 January 2020 in the United States, Brazil, Russia, Western Europe, and India[1,2]. A pandemic disease occurs over a wide area, such as several masses of land or across the world, affecting a large population. On the other hand, the endemic disease is known to be the rapid spread of the disease to many individuals in a specific population within a limited period[3]. (when the infection is continuously maintained at the baseline level in a geographical area). Generally, common endemic conditions, such as seasonal influenza recurrences, with a growing number of infected individuals, are removed since they occur in vast areas of the world, rather than spread internationally[4]. Several epidemics of diseases such as tuberculosis and smallpox have historically taken place. One of the most lethal pandemics has been the Black Death (also called the Plague), which in the 14th century killed almost 75–200 million persons[5,6]. Other significant pandemics include the 1918 influenza pandemic (Spanish flu) and the 2009 influenza pandemic (H1N1)[7]. The coronavirus disease of 2019 caused a great deal of damage to the various professional fraternities, and one of the most influenced fraternities was dentistry. We are very familiar with employment health issues in dentistry, such as hepatitis B and hepatitis C, and HIV. The New York Times has reminded the world that dentistry has the most risk of any profession concerning COVID-19[8,9]. Therefore, this detailed analysis considers the effect of COVID on dentistry and the explanation of pathogenesis, the clinical features of COVID-19.

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### The COVID-19 virus

COVID-19 virus belongs to the genera Betacoronavirus, which has a close similarity of the sequences of COVID-19 to that of acute severe respiratory syndrome-related coronaviruses (SARSr-CoVs), and the virus uses ACE2 as an input receptor such as SARS-CoV. Their names may describe viral characteristics, the diseases they are associated with, or even the tissue or geographic locale where they were first identified[10]. Coronaviruses are named for the solar corona-like appearance (the surface projections) of their virions when viewed with an electron microscope[10,11]. Coronaviruses are the second most prevalent cause of the common cold (rhinoviruses are the first)[12].

### Structure

Coronaviruses are enveloped with ribonucleic acid (RNA) genome with the longest positive (+) virus. The diameter of the virions is 80 to 160 nm. Compared to the most wrapped viruses, “the corona” produced by glycoproteins allow the virus to bear conditions throughout the gastrointestinal tube and spread along the faecal oral route[13,14]. The big, more stranded RNA genome (27,000–30,000 bases) are associated with the virus. Glycoprotein appears on the surface area as a club-shaped projection like a halo (corona) around the virus. The synthesis of proteins is close to the synthesis of togaviruses. When the genome is corrupted, it is converted to a polyprotein and is split into an RNA-dependent RNA polymerase (L [225,000 Da]). The polymerase produces an RNA prototype with negative significance. The L protein replicates new genomes using the RNA template and generates five to seven individual ribonucleic (mRNAs) messengers for each viral protein. Generation of the individual mRNAs may also promote recombination events between viral genomes to promote genetic diversity. Virions contain the glycoproteins E1 (20,000 to 30,000 Da) and E2 (160,000 to 200,000 Da) and a core nucleoprotein (N [47,000 to 55,000 Da]) some strains also contain a hemagglutinin-neuraminidase (E3 [120,000 to 140,000 Da]). Viral attachment and membrane fusion is mediated by the E2 glycoprotein and is the target of neutralizing antibodies. The E1 glycoprotein is a transmembrane matrix protein[15,16].

**Entry into the host**

Viral feedback depends on how the host cells communicate with the virion. The infection starts through the interaction of viral particles with particular proteins on the cell surface. When the receptor adheres early, encircled viruses mix the host cell membrane into the envelope to supply the target cell with the nucleocapsid. Spike protein plays a vital role in the entry of the receptor and membrane fusion as facilitators. The coronavirus uses a range of receptors and triggers to cause fusion, which is the retention of the essential elements that allow this initial stage of the viral life cycle. The fusion procedure requires essential conformational changes in the spike protein. The spike proteins, which give coronaviruses a crown-like appearance on electron micrographs, first touch cells with a receptor-binding domain. In Sars-CoV-2, this docks onto angiotensin-converting enzyme 2(ACE2) and initiates viral entry[17]. The binding domain is a target for vaccine and antiviral drug developers[18]. Results also show a higher affinity of the Sars-CoV-2 receptor-binding domain to human ACE2 by plasmon resonance analysis.

**Clinical features**

The period between COVID-19 exposure and the time when symptoms begin is usually about 5 to 6 days but can be 1 to 14 days. Most important about surface coronavirus is for it to be cleansed with traditional home disinfections, which destroy the virus. Studies have shown that a virus of the COVID-19 can survive on plastic and chromium steel for up to 72 hours, but on copper for 4 hours and on wood for less than 24 hours 19. Aches and pain, nasal congestion, a sore throat, or diarrhoea can be present in some people. These symptoms tend to be mild and start progressively. Some individuals get infected but have only very mild symptoms. Around 1 in five people receiving COVID-19 get seriously ill and develop breathing challenges. Most of them (about 80 percent) get over the disease without hospital treatment. The risk of serious illnesses being developed is higher among older adults and those with underlying medical conditions such as high signs, heart, lung, diabetes, or cancer. But anybody can catch COVID-19 and get seriously ill. The virus can also be transmitted to people with very mild COVID-19 symptoms. Medical attention should be sought by people of all ages who experience fever, cough, and difficulty breathing. Others who have the virus can catch COVID-19. The disease spreads primarily from individual to individual through small droplets from the nose or mouth, which is expelled from the body when a person with COVID-19 coughs, sneezes, or talks. If the person who is exposed to the virus inhales these droplets, people may get COVID-19. Therefore, it's crucial to stay away from others at least 1 meter (3 feet). These droplets can land on objects and surfaces like tables, doorbells, and handrails around people[19]. People may get infected by touching or affecting the eyes, nose, or mouth of those objects or surfaces. Therefore, it is essential to regularly rub your hands with soap and water or clean them with a hand based on alcohol. Research shows that children and adolescents are even as prone to infection and can

spread the disease as other age brackets. There is currently evidence that children and young adults persist in serious illnesses less likely. However, severe cases can still occur in these age groups. In the event of a risk of being exposed or presenting symptoms, kids and people should obey an equivalent guide on self-quarantine and self-isolation. Children need to avoid being in contact with the elderly at risk of severe illness[20,21].

**Impact of COVID 19 pandemic on dentistry**

**Routes of Transmission**

Infections usually spread through respiratory gout or contact with SARS-CoV-2. Having an infected person coughs or sneezes, SARS-CoV-2 can then airborne, potentially infecting close-contact individuals (within a radius of approximately 6 ft). This culminated in a recent intervention to reduce the spread of the disease in the community. Another essential transmission route is if others then touch SARS-CoV-2 droplets of inanimate objects close to an infected human. Therefore, handwashing and disinfection are necessary to avoid the disease spread. This suggestion is further improved, as averages, 23 times per hour are affected by individuals, 44 percent of which include mucous membranes of the mouth and nose. Moreover, tests have shown that both the saliva and feces of the patients concerned have SARS-CoV-2 presence. The presence of SARS CoV-2 in the secretive saliva may explain the possibility that it can bind with human angiotensin-converting enzyme two receptors that are highly concentrated in salivary glands. Consequently, the potential is for aerosol, fomite, or faecal oral transmission of COVID-19, which can aid nosocomial dissemination in the dental rooms.

**Patient Management and Prevention of Nosocomial Infection**

In this epidemic of COVID-19, specific steps for dental patient management will be addressed, based on the information gained from the previous SRS-CoV outbreak and data available on SRAS-CoV-2 and its related illness (COVID-19).

**Patient Evaluation**

Patients should complete a comprehensive medical history form, COVID-19 screening, and a real emergency questionnaire examination upon arrival at the dental practice. Dentists should measure a screening questionnaire and test a simple emergency questionnaire. Dental practitioners are asked to use a non-contact front thermometer or cameras with infrared thermal sensors to measure patient body temperature. The signs of fever and/or airborne ills in patients with >100.4f=38C should be delayed for at least two weeks for optional dental treatment[21].

According to Recommendations of the Center for Disease Control and Prevention, those with suspected COVID-19 infection must be situated at least 6 ft from unidentified patients seeking treatment 24 hr in the separate, well-ventilated waiting room. Patients are asked to wear an operating mask and take good breathing hygiene, such as before coughing and sneezing the body. Once patients are told that they have auto-quarantine, dentists may advise patients to contact their doctor to rule out COVID-19.

**Table 1:Management of patient according to the emergency**

“Diagnosis”	“Primary management”	“Secondary management”
“Symptomatic irreversible pulpitis or apical periodontitis”	Ibuprofen 600mg + Acetaminophen 325 to 500mg	Full Pulpotomy
Acute Apical Abscess	1.Incision & drainage 2.Augmentin 625 mg- bid × 5 days/ Clindamycin 300 mg-qid × 5 days 3.Ibuprofen 600mg + Acetaminophen 325 to 500mg	Call OMFS surgeon if any space infection
Avulsion/Luxation	If tooth is re-implanted properly, follow simply the pain management protocol Ibuprofen 600mg + Acetaminophen 325 to 500mg	If tooth was not re-implanted follow the IADT guidelines.
Tooth fracture	1.Augmentin 625 mg- bid × 5 days/ Clindamycin 300 mg-qid × 5 days 2.Ibuprofen 600mg + Acetaminophen 325 to 500mg	Vital Pulp therapy
Trauma involving facial bones (or) Cellulitis	Refer to Oral Maxillofacial Surgeon	-

**Conclusion**

Dental health care personnel need to understand the implications of the potential transmission of the (SARS)-CoV-2 virus in clinical settings. They, therefore, need to keep up-to-date with any new information on this disease. As there is no specific treatment to date, prevention is the only measure to contain the infection. Even slight negligence in the follow-up to preventive measures would be very costly for humankind. The ICMR has made some recommendations on the prevention and treatment of COVID-19. However, these recommendations are based on the present current evidence and may change once robust clinical data is generated. The famous quote says "United we stand and divided we fall." Therefore, it is the duty of every citizen of India to abide by the rules and regulations led by our government, let's come together and fight against this pandemic.

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