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## Research Article

# Coronavirus (Covid-19) in Children: History and Pediatric Oral Health

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### ABSTRACT

**Objective:** This study aims to, through a recent literature review, present the epidemiological and pediatric oral health of COVID-19.

**Material and Methods:** A bibliographical research was carried out in the PUBMED database, with the keywords COVID-19 and dental practice, until April 5 of 2020.

**Discussion:** Children of all ages appeared susceptible to COVID-19, and there was no significant gender difference. The participants in dental practice expose to tremendous risk of COVID-19 infection due to the face-to-face communication and the exposure to saliva, blood, and other body fluids, and the handling of sharp instruments. There is still much more to know about COVID-19, especially as concerns mortality and capacity of spreading on a pandemic level.

**Conclusion:** Everyone who has had close contact with an infected individual is susceptible to COVID-19. Up-to-date oral health helps in the general health of the children prevent dental care during the pandemic, minimizing the risk of contamination. Healthcare guidance is being updated with frequency, as to how best to proceed in a care setting.

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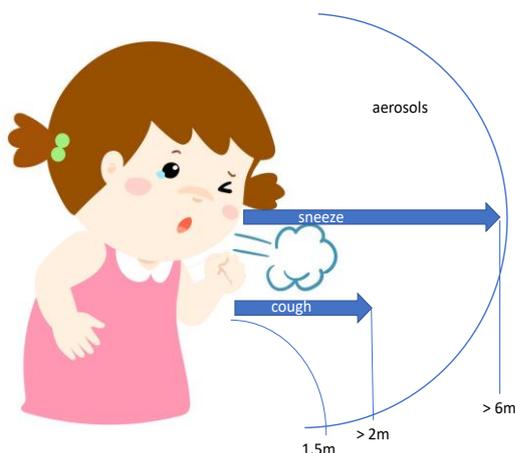
### Introduction

In early 2002, in China, a virus with a transmission from animal to man, followed by an important human-to-human transmission, beginning an outbreak of a disease called Severe Acute Respiratory Syndrome (SARS) in which it killed 800 people out of 8000 infected. The surveillance case definition of SARS is history of high fever ( $>38^{\circ}\text{C}$ ); one or more respiratory symptoms, including cough, shortness of breath and difficulty breathing; and close contact within 10 days before onset of symptoms with a person who has been diagnosed with SARS, history of travel within 10 days before onset before symptoms to an area with reported foci of SARS transmission, or both [1]. Household contact and contacts in health-care settings are believed to be important routes of transmission. All children satisfied the WHO case definition for SARS and all had been in close contact with infected adults [2]. The available data suggest that the clinical course of SARS in pediatric patients is different compared with adults. Young children appeared to have a milder form of the disease [3]. The majority of young children and

teenage patients had a definitive contact history with adult SARS patients, usually an immediate family member. This virus is transmitted through droplets, close person-to-person contact, and possibly also through direct contact by sharing communal facilities [3, 4].

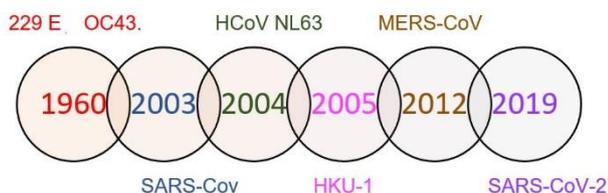
Nowadays, in late 2019 and early 2020, a very similar history is repeated, beginning in the same country China, specifically in the city Wuhan, creating an outbreak by a virus the same family SARS. Since the first cases of pneumonia of unknown scientists have urgently and persistently worked to determine the causative agent. This novel coronavirus was officially termed as 2019-nCoV, COVID-19, or SARS-CoV-2 [5, 6]. Droplet transmission is via larger respiratory particles, generally above 5  $\mu\text{m}$  diameter, which are subject to gravitational forces. These tend to travel no more than one meter. A two-meter limit on contact is therefore precautionary. Contact transmission occurs because once the virus is on a surface, it will remain there and will be a potential source of infection for hours or even days [7].

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**Figure 1:** COVID-19 transmission.

On January 30, 2020, the WHO (World Health Organization) declared a public health emergency and on March 11, 2020, it decreed a pandemic of this disease [8]. Pandemics are defined as epidemics of infectious diseases that spread over large geographical regions, occurring around the world at about the same time. Influenza, cholera, tuberculosis, AIDS, and phypthus are examples of significant pandemics in human history. In the last twenty years coronavirus has been responsible for two major pandemics, Severe Acute Respiratory Syndrome (SARS) in 2002, and MERS (Middle East Respiratory Syndrome) in 2012 [9]. Until today, SARS-CoV-2, is the causative pathogen of COVID-19, identified as the seventh type of coronavirus to infect humans. The first two human coronaviruses, HCoV-229E and HCoV-OC43 were identified in the 1960s and are well-known causes of the common cold [10]. All of which affect the respiratory system and can manifest from a simple cold to lethal pneumonia.



**Figure 2:** Timeline of coronaviruses that infected humans.

As of May 13, 2020, the 2019 novel coronavirus (SARS-CoV-2) has been responsible for more than 4,281,83883 infections and 92,376 deaths worldwide, but data regarding the epidemiologic characteristics and clinical features of infected children are limited [11].

**COVID-19 and Children**

A recent review of 72,314 cases by the Chinese Center for Disease Control and Prevention showed that about 2% of the cases were children age 0-19 years and less 1% younger than 10 years of age [12]. Most reports of children infected with SARS-CoV-2 demonstrate family contact with a proven diagnosis of the infection [13, 14]. It suggests that children are just as likely to be infected as adults but have fewer symptoms or risk of developing disease seriously. Signs and symptoms include different stages as asymptomatic, mild, moderate, severe and critical [14]. Although the majority of affected patients exhibit symptoms including a dry cough which is usually accompanied by fever and

difficulty in breathing [8, 15]. Flu syndrome such as fever, cough, nasal congestion, runny nose, sore throat, but there may also be an increase in respiratory rate, wheezing, and pneumonia. Gastrointestinal symptoms such as vomiting and diarrhoea can occur, being more common in children than in adults. The prevalence of severe and critical disease was 10.6% in children aged <1% at diagnosis; 7.3% in children aged 1-5 years; 4.2% 6-10 years; 4.1% 11-15 years and 3% 16-17 years [14].

**COVID-19 and Pediatric Dentistry**

The first case of a dentist being tested positive for COVID-19 was reported on 23<sup>rd</sup> January 2020 at the Department of Preventive Dentistry in the Wuhan University Dental Hospital. Eventually, the transmission of disease to eight other oral healthcare professionals was identified [3]. The characteristics of epidemiological spread and clinical manifestations of COVID-19 in children have not yet been thoroughly elucidated [16]. The incubation period (2-14 days) and 7 for everyone, and because children can be asymptomatic or present with mild, non-specific symptoms, all child patients and parents should be considered as potential carriers of COVID-19 [15].

Aerosol generating procedures can usefully be separated into respiratory and surgical, only respiratory aerosol-generating procedures aerosolize respiratory or upper airway secretions. These are likely to have a higher viral content and pose a greater risk of transmission than surgical aerosol-generating procedures which aerosolize blood and tissue fluid [17]. Another problem is that, dental treatment is characterized by relatively long operation times, which results in the persistent existence of aerosols within a large area of the clinical office and introduces a potential risk of spreading disease. And on surfaces for up to 72 hours and all clinic surfaces should be disinfected using chemicals recommended with 70% alcohol for disinfection [7].

That is why the current American Dental Association (ADA) recommendation for dentists to keep their offices closed during the quarantine period (maybe until April 30) to all but except when there is dental emergency or urgency dental care [18]. The American Academy of Pediatric Dentistry has also produced an algorithm specific to managing children with emergency dental conditions [19]. It is necessary to attend; the recommendation is the body temperature of the patient should be measured in the first place. A contact-free forehead thermometer is strongly recommended for the screening. A questionnaire should be used to screen patients with potential infection of COVID-19 before they could be led to the dental chair-side.

In case of dental care, always start with telemedicine, for guidance and first conducts. But if the child gets involved in an emergency, try to perform the treatment using high-speed aerosols and use high suction at any time. For caries treatment, prioritize scientifically proven techniques that do not generate aerosols low-speed handpiece with irrigation by drops, Atraumatic restorations, selective removal of carious dentine [20]. Reinforcement for good hand hygiene is of the utmost importance. Since airborne droplet transmission of infection is considered as the main route of spread, particularly in dental clinics and hospitals, barrier-protection equipment, including protective eyewear, masks, gloves, caps, face shields, and protective outdoor, is strongly recommended for all healthcare givers in the clinic/hospital settings during the epidemic period of COVID-19 [8].

## Discussion

Universal precautions should be routinely followed in dental clinics. They are critical for avoiding the transmission of COVID-19 to children as well as transmission from infected children to health care professionals. The main transmission includes cough, sneezing, and spitting as well as transmission by contact with oral, nasal and eye mucous membranes [8]. But, current research also shows that COVID-19 is not only respiratory, they are gastric as well and when the infected person goes to the bathroom, the virus is also eliminated. While in the later stage of infection, the virus is also detectable in anal swabs, suggesting the possibility of oral-fecal route transmission [21]. Therefore, the importance of covering the tamp of the toilet before flushing, to prevent the aerosol of the flush may infect people around it [22].

Focusing on the pediatric population as a means of preventing disease spread is critical. Children are less likely to report symptoms of COVID-19 and more likely to have mild or asymptomatic presentations. However, asymptomatic individuals can still actively shed the virus, transmitting disease so regarding the infection of COVID-19 in children, there are still many gaps in our understanding, including the route of transmission, susceptibility, clinical course of patients, the disease pathogenesis, pharmacological therapies and prognosis [13, 23]. People who have symptoms of COVID-19 are not encouraged to leave the house, but the problem is that asymptomatic people, as children, also have a chance to infect others. If people are less mobile and interact with each other less, the virus has fewer opportunities to spread [24]. The use of masks to protect the mouth and nose was indicated for health professionals.

However, asymptomatic patients, like children, can spread the virus when talk. So, in the last few days, the debate about the extensive use of masks, regardless of whether or not the person is contaminated, has gained strength among specialists as a way to reduce exposure [25]. In South Korea, a country where the containment of the spread of coronavirus was successful, the use of masks is strongly encouraged, and the population strictly follows the recommendation. With your mouth covered, either by a cloth, tissue, or an efficient mask, the risk of reaching another person, object or place decreases considerably [25]. For this reason, research has demonstrated the use of masks to prevent contagion is important. But, because infants younger than 1 year cannot wear masks, they require specific protective measures. Adult caretakers should wear masks, wash hands before close contact with infants, and sterilize the infants' toys and tableware regularly [13]. There is limited information from published literature on susceptibility regarding neutralizing immunity. Existing evidence suggests that everyone (regardless of age, sex, or race) who has had close contact with an infected individual is susceptible to COVID-19 [26]. However, few pediatric cases are published, and their clinical features have yet to be documented but showed that they had clinically milder symptoms and showed fewer alterations in radiological and laboratory testing parameters [2, 3, 13].

During the virus pandemic, which is expected to until the end of May 2020, the World Oral Health (OHS) says that social distance keeps people healthy and safe [8, 27]. Globally, many primary and secondary dental services have been suspended, with many countries providing

telephone-based triage systems to identify those patients requiring urgent or emergency intervention. Through direct contact in the dentist's operation, both dental workers and patients are likely to become infectors and transmitters of COVID-19. Since airborne droplet transmission of infection is considered as the main route of spread, particularly in dental clinics and hospitals, barrier-protection equipment, including protective eyewear, masks, gloves, caps, face shields, and protective outdoor, is strongly recommended for all healthcare givers in the clinic/hospital settings during the epidemic period of COVID-19. Dental patients and professionals can be exposed to pathogenic microorganisms, including viruses and bacteria that infect the oral cavity and respiratory tract. Contact transmission occurs because once the virus is on a surface, it will remain there and will be a potential source of infection for hours or even days [7].

Finally, this is an opportune period to teach children to do the same things that everyone should do to stay healthy. Clean your hands frequently using enough soap and water, if it is not possible to wash hands, clean with 70% alcohol hand sanitizer gel. Frequently clean and disinfect screens, especially cell phones, tablets, and computers. Wash objects and toys, keep distance from other people, keep rooms well ventilated with open windows, and teach children to cough and sneeze on a paper tissue or elbow. Never put the hands-on front nose and mouth. About oral health, tooth the brush at least twice a day, with a fluoridated toothpaste. Oral health prevents not having toothache, removes biofilm that can be a place of retention to respiratory virus [28]. In summary, the pediatric experience with COVID-19 highlights a few key issues about our patients. Because fewer pediatric patients are affected by COVID-19, disease patterns are less clear and warrant close monitoring rather than an assumption of a mild disease course in individual pediatric patients.

## Conclusion

Everyone (regardless of age, sex, or race) who has had close contact with an infected individual is susceptible to COVID-19. Aerosol generating procedures increase the risk of healthcare worker infection and should only be undertaken when necessary. Since airborne droplet transmission of infection is considered as the main route of spread, particularly in dental clinics and hospital barrier-protection equipment, is strongly recommended for all healthcare givers in the clinic/hospital settings during the epidemic period of COVID-19. Up-to-date oral health helps in the general health of the children prevent dental care during the pandemic, minimizing the risk of contamination. Healthcare guidance is being updated with frequency, as to how best to proceed in a care setting.

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