

Coronavirus disease (COVID-19): Characteristics in children and considerations for dentists providing their care

Abstract

The emergence of the novel virus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) causing coronavirus disease (COVID-19) has led to a global pandemic and one of the most significant challenges to the health-care profession. Dental practices are focal points for cross-infection, and care must be taken to minimise the risk of infection to, from, or between dental care professionals and patients. The COVID-19 epidemiological and clinical characteristics are still being collated but children's symptoms seem to be milder than those that adults experience. It is unknown whether certain groups, for example children with comorbidities, might be at a higher risk of more severe illness. Emerging data on disease spread in children, affected by COVID-19, have not been presented in detail. The purpose of this article was to report current data on the paediatric population affected with COVID-19 and highlight considerations for dentists providing care for children during this pandemic. All members of the dental team have a professional responsibility to keep themselves informed of current guidance and be vigilant in updating themselves as recommendations are changing so quickly.

1 | INTRODUCTION

At the beginning of 2020, the novel virus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) appeared, causing the coronavirus disease (COVID-19). The emerging virus has resulted in a global pandemic declared a Public Health Emergency of International Concern (PHEIC) by the World Health Organization (WHO) Director-General on the recommendation of the International Health Regulations (2005) Emergency Committee.¹ The case detection rate is changing daily and can be tracked in almost real time.² As of 31 March 2020, 19:50 hours (Central Standard Time), the number of confirmed cases was 857 487 and reported deaths were

42 106 with 169 418 recovered patients.² The first case of a dentist being tested positive for COVID-19 was reported on 23 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. This article reports current data on the paediatric population affected with COVID-19 and emphasises the importance of following locally, regionally, and nationally relevant safety measures to protect dental care professionals as well as the child patient, whilst providing clinical care for the obviously affected children and those potential carriers of the infection. We emphasise that, in a rapidly changing pandemic landscape, practitioners must actively, regularly seek and use reputable and reliable sources of information on managing child patients that are appropriate for their own region and circumstances.

2 | COVID-19

2.1 | Clinical characteristics of COVID-19 in children

The clinical symptoms of COVID-19 are still being documented and collated, although the majority of affected patients exhibit symptoms including a dry cough which is usually accompanied by fever.⁴ Difficulty in breathing, fatigue, and other less typical symptoms can also occur.^{5,6} Signs and symptoms include different stages as asymptomatic, mild, moderate, severe, and critical.⁷ Children tend to present with similar but milder symptoms to adults. To date, 3092 paediatric cases have been reported to have tested positive, and 1412 children were suspected of having been infected with COVID-19. A survey of 1391 children in China found 171 (12.3%) cases tested positive for SARS-CoV-2.⁸ An analysis of more than 2000 child patients with suspected or confirmed COVID-19 in Hubei, China, found that over 90% presented as asymptomatic or with mild to moderate symptoms.⁹ A summary of paediatric cases reported

with COVID-19 is presented in Table 1.^{7,9-45} These numbers are likely to be under-representative, as there is not universal testing of the whole population for the presence of COVID-19. An overall fatality rate of 1.36%-15% has been reported across all patients with COVID-19.⁴⁶ As of 31 March 2020, seven fatalities have been reported in paediatric population due to COVID-19. These are an infant in Chicago,⁴⁷ a minor child in New York,⁴⁸ a 12-year-old boy in Belgium,⁴⁹ a 13-year-old boy in England,⁵⁰ a 14-year-old boy in China,⁷ a 16-year-old girl in France,⁵¹ and a 17-year-old boy in Los Angeles.⁵²

2.2 | The child patient in the dental setting

Because of the long incubation period (2-14 days)⁶ for everyone, and because children can be asymptomatic or present with mild, nonspecific symptoms, all child patients and parents should be considered as potential carriers of SARS-CoV-2 unless proved otherwise. COVID-19 can be transmitted through direct and indirect contact, mainly via respiratory droplets and splatter from saliva and blood through contact with mucous membranes and contaminated fomites.^{53,54} This leaves dental professionals in potentially high-risk situations. Many dental treatments are aerosol generating procedures (AGPs), which have been associated with the transmission of acute respiratory infections.⁵⁵ In addition, dental settings are more likely to have a high number of potentially contaminated surfaces such as dental chairs, their handles, the spittoon, and dental instruments after carrying out a treatment which are possible routes of transmission.³ SARS-CoV-2 virus can persist on surfaces for up to 72 hours,⁵⁶ and all clinic surfaces should be disinfected using chemicals recommended for eliminating SARS-CoV-2.

Universal precautions should be routinely followed in dental clinics. They are critical for avoiding the transmission of SARS-CoV-2 virus to children as well as transmission from infected children to healthcare professionals. An infection prevention checklist should be used, including administrative measures, infection prevention education and training, dental healthcare personnel safety, programme evaluation, hand hygiene, personal protective equipment (PPE), respiratory hygiene/cough etiquette, sharps safety, safe injection practices, sterilisation and disinfection of patient-care items and devices, environmental infection prevention and control, and dental unit water quality.^{57,58}

2.3 | Country-specific approaches and recommendations

The WHO has described a pandemic as having six different phases.⁵⁹ Countries will be in different phases at different times; therefore, it is not possible to give universal guidelines,

TABLE 1 Summary of reported paediatric cases on COVID-19 (as of 31 March 2020)

| Authors | Country | No. of cases reported | Age range |
|-------------------------------------|---------------|-----------------------|--------------|
| Bi et al ⁹ | China | 20 | - |
| Cai et al ¹⁰ | China | 10 | 3 m to 11 y |
| CDC ¹¹ | USA | 123 | <19 y |
| Chan et al ¹² | China | 1 | <1 y |
| Chang et al ¹³ | China | 1 | 10 y |
| Chen et al ¹⁴ | China | 9 | <1 y |
| Chen et al ¹⁵ | China | 4 | <1 y |
| Choe et al ¹⁶ | South Korea | 480 | 0-19 y |
| Cui et al ¹⁷ | China | 1 | <1 y |
| D'Antiga ¹⁸ | Italy | 3 | - |
| Dong et al ⁷ | China | 731 | 7 y (median) |
| Dong et al ¹⁹ | China | 1 | <1 y |
| Fan et al ²⁰ | China | 2 | <1 y |
| Henry et al ²¹ | International | 82 | 10 y |
| Ji et al ²² | China | 2 | >15 y |
| Kam et al ²³ | Singapore | 1 | <1 y |
| Li et al ²⁴ | China | 5 | 10 m to 6 y |
| Liu et al ²⁵ | China | 6 | 1-7 y |
| Liu et al ²⁶ | China | 4 | - |
| Livingston and Bucher ²⁷ | Italy | 270 | <18 y |
| Lou et al ²⁸ | China | 3 | 6 m to 8 y |
| Lu et al ²⁹ | China | 171 | - |
| Mizumoto et al ³⁰ | Japan | 10 | 0-19 y |
| Pan et al ³¹ | China | 1 | 3 y |
| Qiu et al ³² | China | 36 | 0-16 y |
| Tang et al ³³ | China | 26 | 1-13 y |
| Wang et al ³⁴ | China | 1 | <1 y |
| Wang et al ³⁵ | China | 1 | <1 y |
| Wang et al ³⁶ | China | 34 | 7 y (median) |
| Wei et al ³⁷ | China | 9 | <1 y |
| Wu et al ³⁸ | China | 965 | <19 y |
| Xia et al ³⁹ | China | 20 | - |
| Xing et al ⁴⁰ | China | 3 | 5 and 6 y |
| Xu et al ⁴¹ | China | 2 | 10 to 11 y |
| Yu et al ⁴² | China | 7 | <1 y |
| Zeng et al ⁴³ | China | 3 | <1 y |
| Zhang et al ⁴⁴ | China | 34 | 1 m to 12 y |
| Zhu et al ⁴⁵ | China | 10 | s<1 y |

Abbreviations: CDC, Center for Disease Control and Prevention; m, months; USA, United States of America; y, years.

so following local updated guidelines are essential. All the above applies to child patients during the acute phase of COVID-19 pandemic, and the treatment choices and planning may vary during the next phases. Countries have put different measures in place for the overall delivery of dental care even during the 'Widespread Human Infection' phases of the pandemic leading up to the peaks of infection. These vary from those where dental practices remain open but there are screening activities and additional cross-infection measures. These measures generally seem to fit for countries who managed to contain the disease spread quite quickly as seen in Singapore, for example where isolation and testing were put in place within a very short space of the infection being suspected as being present in the country.⁶⁰ At the other end of the spectrum, some countries have closed all dental practices. Some, such as the UK, have all cases triaged by telephone and attending only for very basic treatment in designated centres. In Brazil, The National Health Surveillance Agency (ANVISA) has recommended that only emergency and urgent dental care should be performed (from 20 March 2020), and all private offices have to stop elective treatments. Dental professionals (primary and secondary care) that work for the National Health Service (SUS) have been allocated to help other health professionals in the fast-track for COVID-19.⁶¹ Between these two examples, there are a myriad of service delivery models.

There are a number of country-specific measures currently in place. For example, in the United States (US), Telephone Health (Telehealth) systems have been introduced, and United States Department of Health and Human Services has relaxed the Health Insurance Portability and Accountability Act (HIPAA) regulations in order to enable free and transparent Telehealth services to patients during the COVID-19 public health emergency.⁶² In Brazil, the Ministry of Health has also implemented regulations for Telehealth services to reduce disease transmission.⁶³ Even though countries may be limiting dental care to only emergency provision, the recommendations between countries may differ. There are some differences between recently published documents on urgent non-emergency, and emergency dental procedures by the American Dental Association,⁶⁴ and the UK Scottish Dental Clinical Effectiveness Practice guidelines.⁶⁵ The American Academy of Pediatric Dentistry has also produced an algorithm specific to managing children with emergency dental conditions.^{66,67} As yet, it is difficult to give standard recommendations regarding personal protective equipment (PPE). The use of N-95 respirator masks in the United States and use of filtering facepiece respirator (often known as FFP) masks in Europe are strongly indicated in managing children but this is not a universal recommendation across all countries.⁶⁸ The evidence is lacking for mask use in some areas.⁶⁹ The recommendations provided by the Center for Disease Control and Prevention (CDC) or other local guidelines that may

supersede these should be strictly followed when placing on and removing personal protective equipment used for treating children infected by COVID-19.⁵⁸

2.4 | The role of guidelines and professional judgement

Guidance cannot ever cover all possible circumstances, and professional judgement must be exercised to make decisions around whether or not to provide treatment. Treatment should only be provided adhering to local, regional, and national guidelines as far as possible and, in the opinion of the dental professional, when it is safe for child patients, their accompanying carer, and for the dental team. During this COVID-19 pandemic, universal infection control procedures are of utmost importance with extreme vigilance and championing required by all. 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.^{59,63} Where dental professionals must offer assessment and/or treatment on a face-to-face basis, they should record all precautions that have been put in place to reduce the risk of cross-infection during treatment and evidence comprehensive risk assessment completion. This includes managing the risk from the treatment itself by carrying out the least invasive treatment possible, and avoiding AGPs.^{57,68}

Healthcare guidance is being updated with alarming frequency, and confusion as to how best to proceed in a care setting is both evident and widespread. It is of the highest importance that all members of the dental team acknowledge and act upon their professional responsibility to ensure they are absolutely contemporary in their understanding of current guidance. Additionally, dental teams should be familiar with treatment options that minimise or eliminate AGPs—many of which are founded on contemporary cariology, well documented in the scientific literature, and minimally invasive by their nature. It must also be appreciated that pandemic experience and staging will differ geographically. Once practice restrictions begin to be eased, continued management of dental disease with contemporary dentistry through minimally interventive concepts and other non-AGPs, whilst viral transmission risk remains high, will be pertinent. These include atraumatic restorative treatment (ART),⁷⁰ sealing in carious lesions using fissure sealants,⁷¹ silver diamine fluoride,⁷² selective caries removal,⁷³ and the Hall Technique.⁷⁴ The importance of toothbrushing with fluoridated toothpaste to prevent tooth decay developing should continue to be emphasised during contact with patients, and there are opportunities being taken for dentists to carry out telephone and video consultations with parents to promote positive oral health behaviours.

3 | CONCLUSIONS

Although reported clinical manifestations of COVID-19 in children are generally less severe than those of adult patients, young children, and particularly infants, remain vulnerable to infection and pose a significant transmission risk. Dental teams must ensure they remain current in their understanding of local, regional, and national guidance in a climate of uncertainty and frequent change to optimise safety for dental care providers and patients. Dentists who treat children during this pandemic should enact universal infection control procedures to the highest standard and champion this behaviour through their teams. Opportunities to promote preventive dental behaviours should be taken. Contemporary, minimally invasive procedures that minimise or eliminate aerosol generation should be employed where intervention is indicated throughout the pandemic, and in future as and when practice restrictions ease.

DISCLAIMER

The views expressed in this editorial represent the views of the authors and not necessarily those of their host institutions. It has not been peer-reviewed, and it does not replace the clinical judgement of the professional. All sources included should be checked to ensure they are still current.

KEYWORDS

children, coronavirus, COVID-19, dentistry, paediatric dentistry

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