

Review Article

Pediatric dental practice during, pre and post COVID-era: a literature review

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Received: 30 July 2024

Accepted: 31 August 2024

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ABSTRACT

Everyone is on edge for their health and safety as the COVID-19 pandemic has hit both developed and developing countries. As a result of its fast transmission rate by direct touch or droplet dispersion, the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a major concern for healthcare practitioners and is responsible for the horrific 2019 coronavirus sickness (COVID-19). An extensive electronic search was conducted using Google Scholar, PubMed, Scopus MEDLINE, EMBASE, Web of Science, Scopus, and Google to investigate the COVID-19 epidemic and its impact on pediatric dentistry. Pediatric dentists still do not have access to full data that would allow them to treat their pediatric patients before, during, and after the pandemic, despite the fact that more information is accessible on the concerning progression of COVID-19.

Keywords: COVID-19, Pediatric dentistry, Preventive measures

INTRODUCTION

In the case of a pandemic, societal and economic systems can be devastated by sudden, widespread disease and death. Many notable pandemics have already swept the world, including smallpox, the Spanish flu, and the Black Death. Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) was the causative agent of the 2019 coronavirus disease (COVID-19) pandemic, which began in China. The Emergency Committee of the World Health Organisation declared a global health emergency on 30 January 2020, and COVID-19 was classified as a pandemic in March of the same year.¹ The United States ranked first in the world for COVID-19 infections and deaths, with India and Brazil following closely after 30 January 2020, is the date of Kerala's first lawsuit. Several other states also had the highest numbers of incidents, including Maharashtra, Tamil Nadu, Gujarat, Madhya Pradesh, and Uttar Pradesh. Since it causes respiratory illness in humans, the coronavirus (CoV) is considered a zoonotic agent.² It is a member of the large coronaviridae family. Along with the more direct ways of droplet and human-to-

human transmission, SARS-CoV-2 can also spread through contaminated objects and airborne infection. The median incubation duration is 5 days, ranging from 2 to 14 days, and the sickness often presents with mild to severe symptoms of an upper respiratory tract infection, including fever, fatigue, coughing, and a sore throat.³⁻⁵ However, it was eventually discovered that some children who showed no symptoms were very prolific carriers of the disease.⁴

By detecting unique SARS-CoV-2 RNA sequences, the nucleic acid amplification test (NAAT) using real-time RT-PCR provided laboratory confirmation of COVID-19. It only took five to ten days after symptoms first appeared for six IgM antibodies to rise to measurable levels. Children with COVID-19 most commonly had peribronchial cuffing (86.3% of cases), followed by ground-glass opacities (50%) on chest X-rays. We used the CT-based COVID-19 reporting and data technique (CO-RADS) to evaluate the possibility of pulmonary involvement. Caution levels increase from very low (CO-RADS category 1) to very high (CO-RADS category 5) (Table 1).⁷ Some aspects of dental care, such as the use of

aerosols and the proximity to patients, are believed to contribute to the nosocomial spread of disease. Extra precautions must be taken to reduce the spread of COVID-19 because of the possibility of two-way infection transmission between patients and dental professionals. Understanding paediatric dentistry practice during and after COVID-19 is vital for providing enough high-quality dental treatment.^{3,4}

Table 1: CO-RADS categories and the corresponding level of suspicion for pulmonary involvement in COVID-19.

CO-RADS category	Level of suspicion of pulmonary involvement of COVID-19	Summary
0	Not interpretable	Scan technically insufficient for assigning a score
1	Very low	Normal or non-infectious
2	Low	Typical for other infection but not COVID-19
3	Equivocal/unsure	Features compatible with COVID-19 but also other diseases
4	High	Suspicious for COVID-19
5	Very high	Typic for COVID-19
6	Proven	RT-PCR positive for SARS-CoV-2

Some aspects of dental care, such as the use of aerosols and the proximity to patients, are believed to contribute to the nosocomial spread of disease. Extra precautions must be taken to reduce the spread of COVID-19 because of the possibility of two-way infection transmission between patients and dental professionals. It is critical to understand paediatric dentistry procedures in order to give enough high-quality dental treatment to children during and after the COVID-19 pandemic.⁴ Consequently, the purpose of this research is to examine the methods used for infection prevention and treatment procedures in pediatric dentistry before, during, and after the COVID-19 pandemic.

METHODS

The following phrases were used in an internet search: pediatric dentistry, post-pandemic dental practice, COVID-19, coronavirus, SARS-CoV-2, dental therapy, pandemics, and guidelines from the American Academy of Paediatric Dentistry. Research for articles about the past, present, and future of pediatric dentistry from an epidemiologic and operational standpoint, as well as about the steps done to treat children's oral and dental health, since the beginning of the COVID-19 pandemic. These

databases include PubMed, Scopus MEDLINE, EMBASE, Web of Science, Google Scholar, Cochran Library, and Google.

DISCUSSION

There was a tremendous loss of life due to the COVID-19 pandemic, and public health faced a plethora of new and unprecedented issues across all facets of society, including the economy and health. Alongside, pediatric dentistry was also affected and a vast difference was observed during, pre and post-COVID era.

Pediatric dentistry before COVID-19 (pre COVID-19 era)

In pre-COVID times, pre-appointment mailings with a description of the practitioner's treatment planning, and an outline of first-visit procedures helped the parent in preparing the child thereby preventing dental fear and anxiety. The waiting areas were always filled with children and their parents, with no limitation to the number of people accompanying the child. All the routine procedures both emergency and non-emergency, which included aerosol-generating procedures like cavity preparation, oral prophylaxis, pulpotomy and pulpectomy with both intraoral and extraoral radiographs were carried out with regular prevention through the use of mouth masks without PPE kits.^{8,9}

Pediatric dentistry during COVID-19

But in many respects, dentistry took a major blow during the epidemic. Paediatric dentists faced an even greater threat from COVID-19 infections because of the close quarters they worked in and the fact that the majority of dental procedures are aerosol-generating procedures (AGPs), which produce plenty of droplets and aerosols and thus increase the likelihood of infection.⁹

A number of Indian dental organizations, including the Dental Council of India (DCI), the Indian Society of Pedodontics and Preventive Dentistry (ISPPD), and the Indian Dental Association (IDA), have issued statements warning against the use of comprehensive patient histories in elective dental operations. We rescheduled and advised testing for patients who had recently been sick with respiratory conditions or who had previously traveled to regions impacted by the COVID-19 epidemic.^{10,11}

A focus was placed on teledentistry, in which patients were offered online consultations. A growing number of people are opting for teledentistry, a hybrid field that combines aspects of both telecommunications and dentistry, to consult with their dentists and plan their treatments through the sharing of clinical information and photos.¹⁵ In the event of a dental emergency during the lockdown, this technology was a godsend for dentists. The most effective approach to understanding the patient's issue and wants was teledentistry, which involved taking a thorough

medical, dental, and travel history over the phone. Proper appointment scheduling and less time spent communicating between patients and dentists were both aided by this. Google Meet, Facebook, Messenger, and WhatsApp were among the "social" digital channels that paediatric dentists utilized to disseminate and promote behavioral guidelines for the protection of children's oral health.^{11,12}

As a means of limiting the transmission of disease, the use of PP barriers such N95 masks and personal protective equipment (PPE) kits was contemplated. Sodium hypochlorite was ideally used to sanitize the operating space and dental chairs in between patient consultations, and high-volume suction were also set up to lower the virus load.^{2,5,7} Minimally invasive dental techniques such as chemo-mechanical caries removal, ART, the hall technique, and SDF application were more prevalent during the pandemic, marking a change in dental practice.⁸⁻¹⁰

Standard operating protocols taken during COVID-19 pandemic

In-office screening

Body temperatures of 100.4°F or above were commonly seen in COVID-19 patients after they entered the dental clinic, as measured with a non-contact thermometer.¹¹

Preparation of the operatory and instrument

It was contemplated to employ copper-coated instruments instead of stainless steel and cardboard was utilized as a barrier. Additionally, chlorine dioxide fumigation or fogging was used following each patient. Hydrogen peroxide vaporizer, 0.1–0.5% sodium hypochlorite, 62%–75% ethanol, and 2% glutaraldehyde were used to disinfect the contaminated surfaces, which included the dentist chair and the areas around the operation room. Operators were positioned at 10 or 11 o'clock to prevent spatter during treatments. Sitting in the waiting area was recommended for parents unless their child was less than three years old.^{1,7,10}

It was suggested that in healthcare facilities, a portable HEPA filter equipped with a negative ion generator be used.^{1,11}

Hand hygiene and masks for patients and dentist

Both patients and healthcare providers were advised to use hand sanitizer containing alcohol (75–80% ethanol). When used appropriately and consistently, three-layer masks were proven to reduce the transmission of SARS-CoV-2. N95 masks offered the greatest amount of protection among the several on the market, including fabric/cloth masks, surgical masks, masks with valves, and others. With N-95, it can block the passage of particles bigger than 0.3 microns and also remove 95% of airborne particles.^{8,9}

Waiting area

To minimize the risk of transmission, the clinic was cleared of magazines, toys, and other unnecessary items, and appointments were scheduled at different times. It was advised to leave thirty minutes between visits. Everyone in the waiting room kept at least one meter of physical distance from one another. A youngster could only have one parent accompany them.¹¹

Post procedure disinfection and decontamination

"No touch surface disinfection" technique was beneficial for the sanitization and disinfection of dental clinics in between each patient. 70% ethyl alcohol used for disinfecting small surface areas like dental chairs, patient hand rest, and dental chair lights, and equipment in between procedures.

Minimally invasive pediatric dentistry

Thorough evaluations of dental situations requiring interventional or restorative therapy were conducted through clinical examinations and through patient histories. In order to avoid dental procedures that produce aerosols, the following approaches were used to treat the cavitated tooth that did not include the pulp.^{10,11,17}

Atraumatic restorative technique

Because it advocates for aerosol-free dentistry, Atraumatic restorative technique (ART) was deemed pertinent during the epidemic. The process begins with the removal of demineralized, pulpy tooth tissue using a spoon excavator and continues with the filling of the cavity with a binding curative substance, most often glass ionomer cement (GIC).^{10,11,14}

Silver diamine fluoride

Applying SDF is a new step in the aerosol-free method. Using cotton rolls, the carious lesion was dried thoroughly. Then, for one minute, the solution was spread over it using an applicator tip. At the conclusion of the treatment, the carious lesion clearly became black. For asymptomatic patients with a cavitated lesion on the coronal or root surface with no pulp involvement SDF was applied.^{10,12}

Hall crown technique

This technique was more favorable in the COVID-era as it does not require any tooth preparation, no use of a drill or arotor thereby eliminating aerosol production.¹¹

Chemomechanical caries removal

During the COVID-19 period, Chemomechanical caries removal (CMCR) compounds were another option for caries treatment; they chemically removed diseased dentine. Treatment for the tooth included manual

excavation and the use of a gel, such as Carisolv or Papacarie. There was no need for a handpiece or local anesthetic with this method.¹⁴

Dental management of emergency situations

In emergency conditions, all the procedures carried out by using the SOP of COVID-19.

Pain due to pulpal inflammation

In cases of reversible or irreversible pulpitis, cavity preparation or access opening of teeth was done by the use of a micromotor under the rubber dam application, and pulpotomy or partial pulpotomy procedures were done in a single sitting.^{10,16}

Extraoral swelling

In pediatric patients, in which extraoral swelling involving facial spaces was present, incision and drainage along with proper antibiotic coverage and pain management was done (Table 2).¹⁰

Dental trauma

According to the British Society of Pediatric Dentistry for dental trauma management during COVID-19, for supporting tissue injuries like concussion, subluxation and extrusion (immature and mature) post-injury instruction was given through remote consultancy at every 2 weeks to assess healing, oral hygiene and complications. The patient was instructed to rinse their mouth twice daily for one week with an alcohol-free chlorhexidine gluconate mouthwash and a gentle brush or cotton swab after each injury to avoid plaque buildup.^{1,16}

Embracing the new normal in dentistry post-COVID pandemic

The administrative task of getting dental offices back to normal clinical practice after the COVID-19 period was difficult. We anticipate a rise in the number of patients, therefore, the challenge at hand was managing the patient flow and establishing treatment priorities in a way that ensures social distancing protocols are followed.^{1,3,25}

The "new normal" in dentistry education and practice at universities and colleges has arrived, and with it, stricter restrictions on governing things like proper social distance and decreasing numbers of people gathering in classrooms and other school spaces. In order to get ready for the "new normal" at the dental clinic, necessary equipment including pulse oximeters, N95 masks, and face shields need to be acquired.^{1,11,12}

Critical criteria to be handled before resuming the new normal include patients' scheduling and triaging. The best way to prevent the spread of germs in any environment is

to wash your hands thoroughly (for at least 30 seconds) and apply surface disinfectants.^{19,21}

Certain adjustments are necessary in clinical paediatric practice following the COVID period, when worldwide constraints are loosened, so that preventative dental operations receive the attention they need.³

Since the dentist, along with the receptionist and dental auxiliaries, works in an atmosphere rife with aerosol-generating procedures (AGP), which encourage the transmission of the COVID-19 virus, it is imperative that they receive the necessary vaccinations against the virus.^{21,23}

Ensuring the safe delivery of oral health services also depends on children and their families becoming vaccinated against COVID-19.^{21,24}

Table 2: Antibiotics recommended according to British Endodontic Society.

Antibiotics	Dosage
Amoxicillin capsules, 250 mg or oral suspension, 125 mg/5 ml or 250 mg/5 ml	6–11 months (125 mg three times daily)
	1–4 years (250 mg three times daily)
	5–11 years (500 mg three times daily)
	12–17 years (500 mg three times daily)
Phenoxymethyl penicillin (PenV) tablets, 250 mg or oral solution, 125 mg/5 ml or 250 mg/5 ml	6–11 months (62.5 mg four times daily)
	1–5 years (125 mg four times daily)
	6–11 years (250 mg four times daily)
	12–17 years (500 mg four times daily)
Metronidazole tablets 200 mg or oral suspension, 200 mg/5 ml	1–2 years (50 mg three times daily)
	3–6 years (100 mg twice daily)
	7–9 years (100 mg three times daily)
	10–17 years (200 mg three times daily)

CONCLUSION

To avoid the spread of SARS-CoV-2 in dentistry practices, one must have a solid understanding of how the virus spreads. There are many potential entry points for infectious diseases in the dentistry field, but since aerosols are a major vector for many diseases, including SARS-CoV-2, it is crucial to implement rigorous infection control protocols. During the COVID-19 epidemic, paediatric dentists took more precautions to protect their patients, their families, and other oral healthcare workers.

In addition, dental practitioners can also further prevent the spread of COVID-19 by following protocols, which

include primary triage, avoiding overcrowding in the office, routine disinfection, and online education through teledentistry.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

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Cite this article as: Gautam K, Srivastava N, Rana V, Kaushik N, Pruthi T. Pediatric dental practice during, pre and post COVID-era: a literature review. *Int J Community Med Public Health* 2024;11:4144-8.