

Paediatric Dental Care in COVID-19 Pandemic - Time to Rethink - A Review

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ABSTRACT

Corona virus infection has affected many people and resulted in numerous deaths. SARS-CoV-2 is a novel strain of coronavirus that has not been recognized in humans earlier. The disease originated in China and has now become a pandemic affecting countries worldwide. The clinical characteristics in children seem to be milder as compared to adults, but the exact clinical features related COVID-19 are still unknown and unclear. This is the reason why a child can be considered as a “silent carrier” for COVID-19. The pandemic has affected the children as well. Children usually suffer from the most common oral disease of dental caries. Dental caries in children has been attributed to having its pathophysiology related in a cytokine response. In the recent COVID-19 pandemic, the adverse outcomes in children, though reported less, has been related to the establishment of a cytokine storm, the components of which are common with the cytokine expression profile of Dental caries and early childhood caries in children. Early carious lesions results in early involvement of dental pulp thereby resulting in periapical pathology. The open carious lesions can result in the direct entry of virus from saliva in the dental pulp of infected patients. The resulting periapical pathology contains viral load and hence virus enters the blood circulation. A dental setting is at a high risk of cross infection amid patients and dental practitioner’s owing to the spread of infection via droplets suspended in the air by infected symptomatic or asymptomatic subjects. This article informs about measures which reduce facility risk, manage symptomatic patients and protect personal health care and management with reference to pediatric dentistry. The antimicrobial therapy to be given to pediatric patients has been also highlighted in the present review. The clinical characteristics of COVID-19 in children, though they are milder are given equal importance. Also this article reviews the precautions and guidelines to be followed by the dentists. The present article reviews the impact of Coronavirus infection on pediatric dental practice and gives the future recommendations. The present article also gives the future directions to the government which can be considered if possible.

KEY WORDS

Children, COVID-19, Pediatric Dentistry.

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BACKGROUND

Coronaviruses (CoVs) belong to Coronaviridae which are RNA viruses. Their size varies from 60 - 140 nanometers with spike like projections on its surface. This strain of viruses is of a zoonotic nature and causes respiratory illness in humans.¹ This viral disease has affected lakhs of people in the United States and had resulted in death of thousands of people.

The first pediatric patient to be affected by COVID-19 was reported on March 1st 2020 in USA. And more than 3000 children below 18 years of age have been affected with COVID 19 in USA.² The characteristics of COVID-19 affecting children and that of an adult differ largely. The mortality rate is also lower in children than in adults.

The role of children in spreading the disease is really questionable. The reason can be attributed to their playful and talkative nature. Children talk loudly and express themselves without restraints. Documentation suggests that talking loudly and shouting may cause the spread of the infection through droplets. Similarly, touching the face, nose and mouth is common during play among children. These age specific concerns might suggest their role in transmission. However, on the contrary there is light evidence by World Health Organization (WHO).³

There are many reasons speculated as to why COVID-19 has had a lesser impact on children. One explanation is that the virus can't attach to body linings (e.g. nasal mucosa) as the receptors are less in children; another is that children are protected by antibodies produced by other viruses they are exposed to, and these antibodies are protective.

It has been noticed that tendency toward immune dysregulation is less in children. Next is, markers of pro-inflammatory response like C-reactive protein is uncommon in children which is suggestive of reduce inflammatory response to infection. Lastly, reduced expression of angiotensin converting enzyme 2 (ACE-2) receptor which is necessary for binding of the virus further reduces the incidence of COVID-19 in children.⁴

Children most commonly experience fever (56 percent), cough (54 percent), headache (28 percent), sore throat (24 percent), and myalgia (23 percent) in addition to minor symptoms including nausea, vomiting, and diarrhea.³ The reported mortality rate is much lower in children than in older age groups.⁵

The intraoral findings in a child affected by the disease are usually non-specific which can be attributed to the mild form of COVID-19. Martin et al in 2020⁶ presented a case series on oral manifestations as ulcers and blisters in patients affected or suspected of the disease. However, the patients were adults with underlying comorbidities. There is no literature yet available that states the intraoral findings in a COVID positive child. Paediatric dentists should be vigilant while examining COVID positive children due to the paucity in information. Children affected by COVID-19 show a reduced amount of white blood cell count particularly lymphocytes and neutrophils. Thrombocytopenia may occur. In patients severely affected by COVID-19 show elevated liver enzymes, as well as abnormal coagulation and elevated D-dimers. (IJSR) Chest radiography, children mostly show bilateral patchy airspace consolidations often at the periphery of the lungs, peribronchial thickening and ground-glass opacities.⁷

DENTAL MANAGEMENT OF PAEDIATRIC DENTAL PATIENTS IN COVID

Considering the risk of transmission, the American Dental Association (ADA) has developed guidance to categorize emergency, urgent and non-urgent or routine dental procedures. Patients with space infections, cellulitis, uncontrolled bleeding and trauma are considered for emergencies.⁸ The nature of dental treatment may increase the risk of transmission due to close proximity between providers and patients and because dental procedures using air / water spray, nitrous oxide, ultrasonic instruments, and high-speed hand pieces may aerosolize the virus. Patients with resolved COVID-19 infection may be seen in a dental setting three days (72 hours) after complete resolution of symptoms.⁸⁻⁹ Since the disease transmits through touching of contaminated inanimate objects or touching face, Occupational Safety and Health Administration (OSHA) recommends use of N-95 and higher respirators for the operator. For aerosol generating procedures (AGP), OSHA recommends to use protective eyewear, face shield, gown and double gloves for the operator. For non-AGP, face shield and surgical masks are recommended.⁹

Child's dental complaint can be addressed with non-aerosol generating approaches such as antibiotics, pain medication, atraumatic restorative treatment (ART), Chemomechanical removal of caries, silver diamine fluoride (SDF), and / or interim therapeutic restorations (ITR).

Hall technique for stainless steel crowns may be an option for more severely decayed teeth that exhibit no clinical or radiographic pathology that indicates a necrotic pulp. Though supported by weak evidence, preprocedural rinse with a 1.5 percent hydrogen peroxide or 0.2 percent povidone-iodine or using soaked cotton rolls for patients who cannot rinse before each appointment is also recommended.⁹ In emergency situations where it is necessary to perform operative procedures, the ADA recommends that handpieces be cleaned after each patient to remove debris followed by heat-sterilization. The use of four-handed dentistry, high volume evacuation suction, and dental dams also have been recommended to minimize droplet splatter and aerosols, and the room should be cleaned and disinfected.¹⁰

PAIN AND SWELLING DUE TO DENTAL CARIES¹¹

Caries when involves pulp causes agonising pain in deciduous or permanent tooth. Initially pharmacological treatment is considered as the first line of treatment. In cases where there is no relief intervention along with the medications is considered. Untreated pulpal exposure are major cause of pulpitis or pulpal necrosis. In cases where only the coronal pulp is involved agents that induce reparative dentin formation can be used. On the contrary, where radicular pulp is affected a pulpectomy is indicated. Depending upon the indication a single visit or multi visit technique is preferred. Single visit pulpectomy should be advocated as much as possible as it not only reduces the symptoms of the child but also reduces the patient exposure. However, when the tooth is

non restorable or has extensive root resorption it is advisable to extract the tooth followed by a space maintainer.

OTHER DENTAL EMERGENCY PROCEDURES IN PEDIATRIC PATIENTS

Acute Apical Abscess¹²

Acute apical abscess localized includes pain with a single tooth or two or more teeth; swelling of the gingiva, face or neck; fever, listlessness, lethargy and loss of appetite in children under 16 years of age. Management of such condition is by self-help includes analgesics and antibiotics (swelling / systemic infection) with a recall after 48 – 72 h. Urgent care by extraction or drainage is needed for spreading infection without airway compromise or continuing or recurrent symptoms.

Acute Periodontal Abscess / Perio-Endo lesions.¹² – Acute periodontal abscess include pain, swelling and tenderness of gingival tissue, increased tooth mobility, fever and swollen / enlarged regional lymph nodes and gingival suppuration. Management by self-help includes analgesics and antibiotics (swelling / systemic infection) with a recall after 48 – 72 h.

Reversible pulpitis¹² - Reversible pulpitis includes intermittent or sharp shooting pain on application of stimuli associated toothache with tenderness to percussion. Self-help care recommend analgesia, repair of a missing filling with an emergency temporary repair kit from a pharmacy or online, avoidance of hot or cold food and to call back if the symptoms worsen.

Irreversible pulpitis¹² – Irreversible pulpitis includes sharp and spontaneous pain which lasts for several hours and keeps the patient awake and pain which is difficult to localize to a single tooth, it may be dull or throbbing and worsened by heat and alleviated by cold. Advice and self-help recommend analgesia, cold water rinses and to call back if symptoms worsen. Urgent care is needed when the severe and uncomfortable pain prevents sleeping or eating. Management includes extraction at an urgent dental care centre.

Oral Ulceration¹²

Oral Ulceration include pain (lip and / or oral cavity), ulceration, inflammation, abnormal appearance and dehydration or listlessness or agitation if severe. Advice and self-help for ulcers less than three weeks include chlorhexidine mouthwash under 7 y, analgesia or topical benzdyamine oromucosal spray, soft diet, keeping the dentures clean or use a repair kit for trauma from an adjacent tooth. If the ulcers are due to primary herpetic gingivostomatitis, herpes Zoster infection or in an immunocompromised patient consider antiviral agents (acyclovir or penciclovir) in the early stages. Urgent care is advised for ulcers persisting over three weeks. If the ulcers are due to an underlying medical condition then a medical practitioner should be consulted. Emergency care is for oral ulceration with severe dehydration

ANTIMICROBIALS IN CHILDREN FOR DENTAL INFECTIONS¹³

Dental infections in children can be managed by amoxicillin, phenoxymethylpenicillin or metronidazole. Amoxicillin is administered as a sugar free oral suspension (125 mg / 5 ml or 250 mg / 5 ml) or capsule (250 mg). The age dependent dose can be given three times a day. The dose for 6 – 11 months is 125 mg, 1 – 4 years is 250 mg, 5 – 11 years is 500 mg and 12 – 17 years is 500 mg. The dose of amoxicillin for severe dental infections in children from 6 months to 11 years the may be increased up to 30 mg / kg (max 1 g) for 3 times a day. For severe infection in children between 12 and 17 years the dose of amoxicillin maybe doubled. Phenoxymethylpenicillin is available as a sugar free oral solution (125 mg / 5 ml or 250 mg / 5 ml) or tablets (250 mg). The age dependent dose can be given up to 4 times a day. The dose for 6 – 11 months is 62.5 mg, 1 – 5 years is 125 mg, 6 – 11 years is 250 mg and 12 – 17 years is 500 mg. For severe infections in children up to 11 years the dose of phenoxymethylpenicillin can be increased up to 12.5 gm / kg for four times a day. For severe infections in children aged 12 – 17 years the dose maybe increased up to 1 g for four times a day. Metronidazole is available as an oral suspension (200 mg / 5 ml) or a tablet (200 mg).

The dose dependent medicine can be administered up to three times a day unless indicated otherwise. The dose for 1 – 2 years is 50 mg, 7 – 9 years is 100 mg and 10 – 17 years is 200 mg. The dose for 3 – 6 years is 100 mg given twice a day as opposed to thrice a day.

ANALGESIC DOSES FOR CHILDREN WITH DENTAL INFECTIONS¹³

Dental pain is managed in children by paracetamol suspension (120 mg / 5 ml or 250 mg / 5 ml) or tablet (500 mg). The age dependent dose can be given up to four times a day. The dose recommended for 6 – 12 month old is 120 mg, 2 – 3 years is 180 mg, 4 – 5 years is 240 mg, 6 – 7 years is 240 – 250 mg, 8 – 9 years is 360 – 375 mg, 10 – 11 years is 480 – 500 mg, 12 – 15 years in 480 – 750 mg and 16 – 17 years is 500 mg – 1 g. The alternative drug is Ibuprofen sugar free suspension (100 mg / 5 ml) or tablet (200 mg). This age dependent drug is given up to three times a day. The recommended dose for 1 – 3 years is 100 mg, 4 – 6 years is 150 mg, 7 – 9 years is 200 mg and 10 – 11 years is 300 mg. The doses for 6 – 11 months is 50 mg and 12 – 17 years is 300 – 400 mg both of which are given four times a day as opposed to three. Combination of paracetamol and ibuprofen is not recommended without the advice of a medical practitioner.

SPECIAL CARE DENTISTRY¹³

In special care dentistry basic advice and dental intervention have a high impact on pain management and clinical outcomes. During the pandemic triaging, ranking, conceding and making challenging choices have become a daily actuality. Telecommunication can enhance communication and provide psychological counseling and advice for special needs patients however phobia, learning disabilities and attention deficit

hyperactivity disorder (ADHD) do not tolerate any form of local anaesthesia require sedation and general anaesthesia which is currently suspended. They can benefit from alternative techniques (gradual exposure, behavioral management, hypnotherapy, professional cognitive behavioral therapy (CBT), desensitization methods, virtual goggles for distraction) in a more adjustable dental service. There is a need to balance and weight the clinical decisions and review service capacity and patient's safety regularly.

Work Station of the Operator Should Consider Using Following Things^{14,15}

- Use of tele-dentistry wherever necessary,
- History recording through telephonic conversation like travel history etc.
- Maintaining social distancing among the family members
- By scheduling the appointments to reduce the risk of transmission
- Utilizing portable high-efficiency particulate air (HEPA) filters of appropriate placement and filtration rate.

Recommendations to the Indian Government

Since small business are affected during COVID-19 pandemic, Indian government can consider the assistance by giving: 1) disaster loans, 2) COVID protection loans, and 3) employee tax rebate. 4) lease abatement

CONCLUSIONS

Every child reporting to dentists can be considered as a suspected case of COVID-19. Preventive measures should be taken while performing aerosol generating procedures and they should be done only if required. Paediatric dentists should stick to the OSHA and CDC regulations and follow them strictly.

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Disclosure forms provided by the authors are available with the full text of this article at jemds.com.

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